Southern Minnesota Beet Sugar Cooperative

2000 Annual Research Report

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ACKNOWLEDGEMENTS

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- Cargill
- Helena

2001 BEET SEED ORDERS

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Seed Size	% of our Market
Non-pelleted	0.8
Mini pellets	5.8
Regular pellets	40.7
Jumbo pellets	34.0
Pro 200	18.7

Tachigaren	% of our Order
45 gram	62.7
75 gram	4.6
Total	**67.3**

Top Ten Varieties

Beta 4811 R
Beta 3945
Beta 6904
Beta 6863
Beta 4930 R
Beta 5815
Crystal 309
Hilleshog 7057
VDH 46109
Hilleshog 7073

Rhizomania Resistant Seed

40% of the seed order was rhizomania resistant varieties.

Table 1. Mean of Three Year Performance Summary of 2001 SMBSC Approved Varieties, 1998-2000.

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Entry		Rec/T (lbs)		Rec/A (lbs)		Loss to Mol.		Yield (T/A)		Sugar %		CLS		Emergence (%)		Tare (%)	
		3 yr avg	*% of Mean*	*3 yr avg*	*% of Mean*	*3 yr avg*	*% of Mean*	*3 yr avg*	*% of Mean*	*3 yr avg*	*% of Mean*	*3 yr avg*	*% of Mean*	*3 yr avg*	*% of Mean*	*3 yr avg*	*% of Mean*
ACH 309		278.83	96.77	6427.79	97.93	1.22	106.75	23.00	101.49	15.16	97.50	3.99	97.35	56.88	108.88	2.94	91.43
Beta 2200 blend		287.39	99.75	6991.04	106.52	1.15	100.43	24.12	106.42	15.52	99.78	4.63	113.06	50.08	95.85	2.98	92.48
Beta 3820		289.41	100.45	6925.46	105.52	1.15	100.44	23.72	104.65	15.62	100.43	4.53	110.62	44.21	84.62	2.51	77.91
Beta 3945		299.47	103.94	6588.40	100.38	1.14	99.19	21.89	96.56	16.11	103.58	4.27	104.19	45.15	86.43	3.12	96.91
Beta 5296		286.73	99.52	6126.70	93.35	1.18	102.68	21.34	94.13	15.51	99.75	3.48	85.06	49.53	94.80	3.76	116.90
Beta 6863		292.66	101.58	6369.24	97.04	1.11	96.57	21.63	95.44	15.74	101.23	4.49	109.56	50.35	96.38	3.27	101.68
Beta 6904		292.62	101.56	6357.83	96.87	1.16	101.52	21.57	95.16	15.79	101.55	4.67	113.96	55.95	107.09	3.58	111.31
Beta 5815 SC		293.88	102.00	7027.50	107.07	1.10	96.37	23.90	105.45	15.80	101.60	3.76	91.90	53.15	101.74	3.01	93.53
Hilleshog RH5		286.94	99.59	6303.85	96.05	1.10	96.03	21.85	96.39	15.45	99.36	3.56	87.01			3.06	95.05
HM 7057		284.52	98.75	6187.71	94.28	1.12	97.73	21.61	95.35	15.35	98.68	3.89	94.99	53.90	103.18	3.65	113.48
HM Hector		282.90	98.19	6228.69	94.90	1.18	102.97	21.80	96.19	15.32	98.53	4.60	112.41	61.50	117.72	3.14	97.53
Holly Hybrid LM1000		285.91	99.23	6888.62	104.96	1.14	99.77	23.91	105.50	15.44	99.28	3.71	90.68			3.43	106.54
Van der Have H46109		284.31	98.68	6900.57	105.14	1.14	99.54	24.31	107.25	15.36	98.75	3.65	89.21	53.99	103.33	3.39	105.26
Mean		**288.12**	***100.00***	**6563.34**	***100.00***	**1.15**	***100.00***	**22.67**	***100.00***	**15.55**	***100.00***	**4.10**	***100.00***	**52.24**	***100.00***	**3.22**	***100.00***
Approved for last year of sale																	
HM Resist		276.34	95.91	6144.95	93.63	1.17	102.10	22.09	97.46	14.98	96.32	276.34	6748.02	60.20	115.23	3.23	100.33
Seedex SX Laser		275.17	95.51	5937.42	90.46	1.20	104.71	21.59	95.25	14.95	96.12	275.17	6719.45	56.32	107.80	3.35	104.06
SPECIALTY																	
ACH 9744	APH Specialty	275.26	95.54	5885.81	89.68	1.16	101.22	21.25	93.75	14.93	96.00	4.07	99.39	58.75	112.45	3.80	118.04
Beta 4811R	RZM & APH	279.51	97.01	6725.75	102.47	1.15	100.35	23.96	105.71	15.13	97.28	4.43	108.18	56.66	108.45	3.05	94.74
Hilleshog 7083	RZM Specialty	269.20	93.43	6225.22	94.85	1.25	109.08	23.06	101.74	14.71	94.58	4.63	113.06		0.00	2.86	88.84
HM 7073	RZM Specialty	275.98	95.79	5944.89	90.58	1.23	107.33	21.40	94.41	15.02	96.57	4.66	113.79	54.05	103.46	2.93	91.01
Van der Have H68108	APH Specialty	266.11	92.36	6505.98	99.13	1.29	112.57	24.35	107.43	14.59	93.81	3.57	87.18	54.12	103.59	2.91	90.39

Table 2. Mean of Two Year Performance Summary of 2001 SMBSC Approved Varieties, 1999 - 2000

Entry		Rec/T (lbs)		Rec/A (lbs)		Loss to Mol.		Yield (T/A)		Sugar %		CLS		Emergence (%)		Tare (%)	
		2 yr avg	% of *Mean*	*2 yr avg*	% of *Mean*	*2 yr avg*	% of *Mean*	*2 yr avg*	% of *Mean*	*2 yr avg*	% of *Mean*	*2 yr avg*	% of *Mean*	*2 yr avg*	% of *Mean*	*2 yr avg*	% of *Mean*
2001 APPROVED VARIETIES																	
ACH 309		282.14	96.48	6667.59	97.74	1.23	105.69	23.62	101.68	15.33	97.15	4.01	98.00	54.25	102.68	3.20	95.00
Beta 2200 blend		293.02	100.20	7487.97	109.76	1.18	101.38	25.41	109.36	15.83	100.28	4.61	112.68	50.08	94.77	3.42	101.38
Beta 3820		296.36	101.34	7290.11	106.86	1.17	100.52	24.40	105.01	15.98	101.27	4.48	109.62	44.21	83.67	2.56	76.00
Beta 3945		306.13	104.68	7058.40	103.46	1.14	97.93	22.95	98.79	16.44	104.18	4.19	102.40	49.23	93.17	3.13	92.77
Beta 5296		289.77	99.09	6108.03	89.53	1.17	100.95	21.04	90.55	15.66	99.21	3.47	84.90	56.62	107.15	3.84	113.85
Beta 6863		297.84	101.85	6668.34	97.75	1.13	97.06	22.28	95.89	16.02	101.52	4.45	108.88	45.18	85.50	3.42	101.38
Beta 6904		299.23	102.32	6792.30	99.56	1.14	98.36	22.59	97.22	16.10	102.03	4.69	114.76	52.05	98.51	3.48	103.16
Beta 5815 SC		292.29	99.95	6956.80	101.98	1.14	98.50	23.80	102.46	15.76	99.86	3.77	92.25	53.15	100.60	2.95	87.48
Hilleshog RH5		289.32	98.94	6525.62	95.65	1.14	98.43	22.41	96.46	15.61	98.92	3.53	86.25	60.34	114.19	3.35	99.57
HM 7057		289.73	99.07	6527.87	95.69	1.15	99.22	22.41	96.45	15.64	99.08	3.88	94.81	56.42	106.78	3.82	113.40
HM Hector		290.84	99.45	6688.49	98.04	1.17	100.95	22.80	98.13	15.72	99.59	4.56	111.58	58.54	110.80	3.18	94.40
Holly Hybrid LM1000		289.24	98.91	6949.04	101.86	1.16	99.65	23.85	102.65	15.62	98.95	3.83	93.71			3.84	113.85
Van der Have H46109		285.74	97.71	6966.09	102.11	1.18	101.38	24.48	105.36	15.46	97.97	3.69	90.17	53.99	102.17	3.63	107.76
MEAN		**292.43**	**100.00**	**6822.05**	**100.00**	**1.16**	**100.00**	**23.23**	**100.00**	**15.78**	**100.00**	**4.09**	**100.00**	**52.84**	**100.00**	**3.37**	**100.00**
2 YEAR TEST MARKET VARIETIES																	
ACH 952	APH Spec.	299.22	102.32	7344.34	107.66	1.17	100.61	24.45	105.24	16.13	102.21	4.59	112.19	45.26	85.66	3.03	89.99
SPECIALTY																	
ACH 9744	APH Specialty	277.81	95.00	6156.79	90.25	1.19	102.67	22.03	94.83	15.08	95.56	4.04	98.85	59.24	112.12	4.28	127.06
Beta 4811R	RZM & APH	279.25	95.49	6610.63	96.90	1.19	102.67	23.56	101.42	15.16	96.07	4.35	106.44	56.66	107.24	3.38	100.34
Beta 4930	RZM & APH	286.30	97.90	6670.23	97.77	1.17	100.95	23.19	99.80	15.49	98.13	4.14	101.18	51.33	97.14	3.87	114.89
Hilleshog 7083	RZM Specialty	277.72	94.97	6645.24	97.41	1.22	105.26	23.98	103.23	15.11	95.75	4.61	112.80	59.92	113.41	2.94	87.28
HM 7073	RZM Specialty	281.15	96.14	6106.93	89.52	1.23	106.12	21.57	92.85	15.28	96.83	4.67	114.27	54.05	102.30	3.19	94.70
Van der Have H68108	APH Specialty	267.21	91.37	6528.50	95.70	1.28	110.44	24.32	104.69	14.64	92.77	3.54	86.62	54.12	102.43	3.12	92.62

Table 3. Mean of One Year Performance Summary of 2001 SMBSC Approved Varieties, 2000.

Entry		Rec/T (lbs)		Rec/A (lbs)		Loss to Mol.		Yield (T/A)		Sugar %		CLS		Emergence (%)		Tare (%)	
		2000	% of *Mean*	*2000*	% of *Mean*	*2000*	% of *Mean*	*2000*	% of *Mean*	*2000*	% of *Mean*	*2000*	% of *Mean*	*2000*	% of *Mean*	*2000*	% of *Mean*
2001 APPROVED VARIETIES																	
ACH 309		283.07	96.91	6993.92	98.91	1.21	102.53	24.66	102.75	15.36	97.31	3.96	97.56	54.44	96.39	2.39	81.93
Beta 2200 blend		292.64	100.18	7756.86	109.70	1.18	99.99	26.24	109.33	15.81	100.16	4.34	106.92	52.97	93.79	2.96	101.47
Beta 3820		298.62	102.23	7543.75	106.68	1.16	98.30	24.88	103.67	16.09	101.94	4.40	108.39	46.24	81.87	1.92	65.82
Beta 3945		304.17	104.13	7403.30	104.70	1.14	96.60	24.13	100.54	16.35	103.58	4.47	110.12	51.67	91.49	2.64	90.50
Beta 5296		287.06	98.27	6081.30	86.00	1.19	100.84	21.08	87.83	15.54	98.45	3.37	83.02	57.83	102.40	3.79	129.92
Beta 6863		293.37	100.43	7235.88	102.33	1.17	99.14	24.37	101.54	15.84	100.35	4.48	110.37	51.28	90.79	2.47	84.67
Beta 6904		299.07	102.38	7093.21	100.31	1.16	98.30	23.49	97.88	16.11	102.06	4.68	115.29	55.27	97.86	2.94	100.78
Beta 4815 SC		289.18	99.00	7362.40	104.12	1.18	100.12	25.39	105.78	15.65	99.13	3.79	93.37	53.15	94.11	2.73	93.70
Hilleshog RH5		291.00	99.62	6751.56	95.48	1.19	100.84	22.86	95.25	15.74	99.72	3.23	79.57	60.34	106.83	2.87	98.38
HM 7057		293.14	100.35	6895.97	97.52	1.18	99.99	23.32	97.17	15.83	100.29	3.89	95.83	63.05	111.64	3.18	109.01
HM Hector		293.94	100.63	7141.38	100.99	1.17	99.14	23.95	99.79	15.87	100.54	4.71	116.03	62.10	109.96	2.57	88.10
Holly Hybrid LM1000		290.68	99.51	6817.85	96.42	1.19	100.84	23.11	96.29	15.72	99.59	3.78	93.12	65.16	115.38	3.67	125.81
Van der Have H46109		281.48	96.36	6849.00	96.86	1.22	103.38	24.52	102.17	15.29	96.87	3.67	90.41	60.71	107.50	3.79	129.92
Mean		**292.11**	**100.00**	**7071.26**	**100.00**	**1.18**	**100.00**	**24.00**	**100.00**	**15.78**	**100.00**	**4.06**	**100.00**	**56.48**	**100.00**	**2.92**	
TEST MARKET VARIETIES																	
ACH 952	APH Spec.	295.99	101.33	7331.83	103.68	1.17	99.14	24.56	102.33	15.97	101.18	4.37	107.66	45.26	80.14	3.07	105.24
Beta 4600R	RZM & APH	301.56	103.24	7383.14	104.41	1.15	97.45	24.30	101.25	16.22	102.76	4.79	118.00	52.59	93.12	2.30	78.84
SPECIALTY																	
ACH 9744	APH Specialty	281.69	96.43	6218.61	87.94	1.21	102.53	21.89	91.21	15.30	96.93	4.09	100.76	55.24	97.81	3.61	123.75
Beta 4811R	RZM & APH	278.44	95.32	6857.56	96.98	1.23	104.23	24.39	101.63	15.15	95.98	3.96	97.56	56.30	99.69	2.45	83.98
Beta 4930	RZM & APH	290.19	99.34	6918.53	97.84	1.18	99.99	23.63	98.46	15.69	99.40	3.86	95.09	49.90	88.36	3.62	124.09
Hilleshog 7083	RZM Specialty	275.11	94.18	6962.74	98.47	1.23	104.23	25.32	105.50	14.99	94.97	4.69	115.54	59.92	106.10	2.29	78.50
HM 7073	RZM Specialty	285.98	97.90	6413.67	90.70	1.20	101.68	22.14	92.25	15.50	98.20	4.50	110.86	55.11	97.58	2.06	70.62
Van der Have H68108	APH Specialty	265.00	90.72	6434.80	91.00	1.26	106.77	24.10	100.42	14.51	91.93	3.34	82.28	56.99	100.91	2.16	74.04

Table 4. Mean of One Year Performance Summary of 2001 SMBSC Approved Varieties on Diseased Ground, 2000.

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REVISED

Entry		Rec/T (lbs) 2000 Mean	Rec/T (lbs) % of Mean	Rec/A (lbs) 2000 Mean	Rec/A (lbs) % of Mean	Loss to Mol. 2000 Mean	Loss to Mol. % of Mean	Yield (T/A) 2000 Mean	Yield (T/A) % of Mean	Sugar % 2000 Mean	Sugar % % of Mean	Emergence 2000 Mean	Emergence % of Mean	Tare % 2000 Mean	Tare % % of Mean
Beta 2200 blend		293.98	99.98	6891.28	115.84	1.17	100.15	23.80	115.98	15.87	100.00	46.77	101.06	2.97	97.13
Beta 3820		304.56	103.58	6898.03	115.96	1.13	96.73	22.82	111.20	16.36	103.08	41.83	90.38	1.98	64.75
Beta 3945		310.83	105.71	6649.91	111.78	1.11	95.01	21.57	105.11	16.65	104.91	44.10	95.30	3.00	98.11
Beta 5296		290.38	98.76	5679.81	95.48	1.18	101.01	19.84	96.68	15.70	98.92	51.67	111.65	3.65	119.37
Beta 6863		303.12	103.09	6847.72	115.11	1.13	96.73	23.06	112.37	16.29	102.64	41.99	90.74	3.01	98.44
Beta 6904		304.57	103.58	5643.89	94.87	1.13	96.73	18.65	90.88	16.36	103.08	45.09	97.43	3.63	118.72
Beta 5815 SC		293.40	99.78	5728.58	96.30	1.17	99.92	20.04	97.64	15.85	99.87	50.88	109.95	2.26	73.91
Crystal 309		283.97	96.58	5527.96	92.92	1.20	102.72	19.81	96.53	15.40	97.03	43.20	93.34	3.46	113.16
Hilleshog RH5		273.30	92.95	5117.70	86.03	1.25	107.00	18.88	92.00	14.91	93.95	50.05	108.16	2.81	91.90
Hilleshog 7057		280.15	95.28	4435.81	74.57	1.22	104.43	16.01	78.02	15.23	95.96	42.37	91.55	3.13	102.36
Hilleshog Hector		293.26	99.74	5142.27	86.44	1.17	100.15	17.86	87.03	15.83	99.74	50.38	108.87	3.28	107.27
Holly Hybrid LM1000		299.04	101.70	6579.23	110.60	1.15	98.44	22.49	109.59	16.10	101.44	48.23	104.22	3.59	117.41
Vanderhave H46109		291.84	99.25	6192.96	104.10	1.18	101.01	21.95	106.96	15.77	99.37	45.06	97.37	2.98	97.46
Mean		**294.03**	**100.00**	**5948.86**	**100.00**	**1.17**	**100.00**	**20.52**	**100.00**	**15.87**	**100.00**	**46.28**	**100.00**	**3.06**	**100.00**
Approved for last year of sale															
Hilleshog Resist		276.06	93.89	4805.36	80.78	1.24	106.14	17.69	86.20	15.04	94.77	48.97	105.82	3.03	99.09
Seedex Laser		270.61	92.03	4421.92	74.33	1.25	107.00	16.44	80.11	14.78	93.13	44.73	96.65	3.63	118.72
Test Market															
Crystal 952	APH Spec.	294.35	100.11	5832.14	98.04	1.17	100.15	20.34	99.12	15.89	100.12	42.14	91.06	2.84	92.88
Beta 4600R	RZM & APH	311.59	105.97	7114.22	119.59	1.11	95.01	23.01	112.13	16.69	105.16	46.33	100.12	2.04	66.72
Special Varieties															
Crystal 9744	APH Spec.	278.33	94.66	4208.28	70.74	1.22	104.43	15.32	74.65	15.14	95.40	38.61	83.43	3.57	116.75
Beta 4811R	RZM & APH	310.15	105.48	9656.78	162.33	1.11	95.01	31.24	152.23	16.62	104.72	43.28	93.51	1.71	55.92
Beta 4930	RZM & APH	307.43	104.56	7436.36	125.00	1.12	95.87	24.61	119.92	16.49	103.90	45.97	99.34	2.09	68.35
Hilleshog 7073	RZM Spec.	297.84	101.30	7597.05	127.71	1.15	98.44	25.84	125.92	16.05	101.13	49.09	106.07	1.81	59.19
Hilleshog 7083	RZM Spec.	302.97	103.04	7825.07	131.54	1.14	97.58	26.07	127.04	16.28	102.58	46.38	100.21	1.92	62.79
Vanderhave H68108	Aph Spec.	287.51	97.78	6712.90	112.84	1.19	101.86	23.70	115.49	15.57	98.11	42.50	91.84	2.63	86.01

2000 Aphanomyces Readings for Coded Test Entries
Betaseed Nursery - Shakopee, MN

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2000 Ratings

Code	Description	Foliar 1* Rating	Foliar 1* % App+	Root Index** Rating	Root Index** % App+	2 Yr Mean Foliar1*	2 Yr Mean %App+	2 Yr Mean Rt.Indx**	2 Yr Mean %App+	1999 Foliar1*	1999 Rt.Indx**	1998 Foliar1*	1998 Rt.Indx**
637	Beta 2200(M703 Blend Aph Spec)	3.50	127	5.00	104	2.67	110.3	5.92	93.7	1.83	6.83	4.30	5.40
548	Beta 3820(M701 Aph Spec)	2.83	103	4.60	95	2.38	98.3	5.68	89.9	1.92	6.75	3.70	4.40
623	Beta 3945 (Aph Spec)	2.33	85	4.50	93	2.38	98.3	5.88	93.1	2.42	7.25		
531	Beta 4811R(M811 Aph&Rzm Spec)	2.33	85	3.50	72	2.04	84.4	5.09	80.6	1.75	6.67	3.80	4.00
613	Beta 5296 (Aph Spec)	3.33	121	5.50	114	2.75	113.8	6.42	101.7	2.17	7.33	4.20	4.90
635	Beta 6863 (Aph Spec)	4.00	145	5.50	114	3.34	138.0	6.42	101.7	2.67	7.33		
554	Beta 6904(Aph Spec)	3.17	115	4.50	93	2.80	115.6	5.88	93.1	2.42	7.25	3.90	6.10
593	Beta BX0960(Rzm&Aph Spec)	2.33	85	4.00	83								
597	Beta M815(Aph)	3.17	115	4.67	97	2.80	115.6	5.84	92.5	2.42	7.00	4.20	4.60
616	Beta M930 (Rzm & Aph Spec)	3.00	109	4.00	83	2.59	107.0	5.38	85.2	2.17	6.75		
636	Crystal 309 (Aph Spec)	2.67	97	4.50	93	2.34	96.6	5.79	91.8	2.00	7.08	3.50	5.30
583	Crystal 952(Aph Spec)	2.50	91	4.50	93	2.17	89.6	5.50	87.2	1.83	6.50		
590	Crystal 9744(Aph Spec)	2.00	73	4.17	86	1.75	72.4	5.34	84.5	1.50	6.50	3.30	3.80
629	Hilleshog 7057 (Aph Spec)	3.50	127	5.00	104	3.00	124.1	6.09	96.4	2.50	7.17	4.00	5.30
617	Hilleshog 7073Rz (Rzm)	3.33	121	5.00	104	3.08	127.4	6.25	99.0	2.83	7.50		
630	Hilleshog 7083Rz (Rzm)	3.33	121	5.17	107	3.25	134.5	6.34	100.4	3.17	7.50		
619	Hilleshog Hector	3.50	127	4.83	100	3.25	134.5	6.21	98.3	3.00	7.58		
549	Hilleshog Resist(Aph Spec)	2.17	79	4.50	93	1.92	79.4	5.84	92.5	1.67	7.17	4.00	5.50
620	Hilleshog RH5 (Rhizoc Spec)	3.17	115	4.67	97	2.75	113.8	5.88	93.1	2.33	7.08		
638	Holly LM1000 (98HX829 Aph & Rzm Spec)	2.67	97	4.83	100	2.34	96.6	5.96	94.4	2.00	7.08		
626	Van der Have H46109	2.83	103	4.50	93	2.42	99.9	5.67	89.8	2.00	6.83	3.60	4.70
561	Van der Have H68108(Aph Spec)	3.00	109	4.67	97	2.21	91.4	5.63	89.1	1.42	6.58	2.50	3.20
	Check Varieties												
639	Aph Res Check	2.83	103	4.50	93								
643	Aph Res Check	2.83	103	4.33	90								
642	RRV Mod Susc Check	4.83	175	6.33	131								
646	RRV Mod Susc Check	4.83	175	6.00	124								
640	USDA Res Check	3.67	133	4.83	100								
644	USDA Res Check	3.17	115	5.33	110								
641	Very Susc Check	6.67	242	7.83	162								
645	Very Susc Check	6.33	230	7.50	155								
	Approval Limit +	2.75	100	4.83	100	2.42	100.0	6.31	100.0	2.08	7.79	4.11	5.90
	Trial Mean	3.62	82	5.18	89								
	CV %	18.15		13.51									
	LSD .05	0.75	21	0.79	15								

* Lower numbers indicate better Aphanomyces resistance (1=Healthy, 9=Dead). Foliar rating from 8/7. Factors in plant stand and plant health.

** Lower number indicate better Aphanomyces resistance (1=High number of healthy plants, 9=Few survivors and severe damage). Root rating taken 10/3. Factors include number and condition of survivors.

+ Approval Limit effective in 2001 (110% of mean of Beta 6904, Crystal 205 and Hilleshog Resist).

2000 Cercospora Readings for Coded Test Entries
Betaseed Nursery - Shakopee, MN

Code	Description	Average Rating at Each Date *						All Data Adjusted to 5.5 Equivalent				
		7/287	8/2**	8/11	8/16	8/21	8/25	2000 Mean	2 Yr Mean	3 Yr Mean	1999 Mean	1998 Mean
897	Beta 2200(M703 Blend Aph Spec)	1.93	2.57	3.69	4.82	6.10	6.91	4.34	4.60	4.63	4.87	4.68
726	Beta 3820(M701 Aph Spec)	1.93	2.89	3.86	5.14	5.78	6.75	4.40	4.48	4.53	4.56	4.63
900	Beta 3945(Aph Spec)	1.93	2.73	3.86	5.14	6.10	7.07	4.47	4.19	4.27	3.90	4.43
817	Beta 4811R(M811 Aph & Rzm Spec)	1.93	2.57	3.37	4.50	5.47	5.95	3.96	4.35	4.43	4.73	4.59
902	Beta 5296(Aph Spec)	1.28	1.93	2.89	3.86	4.82	5.47	3.37	3.47	3.48	3.57	3.51
886	Beta 6863(Aph Spec)	1.61	2.65	4.02	5.30	6.27	7.07	4.48	4.45	4.49	4.42	4.56
730	Beta 6904(Aph Spec)	1.76	2.81	4.02	5.78	6.43	7.23	4.68	4.69	4.67	4.70	4.62
759	Beta BX0960(Rzm & Aph Spec)	1.93	2.89	4.17	5.62	6.58	7.55	4.79				
802	Beta M815(Aph)	1.76	2.65	3.06	4.34	5.30	5.62	3.79	3.77	3.76	3.75	3.75
876	Beta M930(Rzm & Aph Spec)	1.93	2.41	3.06	4.50	5.30	5.95	3.86	4.13		4.41	
879	Crystal 309(Aph Spec)	1.93	2.57	3.54	4.66	5.47	5.62	3.96	4.01	3.99	4.05	3.95
768	Crystal 952(Aph)	1.93	2.73	3.86	5.14	5.95	6.58	4.37	4.58		4.80	
746	Crystal 9744(Aph Spec)	1.93	2.65	3.37	4.66	5.47	6.43	4.09	4.04	4.07	3.99	4.12
877	Hilleshog 7057(Aph Spec)	1.76	2.81	3.37	4.17	5.30	5.95	3.89	3.88	3.89	3.86	3.92
812	Hilleshog 7073Rz(Rzm Spec)	1.93	2.89	3.86	5.14	6.10	7.07	4.50	4.67		4.83	
892	Hilleshog 7083Rz(Rzm Spec)	1.93	2.89	4.17	5.47	6.10	7.55	4.69	4.60	4.63	4.52	4.68
898	Hilleshog Hector	2.09	2.89	4.17	5.62	6.27	7.23	4.71	4.56	4.60	4.41	4.69
844	Hilleshog Resist(Aph Spec)	1.76	2.73	3.69	4.66	5.78	6.10	4.13	4.07	4.18	4.01	4.40
894	Hilleshog RH5(Rhizoc Spec)	1.61	2.17	2.25	3.21	4.66	5.47	3.23	3.52	3.56	3.82	3.64
880	Holly LM1000(98HX829 Aph & Rzm Spec)	1.76	2.41	3.06	4.50	5.30	5.62	3.78	3.83	3.71	3.88	3.48
874	Seedex Laser	1.76	2.41	3.54	4.66	5.47	5.78	3.93	3.88	3.93	3.82	4.05
878	Van der Have H46109	1.45	2.25	3.06	4.34	5.14	5.78	3.67	3.69	3.65	3.70	3.59
785	Van der Have H68108(Aph Spec)	1.28	2.17	2.73	4.02	4.50	5.30	3.34	3.54	3.57	3.74	3.63
909	Check1 CR Res	1.76	2.33	2.73	3.86	4.66	4.98	3.38				
910	Check2 Res Source	0.96	1.13	1.93	1.93	2.57	2.73	1.87				
911	Check3 Susceptible	1.93	2.97	4.98	6.91	7.23	8.51	5.43				
912	Check4 Mod Susc	1.93	2.89	4.34	5.95	6.58	7.71	4.90				
913	Check5 CR Res	1.76	2.33	2.57	3.69	4.98	4.98	3.38				
914	Check6 Res Source	0.96	1.28	1.61	2.09	2.41	2.73	1.85				
915	Check7 Susceptible	2.25	2.89	4.98	6.75	7.71	8.68	5.54				
916	Check8 Mod Susc	1.93	2.97	4.17	5.95	6.75	7.71	4.92				
	Trial Mean	1.93	2.82	4.14	5.49	6.23	7.11	4.62				
	CV	16%	10%	9%	8%	8%	9%	7%				
	LSD .05	0.35	0.31	0.58	0.58	0.64	0.62	0.35				

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

* Ratings adjusted to 5.5 equivalent.

**Average of ratings from 8/2 and 8/7.

Rhizomania Ratings for 2000 ACS Coded Entries (grown in infested soil).

Entry	Description	Top Weight (g) bi	Leaf Area (cm2) ci	Crown Weight (g) d	Root Weight (g) di	Diameter (cm) e	Disease Rating fj	ELISA (A405) gi	Aph. Dis. Rating h
661	Beta 4811R (Rzm Spec)	112.5	1968	63.4 abc	35.8	4.2 ab	2.3 z	0.06	2.3 abcd
659	Beta BX 0960 (Rzm & Aph Spec)	129.0	2098	29.8 d	21.9	2.5 dc	3.4 wx	0.29	0.9 de
658	Hilleshog 7073Rz (Rzm)	134.6	2114	51.6 bcd	37.5	3.1 abcd	3.3 wxy	0.26	3.1 ab
Chk 1	Susceptible Commercial Variety	161.4	2662	34.1 dc	29.9	2.3 d	3.3 wxy	0.19	1.4 cde
Chk 2	Susceptible Commercial Variety	170.6	2738	42.2 dc	41.3	2.7 bcd	3.4 wx	0.27	1.3 cde
Chk 3	Resistant Commercial Variety	128.8	2195	73.4 ab	45.3	4.0 abc	2.4 yz	0.10	2.0 bcd
Chk 4	Resistant Commercial Variety	142.9	2388	51.2 bcd	40.1	3.5 abcd	2.5 xyz	0.21	0.3 e

* Beets were infested with a soil and root mixture containing BNYVV-infested Polymyxa betae and Aphanomyces cochlioides at planting. Thinned to one per pot. Four infested replications/entry.

b Leaves were trimmed at the base of the petioles for determining top weight.

c Leaf area was determined using a Licor Li 3100 Area Meter.

d Beets were cut crosswise at the intersection of root and crown before weighing.

e Diameter was measured across the cut surface at the intersection of root and crown.

f Beets were assigned desease ratings on a scale of 1-4, (1 = medium to large size, smooth, slightly constricted, lateral roots were light to medium brown; 4 = stunted, distorted, and sharply constricted with dark lateral roots).

g Absorbance values for beets tested by ELISA for BNYVV. Values greater than 0.1 were considered to be positive.

h Aphanomyces ratings on a 0-4 scale were made at the seedling stage (0 = no obvious symptoms, 4 = all plants within a pot were mostly or entirely dead).

I Means followed by no letters or the same letter within columns are not significantly different according to Duncan's multiple range test (P = 0.05).

j Means for disease ratings followed by the same letter are not significantly different according to Duncan's multiple range test (P = 0.10).

Rhizoctonia Ratings for 2000 SMBSC Coded Entries.

Description	DI[1]	% Healthy[2]	% 0 - 3[3]	Z%[4] Healthy	Z% 0 - 3[4]
Crystal RZ1010	3.3	5	54	8.45	47.51
Hilleshog RH5	3.5	8	50	10.60	45.33
Susceptible Check	5.4	0	12	0.00	17.64
Highly Resistant Check	2.7	23	78	22.70	65.24
Resistant Check	3.7	3	39	4.87	38.34
Experiment Mean	4.5	2	21	2.94	21.69
LSD (0.05)[5]	**0.80**			**13.15**	**16.90**

[1]Disease Index is based on a scale of 0 (= healthy) to 7 (= plant dead).

[2]Percent of healthy roots (disease classes 0 and 1 combined).

[3]Percent of diseased roots likely to be taken for processing (disease classes 0 through 3 combined).

[4]Percentages were transformed to arcsin-square roots to normalize the data for analyzes.

5601 Hector/Wehking
American Crystal Sugar - Technical Service Center
30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot

SMBSC Commercial (Non-Disease)
Coded Trial - Lattice

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Entry	Rec/T (lbs)			Rec/A (lbs)			Loss to Mol.			Yield (T/A)		
	Mean	%Test Mean	P-Val	Mean	%Test Mean	P-Val	Mean	%Test Mean	P-Val	Mean	%Test Mean	P-Val
Beta 2200 blend	267.1	101	0.54	6770.19	112	0.03	1.27	99	0.58	25.12	109	0.04
Beta 3820	277.6	105	0.02	6797.22	112	0.02	1.23	96	0.03	24.6	107	0.11
Beta 3945	291.1	111	0.00	7041.84	116	0.00	1.18	92	0.00	24.13	105	0.26
Beta 4811R	257.4	98	0.35	5700.71	94	0.25	1.3	102	0.24	22.32	97	0.49
Beta 5296	255.6	97	0.22	5415.11	89	0.04	1.3	102	0.27	21.05	91	0.05
Beta 6863	268.1	102	0.44	6156.29	102	0.77	1.27	99	0.52	22.68	99	0.74
Beta 6904	271.6	103	0.19	6067.27	100	0.99	1.25	98	0.21	22.32	97	0.49
Beta BX960	279.5	106	0.01	6550.94	108	0.12	1.22	96	0.01	23.39	102	0.70
Beta M930	263.3	100	1.00	6151.26	101	0.78	1.29	100	0.78	23.37	102	0.71
Blank 1 (Hilleshog 7057)	273	104	0.13	6255.87	103	0.54	1.26	98	0.24	23.07	100	0.95
Blank 2 (Vanderhave H46109)	257.4	98	0.35	5737.87	95	0.30	1.31	102	0.22	22.34	97	0.51
Blank 3 (Beta 6904)	275.2	105	0.06	6036.34	100	0.93	1.23	96	0.03	22.01	96	0.32
Crystal 309	259	98	0.50	6945.57	115	0.01	1.3	101	0.37	26.8	116	0.00
Crystal 952	271.3	103	0.21	6903.11	114	0.01	1.25	98	0.20	25.5	111	0.01
Crystal 9744	254.1	97	0.15	5570.21	92	0.12	1.32	103	0.10	21.81	95	0.23
Crystal 999	271.4	103	0.20	6793.7	112	0.02	1.25	98	0.14	24.87	108	0.06
Hilleshog 7057	275.3	105	0.06	6443.06	106	0.23	1.24	97	0.08	23.47	102	0.64
Hilleshog 7073	251.6	96	0.07	5238.49	86	0.01	1.32	103	0.04	20.87	91	0.03
Hilleshog 7083	250.8	95	0.05	6060.89	100	0.99	1.33	104	0.03	24.2	105	0.23
Hilleshog Hector	269.3	102	0.34	5828.99	96	0.45	1.26	99	0.43	21.68	94	0.19
Hilleshog Resist	261.5	99	0.78	6186.62	102	0.70	1.29	101	0.69	23.45	102	0.65
Hilleshog RH5	251.6	96	0.07	5516.15	91	0.08	1.32	103	0.04	21.93	95	0.28
Holly Hybrid 99HX975	225.4	86	0.00	4461.57	74	0.00	1.37	107	0.00	19.84	86	0.00
Holly Hybrid LM1000	263.9	100	0.92	6046.04	100	0.95	1.28	100	0.87	22.89	100	0.91
Seedex Laser	264.1	100	0.89	5925.5	98	0.66	1.28	100	0.87	22.51	98	0.62
Seedex SX1020	247.5	94	0.01	4870.33	80	0.00	1.33	104	0.02	19.54	85	0.00
Vanderhave H46109	256.4	97	0.27	6510.77	107	0.16	1.31	102	0.17	25.41	110	0.02
Vanderhave H46140	277.7	105	0.02	5954.28	98	0.72	1.23	96	0.03	21.43	93	0.12
Vanderhave H46177	278.7	106	0.02	6648.42	110	0.06	1.23	96	0.02	24.19	105	0.23
Vanderhave H68108	231.7	88	0.00	5374.1	89	0.03	1.36	106	0.00	23.35	102	0.73
Check Mean	**263.3**			**6065.29**			**1.28**			**23**		
Coeff. of Var. (%)	**4.57**			**10.12**			**3.2**			**8.37**		
F Value	**4.98****			**3.99****			**4.09****			**2.77****		
Mean LSD (0.05)	**17.96**	**7**		**892.08**	**15**		**0.06**	**5**		**2.84**	**12**	
Mean LSD (0.01)	**23.8**	**9**		**1182.07**	**19**		**0.08**	**6**		**3.77**	**16**	

5601 Hector/Wehking **(Continued)** **SMBSC Commercial (Non-Disease)**
American Crystal Sugar - Technical Service Center **Coded Trial - Lattice**
30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot

	Sugar %			Emergence 1			Emergence 2			Tare		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta 2200 blend	14.63	101	0.54	49.72	96	0.61	67.7	94	0.20	4.03	127	0.15
Beta 3820	15.12	105	0.02	45.42	88	0.12	56.3	78	0.00	2.1	66	0.07
Beta 3945	15.74	109	0.00	46.41	90	0.19	68.1	95	0.24	2.68	85	0.41
Beta 4811R	14.18	98	0.36	46.83	90	0.22	66.3	92	0.09	3.41	108	0.68
Beta 5296	14.08	98	0.22	54.54	105	0.51	73.3	102	0.65	4.72	149	0.01
Beta 6863	14.67	102	0.44	44.27	85	0.07	63.9	89	0.01	2.32	73	0.16
Beta 6904	14.83	103	0.19	57.31	111	0.18	70.8	99	0.76	2.72	86	0.45
Beta BX960	15.2	105	0.01	42.98	83	0.03	73.6	102	0.58	2.7	85	0.44
Beta M930	14.45	100	0.98	52.12	101	0.94	66	92	0.07	2.38	75	0.19
Blank 1 (Hilleshog 7057)	14.9	103	0.12	50.79	98	0.80	77.8	108	0.06	4.42	140	0.03
Blank 2 (Vanderhave H46109)	14.18	98	0.36	63.91	123	0.00	84.4	117	0.00	5.08	161	0.00
Blank 3 (Beta 6904)	15	104	0.06	50.88	98	0.82	69.4	97	0.45	1.95	62	0.04
Crystal 309	14.25	99	0.51	52.68	102	0.84	75.7	105	0.23	2.52	80	0.28
Crystal 952	14.81	103	0.21	39.73	77	0.00	63.6	88	0.01	2.45	77	0.23
Crystal 9744	14.02	97	0.15	42.6	82	0.03	78.5	109	0.04	4.31	136	0.05
Crystal 999	14.82	103	0.20	47.11	91	0.25	66.3	92	0.09	2.69	85	0.42
Hilleshog 7057	15.01	104	0.06	66.58	128	0.00	78.5	109	0.04	2.55	81	0.30
Hilleshog 7073	13.91	96	0.07	57.22	110	0.19	74.7	104	0.37	3.31	105	0.80
Hilleshog 7083	13.86	96	0.05	56.83	110	0.22	76	106	0.19	2.53	80	0.28
Hilleshog Hector	14.73	102	0.34	66.12	128	0.00	79.5	111	0.02	2.29	72	0.14
Hilleshog Resist	14.36	99	0.79	50.5	97	0.75	79.5	111	0.02	2.81	89	0.55
Hilleshog RH5	13.9	96	0.07	58.19	112	0.12	78.8	110	0.03	3.06	97	0.87
Holly Hybrid 99HX975	12.64	87	0.00	35.88	69	0.00	61.1	85	0.00	1.81	57	0.02
Holly Hybrid LM1000	14.48	100	0.91	61.77	119	0.02	82.3	115	0.00	3.95	125	0.18
Seedex Laser	14.49	100	0.88	48	93	0.35	63.9	89	0.01	2.83	89	0.57
Seedex SX1020	13.71	95	0.01	34.05	66	0.00	53.5	74	0.00	2.65	84	0.39
Vanderhave H46109	14.13	98	0.28	59.85	115	0.05	77.4	108	0.08	4.51	143	0.02
Vanderhave H46140	15.12	105	0.02	54.57	105	0.50	71.9	100	0.98	4.85	153	0.01
Vanderhave H46177	15.16	105	0.02	67.89	131	0.00	81.9	114	0.00	4.59	145	0.02
Vanderhave H68108	12.94	90	0.00	50.08	97	0.67	74	103	0.50	2.68	85	0.41
Check Mean	**14.44**			**51.83**			**71.8**			**3.16**		
Coeff. of Var. (%)	**3.89**			**15.38**			**9**			**37.42**		
F Value	**5.05****			**4.13****			**5.83****			**2.59****		
Mean LSD (0.05)	**0.84**	**6**		**11.69**	**23**		**9.08**	**13**		**1.68**	**53**	
Mean LSD (0.01)	**1.11**	**8**		**15.49**	**30**		**12**	**17**		**2.23**	**70**	

* Significant at 5%. ** Significant at 1%. Ns Not significant.
Mean LSD is only appropriate for comparing entry means with each other when F value is significant.

2nd column for each trait is percent of check. General Mean used as check.
3rd column for trait is probability that detection of a diff. (from check mean) of this size due to chance.

5602 - Lake Lillian/Schmoll **SMBSC Commercial (Non-Disease)**
American Crystal Sugar - Techn.Service Center **Coded Trial - Lattice**
30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot

	Rec/T (lbs)			Rec/A (lbs)			Loss to Mol.			Yield (T/A)		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta 2200 blend	290	102	0.43	6041.54	103	0.62	1.19	98	0.49	21.08	102	0.74
Beta 3820	285	101	0.79	5874.02	101	0.93	1.2	99	0.84	20.59	100	0.97
Beta 3945	285	101	0.84	6060.97	104	0.59	1.2	100	0.88	21.29	103	0.62
Beta 4811R	272	96	0.19	6144.52	105	0.46	1.25	104	0.15	22.5	109	0.16
Beta 5296	297	105	0.11	5367.16	92	0.25	1.16	96	0.12	18.07	88	0.05
Beta 6863	284	100	0.92	6510.21	111	0.10	1.2	99	0.82	22.65	110	0.13
Beta 6904	290	102	0.43	6119.9	105	0.49	1.19	98	0.49	21.11	102	0.72
Beta BX960	299	106	0.06	6135.95	105	0.47	1.15	95	0.07	20.58	100	0.96
Beta M930	289	102	0.53	5520.11	95	0.43	1.19	98	0.57	19.16	93	0.26
Blank 1 (Hilleshog 7057)	287	101	0.69	5414.06	93	0.30	1.17	97	0.21	18.94	92	0.20
Blank 2 (Vanderhave H46109)	300	106	0.05	6194.43	106	0.39	1.14	94	0.03	20.82	101	0.89
Blank 3 (Beta 6904)	285	101	0.80	5860.34	100	0.96	1.2	99	0.80	20.32	98	0.81
Crystal 309	271	96	0.17	5697.8	98	0.73	1.25	104	0.17	20.82	101	0.89
Crystal 952	286	101	0.72	5912.34	101	0.86	1.2	99	0.82	20.84	101	0.88
Crystal 9744	274	97	0.27	4853.56	83	0.02	1.24	103	0.28	17.61	85	0.02
Crystal 999	265	94	0.04	6195.75	106	0.38	1.28	106	0.03	23.62	114	0.03
Hilleshog 7057	281	99	0.76	5208.18	89	0.12	1.22	101	0.67	18.49	90	0.10
Hilleshog 7073	285	101	0.82	5651.98	97	0.65	1.2	100	0.88	19.53	95	0.40
Hilleshog 7083	257	91	0.00	6636.69	114	0.05	1.3	107	0.01	26.06	126	0.00
Hilleshog Hector	286	101	0.78	6169.97	106	0.42	1.2	99	0.83	21.34	103	0.59
Hilleshog Resist	276	97	0.39	5020.07	86	0.05	1.23	102	0.48	18.1	88	0.06
Hilleshog RH5	292	103	0.33	5689.29	97	0.71	1.18	97	0.33	19.35	94	0.33
Holly Hybrid 99HX975	288	102	0.54	6643.62	114	0.05	1.19	99	0.63	23.34	113	0.04
Holly Hybrid LM1000	284	100	0.92	6354.05	109	0.21	1.21	100	0.97	21.7	105	0.42
Seedex Laser	279	98	0.58	4833.37	83	0.02	1.23	102	0.48	17.57	85	0.02
Seedex SX1020	277	98	0.49	5429.19	93	0.32	1.24	102	0.41	19.6	95	0.43
Vanderhave H46109	275	97	0.31	5746.53	98	0.82	1.24	103	0.31	21.29	103	0.62
Vanderhave H46140	294	104	0.19	5950.29	102	0.79	1.16	96	0.17	20.06	97	0.66
Vanderhave H46177	300	106	0.05	6444.07	110	0.14	1.15	95	0.07	21.46	104	0.53
Vanderhave H68108	263	93	0.02	5511.38	94	0.42	1.28	106	0.02	21.35	103	0.59
Check Mean	**283**			**5839.71**			**1.21**			**20.64**		
Coeff. of Var. (%)	**5.73**			**14.05**			**5.11**			**12.92**		
F Value	**1.57ns**			**1.42ns**			**1.56ns**			**2.00****		
Mean LSD (0.05)	**24.28**	**9**		**1162.99**	**20**		**0.09**	**8**		**3.75**	**18**	
Mean LSD (0.01)	**32.19**	**11**		**1541.15**	**26**		**0.12**	**10**		**4.96**	**24**	

5602 - Lake Lillian/Schmoll **(Continued) SMBSC Commercial (Non-Disease)**
American Crystal Sugar - Techn.Service Center **Coded Trial - Lattice**
30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot

	Sugar %			Emergence 1			Emergence 2			Tare		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta 2200 blend	15.68	102	0.43	42.35	96	0.69	65.3	94	0.17	3.03	98	0.94
Beta 3820	15.47	101	0.79	35.08	80	0.02	54.3	78	0.00	2.04	66	0.13
Beta 3945	15.45	101	0.83	35.75	81	0.04	67.9	97	0.58	3.81	123	0.30
Beta 4811R	14.86	97	0.20	54.15	123	0.01	69.1	99	0.87	1.29	42	0.01
Beta 5296	16	104	0.11	45.15	103	0.75	72.2	104	0.42	4.21	136	0.10
Beta 6863	15.4	100	0.93	44.8	102	0.82	63.8	92	0.07	3.43	111	0.62
Beta 6904	15.69	102	0.42	46.53	106	0.50	60.4	87	0.00	3.14	102	0.94
Beta BX960	16.12	105	0.06	42.7	97	0.75	68.8	99	0.78	1.75	57	0.05
Beta M930	15.62	102	0.53	30.93	70	0.00	67.2	97	0.44	5.93	192	0.00
Blank 1 (Hilleshog 7057)	15.5	101	0.74	45.13	103	0.75	77.9	112	0.01	2.6	84	0.48
Blank 2 (Vanderhave H46109)	16.14	105	0.05	56.25	128	0.00	79.2	114	0.00	3.92	127	0.22
Blank 3 (Beta 6904)	15.47	101	0.80	39.6	90	0.26	67.1	96	0.42	3.03	98	0.93
Crystal 309	14.82	96	0.17	49.65	113	0.14	65.8	94	0.23	1.71	55	0.05
Crystal 952	15.51	101	0.72	30.55	70	0.00	61.7	89	0.01	2.83	92	0.71
Crystal 9744	14.93	97	0.27	35.43	81	0.03	77.4	111	0.02	3.22	104	0.85
Crystal 999	14.55	95	0.04	49.65	113	0.14	66.2	95	0.27	3.2	104	0.87
Hilleshog 7057	15.25	99	0.77	39.6	90	0.26	76.6	110	0.03	4.72	153	0.02
Hilleshog 7073	15.46	101	0.82	37.83	86	0.12	71.8	103	0.50	1.76	57	0.05
Hilleshog 7083	14.17	92	0.00	46.55	106	0.49	74.8	107	0.10	2.13	69	0.16
Hilleshog Hector	15.48	101	0.77	39.58	90	0.26	79.5	114	0.00	2.81	91	0.69
Hilleshog Resist	15.02	98	0.38	33.33	76	0.01	78.3	112	0.01	3.23	105	0.83
Hilleshog RH5	15.76	103	0.33	45.83	104	0.62	73.6	106	0.21	2.32	75	0.26
Holly Hybrid 99HX975	15.61	102	0.53	30.55	70	0.00	50.9	73	0.00	1.76	57	0.05
Holly Hybrid LM1000	15.41	100	0.91	47.93	109	0.30	76.9	110	0.02	4.38	142	0.06
Seedex Laser	15.16	99	0.59	50	114	0.12	67.8	97	0.56	3.49	113	0.56
Seedex SX1020	15.1	98	0.50	39.93	91	0.30	55.6	80	0.00	3.04	99	0.95
Vanderhave H46109	14.97	97	0.31	52.08	119	0.04	75.7	109	0.06	3.21	104	0.86
Vanderhave H46140	15.88	103	0.19	56.6	129	0.00	76.4	110	0.03	5.04	163	0.01
Vanderhave H46177	16.14	105	0.05	61.43	140	0.00	76.9	110	0.02	3.27	106	0.79
Vanderhave H68108	14.42	94	0.02	52.4	119	0.03	70.3	101	0.85	2.33	75	0.27
Check Mean	**15.37**			**43.91**			**69.7**			**3.09**		
Coeff. of Var. (%)	**4.89**			**17.78**			**8.95**			**44.77**		
F Value	**1.57ns**			**4.46****			**5.68****			**2.36****		
Mean LSD (0.05)	**1.12**	**7**		**10.97**	**25**		**9.01**	**13**		**1.95**	**63**	
Mean LSD (0.01)	**1.49**	**10**		**14.54**	**33**		**11.9**	**17**		**2.59**	**84**	

* Significant at 5%. ** Significant at 1%. Ns Not significant.
Mean LSD is only appropriate for comparing entry means with each other when F value is significant.

2nd column for each trait is percent of check. General Mean used as check.
3rd column for trait is probability that detection of a diff. (from check mean) of this size due to chance.

5603 Clara City/Condon **SMBSC Commercial (Non-Disease)**
AMERICAN CRYSTAL SUGAR CO. - TECH. SERV. CENTER **Coded Trial - Lattice**
30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot

Entry	Rec/T (lbs)			Rec/A (lbs)			Loss to Mol.			Yield (T/A)		
	Mean	%Test Mean	P-Val	Mean	%Test Mean	P-Val	Mean	%Test Mean	P-Val	Mean	%Test Mean	P-Val
Beta 2200 blend	292.2	98	0.45	6008.87	108	0.19	1.17	102	0.47	20.61	111	0.07
Beta 3820	282.7	95	0.06	5715.2	103	0.62	1.2	105	0.10	20.52	111	0.09
Beta 3945	298.6	100	0.99	6079.71	110	0.13	1.15	100	0.96	20.27	109	0.13
Beta 4811R	291.8	98	0.42	5672.13	102	0.71	1.18	103	0.35	19.49	105	0.41
Beta 5296	291.5	98	0.40	4822.7	87	0.05	1.18	102	0.40	16.53	89	0.08
Beta 6863	301.4	101	0.75	5802.5	105	0.46	1.14	99	0.69	19.24	104	0.54
Beta 6904	307.4	103	0.31	5824.31	105	0.42	1.12	97	0.36	19	102	0.69
Beta BX960	292.7	98	0.48	6196.62	112	0.07	1.17	102	0.47	21.28	115	0.02
Beta M930	303.1	101	0.61	5949.39	107	0.25	1.13	98	0.52	19.67	106	0.32
Blank 1 (Hilleshog 7057)	307.2	103	0.33	5565.02	100	0.94	1.12	97	0.33	18.12	98	0.71
Blank 2 (Vanderhave H46109)	301.9	101	0.71	5766.96	104	0.52	1.14	99	0.68	19.17	103	0.58
Blank 3 (Beta 6904)	307.1	103	0.33	5625.52	102	0.81	1.12	97	0.29	18.33	99	0.86
Crystal 309	300.2	100	0.87	5971.07	108	0.23	1.15	100	0.89	19.92	107	0.23
Crystal 952	302.9	101	0.63	5738.86	104	0.57	1.14	99	0.65	18.92	102	0.74
Crystal 9744	285.8	96	0.13	4324.54	78	0.00	1.2	104	0.12	15.15	82	0.00
Crystal 999	311.2	104	0.15	6911.55	125	0.00	1.1	96	0.13	22.15	119	0.00
Hilleshog 7057	301.5	101	0.75	4804.65	87	0.04	1.14	99	0.82	15.89	86	0.02
Hilleshog 7073	287.3	96	0.19	4700.95	85	0.02	1.19	104	0.18	16.38	88	0.06
Hilleshog 7083	301.3	101	0.76	5199.18	94	0.34	1.14	99	0.76	17.32	93	0.29
Hilleshog Hector	305.6	102	0.42	6306.81	114	0.03	1.12	97	0.35	20.62	111	0.07
Hilleshog Resist	293.2	98	0.52	4907.96	89	0.08	1.17	102	0.51	16.73	90	0.12
Hilleshog RH5	294.6	99	0.63	5280.47	95	0.47	1.17	101	0.65	17.91	97	0.58
Holly Hybrid 99HX975	281.8	94	0.05	4483.51	81	0.00	1.22	106	0.04	15.87	86	0.02
Holly Hybrid LM1000	317.4	106	0.03	5575.55	101	0.92	1.08	94	0.03	17.56	95	0.39
Seedex Laser	296.1	99	0.76	4855.96	88	0.06	1.16	101	0.76	16.29	88	0.05
Seedex SX1020	278.4	93	0.02	4803.89	87	0.04	1.23	107	0.01	17.24	93	0.26
Vanderhave H46109	296.1	99	0.76	4951.09	89	0.10	1.16	101	0.80	16.69	90	0.11
Vanderhave H46140	323.4	108	0.00	5694.61	103	0.66	1.06	92	0.01	17.62	95	0.42
Vanderhave H46177	318.9	107	0.02	6343.06	115	0.03	1.08	94	0.03	19.85	107	0.25
Vanderhave H68108	288.2	96	0.22	6265.52	113	0.04	1.19	104	0.20	21.81	118	0.01
Check Mean	**298.7**			**5538.27**			**1.15**			**18.54**		
Coeff. of Var. (%)	**5.65**			**12.73**			**5.51**			**12.16**		
F Value	**1.56ns**			**3.05****			**1.59ns**			**2.68****		
Mean LSD (0.05)	**24.47**	**8**		**1014.64**	**18**		**0.09**	**8**		**3.26**	**18**	
Mean LSD (0.01)	**32.42**	**11**		**1344.5**	**24**		**0.12**	**11**		**4.31**	**23**	

5603 Clara City/Condon (Continued) **SMBSC Commercial (Non-Disease)**
AMERICAN CRYSTAL SUGAR CO. - TECH. SERV. CENTER **Coded Trial - Lattice**
30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot

	Sugar %			Emergence 1			Emergence 2			Tare		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta 2200 blend	15.78	98	0.44	28.47	112	0.59	47.6	85	0.04	2.25	84	0.44
Beta 3820	15.34	95	0.06	25.7	101	0.97	45.9	82	0.02	2.02	75	0.23
Beta 3945	16.08	100	0.99	22.9	90	0.64	49.7	88	0.12	2.5	93	0.74
Beta 4811R	15.77	98	0.43	24.3	95	0.83	51.8	92	0.30	1.63	61	0.06
Beta 5296	15.75	98	0.40	26.4	104	0.87	61.8	110	0.19	4.41	164	0.00
Beta 6863	16.21	101	0.76	26.02	102	0.92	55.2	98	0.82	3.32	124	0.25
Beta 6904	16.49	103	0.31	24.65	97	0.88	56.6	101	0.93	3.55	132	0.12
Beta BX960	15.81	98	0.48	27.07	106	0.77	59.4	106	0.45	3	112	0.57
Beta M930	16.29	101	0.61	30.57	120	0.36	49	87	0.09	2.56	95	0.82
Blank 1 (Hilleshog 7057)	16.48	102	0.33	25.32	99	0.98	58	103	0.67	2.86	106	0.75
Blank 2 (Vanderhave H46109)	16.23	101	0.71	24.65	97	0.88	64.6	115	0.05	2.34	87	0.53
Blank 3 (Beta 6904)	16.47	102	0.33	32.62	128	0.20	55.2	98	0.81	2.82	105	0.80
Crystal 309	16.15	100	0.86	30.92	121	0.32	60.7	108	0.29	2.52	94	0.77
Crystal 952	16.28	101	0.62	15.27	60	0.07	48.3	86	0.06	1.41	53	0.02
Crystal 9744	15.49	96	0.14	15.95	63	0.09	61.5	109	0.21	4.53	169	0.00
Crystal 999	16.66	104	0.15	32.95	129	0.18	49.7	88	0.12	2.65	99	0.95
Hilleshog 7057	16.22	101	0.74	21.17	83	0.43	66.3	118	0.02	2.7	101	0.98
Hilleshog 7073	15.56	97	0.19	20.15	79	0.33	60.8	108	0.28	2.18	81	0.36
Hilleshog 7083	16.21	101	0.76	22.57	89	0.60	59.4	106	0.46	2.76	103	0.90
Hilleshog Hector	16.4	102	0.43	19.1	75	0.25	60.8	108	0.28	1.7	63	0.08
Hilleshog Resist	15.83	98	0.52	23.95	94	0.78	68.1	121	0.01	2.48	92	0.71
Hilleshog RH5	15.9	99	0.63	30.55	120	0.36	58	103	0.67	2	74	0.21
Holly Hybrid 99HX975	15.31	95	0.05	18.75	74	0.22	48.6	87	0.08	2.08	77	0.27
Holly Hybrid LM1000	16.95	105	0.03	28.47	112	0.59	58	103	0.67	2.42	90	0.63
Seedex Laser	15.96	99	0.76	25.35	99	0.98	51	91	0.22	2.93	109	0.66
Seedex SX1020	15.15	94	0.02	11.8	46	0.01	41.7	74	0.00	2.66	99	0.97
Vanderhave H46109	15.96	99	0.76	29.52	116	0.46	58	103	0.67	2.64	98	0.94
Vanderhave H46140	17.23	107	0.00	32.62	128	0.20	53.1	95	0.47	4.02	150	0.02
Vanderhave H46177	17.02	106	0.02	39.25	154	0.01	69.5	124	0.00	2.78	104	0.86
Vanderhave H68108	15.6	97	0.22	27.4	108	0.73	58	103	0.67	2.8	104	0.83
Check Mean	**16.09**			**25.48**			**56.2**			**2.68**		
Coeff. of Var. (%)	**4.85**			**43.72**			**15.3**			**41.6**		
F Value	**1.56ns**			**1.12ns**			**2.54****			**1.69***		
Mean LSD (0.05)	**1.13**	**7**		**15.66**	**61**		**12.1**	**21**		**1.57**	**58**	
Mean LSD (0.01)	**1.5**	**9**		**20.75**	**81**		**16**	**28**		**2.08**	**77**	

* Significant at 5%. ** Significant at 1%. Ns Not significant.
Mean LSD is only appropriate for comparing entry means with each other when F value is significant.

2nd column for each trait is percent of check. General Mean used as check.
3rd column for trait is probability that detection of a diff. (from check mean) of this size due to chance.

5604 Montevideo/Payne
AMERICAN CRYSTAL SUGAR CO. - TECH. SERV. CENTER **SMBSC Commercial (Non-Disease)**
30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Rec/T (lbs)			Rec/A (lbs)			Loss to Mol.			Yield (T/A)		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta 2200 blend	321.6	101	0.78	10363.1	119	0.00	1.07	99	0.83	32.29	119	0.00
Beta 3820	333.2	104	0.09	9990.91	115	0.00	1.04	96	0.11	29.77	109	0.02
Beta 3945	337.6	106	0.03	9104.54	105	0.33	1.03	96	0.10	27	99	0.83
Beta 4811R	305.4	96	0.09	8771.36	101	0.85	1.13	105	0.07	28.76	106	0.17
Beta 5296	308.1	97	0.18	7417.48	85	0.00	1.11	103	0.19	24.15	89	0.01
Beta 6863	328.2	103	0.28	9002.31	104	0.47	1.04	97	0.17	27.4	101	0.89
Beta 6904	335.4	105	0.05	9124.14	105	0.31	1.04	96	0.11	27.13	100	0.92
Beta BX960	325.9	102	0.41	9466.67	109	0.07	1.07	99	0.60	28.91	106	0.14
Beta M930	318.6	100	0.94	9121.35	105	0.31	1.07	100	0.84	28.49	105	0.26
Blank 1 (Hilleshog 7057)	325.6	102	0.44	8201.39	94	0.25	1.05	98	0.32	25.25	93	0.08
Blank 2 (Vanderhave H46109)	333.7	105	0.08	8740.5	101	0.91	1.02	95	0.04	26.46	97	0.49
Blank 3 (Beta 6904)	328.4	103	0.27	8320.89	96	0.38	1.05	98	0.35	25.34	93	0.09
Crystal 309	318.7	100	0.95	8347.68	96	0.42	1.08	100	0.94	26.27	96	0.39
Crystal 952	330.9	104	0.16	9171.66	106	0.26	1.04	97	0.17	27.84	102	0.59
Crystal 9744	317.9	100	0.87	8169.48	94	0.22	1.08	100	0.91	25.76	95	0.19
Crystal 999	318.4	100	0.92	9631.68	111	0.03	1.07	99	0.84	30.32	111	0.01
Hilleshog 7057	322.2	101	0.72	9111.45	105	0.32	1.07	99	0.59	28.24	104	0.37
Hilleshog 7073	321	101	0.83	8350.64	96	0.42	1.07	99	0.67	25.96	95	0.25
Hilleshog 7083	317	99	0.78	8201.68	94	0.25	1.08	100	0.96	25.88	95	0.22
Hilleshog Hector	326.3	102	0.39	9441.33	109	0.08	1.05	97	0.23	28.72	105	0.18
Hilleshog Resist	303	95	0.05	8257.75	95	0.31	1.14	105	0.04	27.25	100	0.99
Hilleshog RH5	329.1	103	0.23	9056.16	104	0.39	1.06	98	0.43	27.45	101	0.85
Holly Hybrid 99HX975	295.1	92	0.00	7929.75	91	0.07	1.17	108	0.00	27.12	100	0.92
Holly Hybrid LM1000	322.1	101	0.72	8072.6	93	0.15	1.07	99	0.76	24.97	92	0.04
Seedex Laser	298.9	94	0.01	7689.2	88	0.02	1.16	107	0.01	25.95	95	0.25
Seedex SX1020	294.4	92	0.00	7323.59	84	0.00	1.16	108	0.00	24.83	91	0.03
Vanderhave H46109	313.8	98	0.51	8281.05	95	0.33	1.1	102	0.51	26.54	97	0.53
Vanderhave H46140	320.7	100	0.85	9015.72	104	0.45	1.06	99	0.57	28.08	103	0.45
Vanderhave H46177	324.5	102	0.52	8668.84	100	0.96	1.06	98	0.38	26.87	99	0.75
Vanderhave H68108	301.2	94	0.03	8431.44	97	0.54	1.14	106	0.03	28.08	103	0.45
Check Mean	**319.2**			**8692.55**			**1.08**			**27.24**		
Coeff. of Var. (%)	**4.95**			**9.74**			**4.8**			**8.19**		
F Value	**2.06****			**2.74****			**2.21****			**2.43****		
Mean LSD (0.05)	**23.34**	**7**		**1208.03**	**14**		**0.08**	**7**		**3.17**	**12**	
Mean LSD (0.01)	**30.94**	**10**		**1600.42**	**18**		**0.1**	**9**		**4.21**	**15**	

5604 Montevideo/Payne **(Continued)**

AMERICAN CRYSTAL SUGAR CO. - TECH. SERV. CENTER **SMBSC Commercial (Non-Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Sugar %			Emergence 1			Emergence 2			Tare		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta 2200 blend	17.15	101	0.77	31.27	96	0.84	61.5	96	0.45	1.85	78	0.37
Beta 3820	17.7	104	0.09	35.4	109	0.64	50.3	78	0.00	1.58	67	0.17
Beta 3945	17.92	105	0.02	30.55	94	0.75	61.8	96	0.51	1.52	64	0.15
Beta 4811R	16.4	96	0.10	43.07	132	0.09	57.3	89	0.06	2.79	118	0.47
Beta 5296	16.52	97	0.18	30.9	95	0.79	71.9	112	0.03	2.47	104	0.86
Beta 6863	17.45	102	0.29	27.42	84	0.41	63.2	98	0.78	1.73	73	0.27
Beta 6904	17.8	104	0.05	34.02	105	0.81	62.1	97	0.57	2.92	123	0.34
Beta BX960	17.36	102	0.40	29.52	91	0.63	58.7	91	0.13	2.56	108	0.75
Beta M930	17.01	100	0.93	23.97	74	0.17	57.6	90	0.07	2.58	109	0.72
Blank 1 (Hilleshog 7057)	17.33	102	0.45	30.22	93	0.71	70.5	110	0.08	2.52	107	0.79
Blank 2 (Vanderhave H46109)	17.7	104	0.09	37.15	114	0.45	68.1	106	0.28	3.67	155	0.03
Blank 3 (Beta 6904)	17.47	103	0.26	43.77	135	0.07	63.2	98	0.79	1.32	56	0.07
Crystal 309	17.01	100	0.95	27.05	83	0.38	56.6	88	0.04	2.78	117	0.48
Crystal 952	17.59	103	0.16	22.22	68	0.10	54.2	84	0.01	3.82	161	0.01
Crystal 9744	16.98	100	0.87	26.75	82	0.35	70.9	110	0.07	3.24	137	0.13
Crystal 999	16.99	100	0.90	30.55	94	0.75	59	92	0.16	1.49	63	0.13
Hilleshog 7057	17.17	101	0.73	42.35	130	0.11	74.3	116	0.01	2.22	94	0.80
Hilleshog 7073	17.12	100	0.84	26.4	81	0.32	63.5	99	0.86	1.11	47	0.03
Hilleshog 7083	16.93	99	0.77	28.47	88	0.51	76	118	0.00	2.05	86	0.58
Hilleshog Hector	17.36	102	0.40	38.52	118	0.33	69.5	108	0.15	2.91	123	0.35
Hilleshog Resist	16.28	96	0.05	34.4	106	0.76	67.7	105	0.33	2.48	105	0.85
Hilleshog RH5	17.51	103	0.22	34.02	105	0.81	72.9	114	0.02	3.28	138	0.12
Holly Hybrid 99HX975	15.92	93	0.00	19.07	59	0.03	52.8	82	0.00	2.02	85	0.55
Holly Hybrid LM1000	17.18	101	0.72	50.7	156	0.00	72.6	113	0.02	2.78	117	0.47
Seedex Laser	16.1	94	0.02	39.95	123	0.23	60.4	94	0.30	2.12	90	0.67
Seedex SX1020	15.89	93	0.00	19.07	59	0.03	49.3	77	0.00	1.84	78	0.36
Vanderhave H46109	16.79	99	0.51	26.37	81	0.32	71.9	112	0.03	3.81	161	0.01
Vanderhave H46140	17.1	100	0.87	36.8	113	0.49	70.5	110	0.08	2.78	117	0.47
Vanderhave H46177	17.28	101	0.53	44.12	136	0.06	74.3	116	0.01	1.53	65	0.15
Vanderhave H68108	16.2	95	0.03	31.25	96	0.84	62.9	98	0.71	1.29	55	0.06
Check Mean	**17.04**			**32.51**			**64.2**			**2.37**		
Coeff. of Var. (%)	**4.34**			**38.64**			**11.4**			**46.56**		
F Value	**2.04****			**1.48ns**			**4.33****			**1.65***		
Mean LSD (0.05)	**1.09**	**6**		**17.65**	**54**		**10.3**	**16**		**1.64**	**69**	
Mean LSD (0.01)	**1.45**	**8**		**23.39**	**72**		**13.6**	**21**		**2.18**	**92**	

* Significant at 5%. ** Significant at 1%. Ns Not significant.

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

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

3rd column for trait is probability that detection of a diff. (from check mean) of this size due to chance.

5605 REVISED DeGraff/Bosch
AMERICAN CRYSTAL SUGAR CO. – TECH. SERV. CENTER
30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot

SMBSC Commercial (Disease)
Coded Trial - Lattice

Click for Main Menu

Entry	Rec/T (lbs)			Rec/A (lbs)			Loss to Mol.			Yield (T/A)		
	Mean	%Test Mean	P-Val	Mean	%Test Mean	P-Val	Mean	%Test Mean	P-Val	Mean	%Test Mean	P-Val
Beta 2200 blend	285.4	97	0.28	4955.97	97	0.71	1.2	103	0.23	17.44	101	0.94
Beta 3820	289.9	99	0.65	5775.73	113	0.12	1.19	101	0.56	19.71	114	0.09
Beta 3945	300.3	102	0.32	5398.15	106	0.5	1.14	98	0.29	17.71	102	0.79
Beta 4811R	311.2	106	0.01	7870.31	154	0	1.1	94	0.01	25.37	146	0
Beta 5296	282.6	96	0.14	4279.93	84	0.05	1.21	103	0.13	15.29	88	0.14
Beta 6863	307.7	105	0.04	5438.47	106	0.45	1.12	95	0.04	17.64	102	0.83
Beta 6904	302.6	103	0.19	4843.37	95	0.52	1.14	97	0.2	15.86	91	0.28
Beta BX960	314.7	107	0	6695.89	131	0	1.09	93	0	21.4	123	0
Beta M930	310	106	0.02	7745.06	151	0	1.11	95	0.02	24.64	142	0
Blank 1 (Hilleshog 7057)	301.9	103	0.22	4234.07	83	0.04	1.14	97	0.21	14.09	81	0.02
Blank 2 (Vanderhave H46109)	290.7	99	0.73	4908.31	96	0.63	1.18	101	0.72	17.21	99	0.92
Blank 3 (Beta 6904)	293.2	100	1	4428.6	87	0.11	1.17	100	0.96	15.32	88	0.14
Crystal 309	291.5	99	0.81	3527.36	69	0	1.18	101	0.8	12.05	69	0
Crystal 952	292.8	100	0.96	4910.18	96	0.63	1.18	100	0.84	16.66	96	0.62
Crystal 9744	273.3	93	0.01	2869.33	56	0	1.25	106	0.01	10.39	60	0
Crystal 999	274.9	94	0.01	4835.16	95	0.51	1.24	106	0.01	17.63	102	0.83
Hilleshog 7057	279.1	95	0.05	3454.4	68	0	1.22	104	0.06	12.6	73	0
Hilleshog 7073	300.9	103	0.28	6755.54	132	0	1.14	97	0.27	22.22	128	0
Hilleshog 7083	304.7	104	0.11	7766.8	152	0	1.12	96	0.08	25.38	146	0
Hilleshog Hector	294.7	101	0.83	4081.75	80	0.02	1.17	99	0.81	13.89	80	0.01
Hilleshog Resist	277.3	95	0.03	2990.16	58	0	1.23	105	0.02	10.82	62	0
Hilleshog RH5	275.2	94	0.01	4198.6	82	0.03	1.24	106	0.01	15.5	89	0.18
Holly Hybrid 99HX975	295.1	101	0.78	6544.74	128	0	1.16	99	0.79	22.05	127	0
Holly Hybrid LM1000	299.1	102	0.41	5251.1	103	0.75	1.15	98	0.33	17.85	103	0.71
Seedex Laser	272.8	93	0.01	3326.52	65	0	1.25	107	0	12.31	71	0
Seedex SX1020	275.5	94	0.01	4242.03	83	0.04	1.24	106	0.01	15.42	89	0.16
Vanderhave H46109	291.4	99	0.8	4564.9	89	0.2	1.18	101	0.78	15.75	91	0.25
Vanderhave H46140	315.5	108	0	6434.91	126	0	1.09	93	0	20.42	118	0.03
Vanderhave H46177	319	109	0	6095.77	119	0.02	1.07	92	0	19.23	111	0.17
Vanderhave H68108	271.8	93	0	5011.1	98	0.81	1.25	106	0.01	18.47	106	0.41
Check Mean	293.2			5114.47			1.17			17.34		
Coeff. of Var. (%)	4.76			16.39			4.52			15.37		
F Value	3.90**			10.26**			3.97**			8.38**		
Mean LSD (0.05)	20.29	7		1210.75	24		0.08	7		3.92	23	
Mean LSD (0.01)	26.89	9		1604.36	31		0.1	9		5.19	30	

5605 DeGraff/Bosch **(Continued)**

AMERICAN CRYSTAL SUGAR CO. – TECH SERV. CENTER **SMBSC Commercial (Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Sugar %			Emergence 1			Emergence 2			Tare		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta 2200 blend	15.47	98	0.28	34.38	103	0.86	57.1	96	0.43	1.91	98	0.9
Beta 3820	15.68	99	0.66	26.75	80	0.22	52.3	88	0.02	1.6	82	0.36
Beta 3945	16.16	102	0.32	26.75	80	0.22	58.9	99	0.86	2.86	146	0.02
Beta 4811R	16.66	105	0.01	33	99	0.94	54	91	0.08	1.57	80	0.32
Beta 5296	15.34	97	0.14	37.15	111	0.49	60.9	103	0.62	3.17	162	0
Beta 6863	16.5	104	0.04	33.68	101	0.96	59.6	100	0.96	1.6	82	0.35
Beta 6904	16.26	103	0.19	32.98	99	0.94	61.3	103	0.53	2.23	114	0.48
Beta BX960	16.82	106	0	32.65	98	0.89	66.4	112	0.02	1.5	76	0.23
Beta M930	16.61	105	0.02	22.9	69	0.05	55.6	94	0.2	1.32	67	0.1
Blank 1 (Hilleshog 7057)	16.23	103	0.22	35.08	105	0.76	61.6	104	0.48	1.77	90	0.62
Blank 2 (Vanderhave H46109)	15.71	99	0.73	41.65	125	0.13	67.9	114	0.01	2.17	111	0.58
Blank 3 (Beta 6904)	15.83	100	1	36.45	109	0.57	63.1	106	0.22	1.78	91	0.64
Crystal 309	15.75	100	0.81	34.03	102	0.91	62.6	105	0.3	2.2	112	0.53
Crystal 952	15.82	100	0.97	25.7	77	0.15	47.7	80	0	1.49	76	0.23
Crystal 9744	14.91	94	0.01	21.53	64	0.03	60.8	102	0.66	2.35	120	0.31
Crystal 999	14.98	95	0.01	30.9	92	0.64	52.5	88	0.02	1.93	99	0.94
Hilleshog 7057	15.18	96	0.05	30.2	90	0.55	60.1	101	0.83	2.67	136	0.07
Hilleshog 7073	16.19	102	0.28	35.78	107	0.66	63.5	107	0.18	0.81	41	0
Hilleshog 7083	16.36	103	0.11	34.2	102	0.88	61.2	103	0.56	1.13	57	0.03
Hilleshog Hector	15.9	100	0.83	44.45	133	0.04	68.2	115	0	2.01	103	0.9
Hilleshog Resist	15.1	95	0.03	38.55	115	0.34	68.3	115	0	3.04	155	0.01
Hilleshog RH5	15	95	0.01	49	147	0	63.7	107	0.16	1.74	89	0.58
Holly Hybrid 99HX975	15.92	101	0.78	14.25	43	0	34.4	58	0	1.43	73	0.17
Holly Hybrid LM1000	16.1	102	0.41	36.78	110	0.53	67.4	113	0.01	1.94	99	0.95
Seedex Laser	14.89	94	0.01	38.2	114	0.37	56	94	0.25	2.24	114	0.47
Seedex SX1020	15.02	95	0.02	36.48	109	0.57	51.8	87	0.01	1.99	102	0.93
Vanderhave H46109	15.75	99	0.81	34.35	103	0.86	63.4	107	0.19	2.63	134	0.08
Vanderhave H46140	16.86	107	0	33.35	100	0.99	62.3	105	0.35	1.83	93	0.73
Vanderhave H46177	17.02	108	0	39.6	119	0.25	65	109	0.07	1.95	99	0.98
Vanderhave H68108	14.84	94	0	31.58	95	0.73	55.9	94	0.24	1.92	98	0.91
Check Mean	15.83			33.41			59.5			1.96		
Coeff. of Var. (%)	4.07			32.59			9.67			39.88		
F Value	3.89**			1.59ns			5.40**			1.92*		
Mean LSD (0.05)	0.94	6		15.31	46		8.61	14		1.1	56	
Mean LSD (0.01)	1.24	8		20.28	61		11.4	19		1.45	74	

* Significant at 5%. ** Significant at 1%. Ns Not significant.
Mean LSD is only appropriate for comparing entry means with Each other when F value is significant.

2nd column for each trait is percent of check. General Mean used as check.
3rd column for trait is probability that detection of a diff. (from check mean) of this size due to chance.

5606 Maynard - Luschen/Noble

AMERICAN CRYSTAL SUGAR CO. - TECH SERV. CENTER **SMBSC Commercial (Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Rec/T (lbs)			Rec/A (lbs)			Loss to Mol.			Yield (T/A)		
Entry	**Mean**	**%**	**P-Val**	**Mean**	**%**	**P-Val**	**Mean**	**%**	**P-Val**	**Mean**	**%**	**P-Val**
Beta 2200 blend	289.05	105	0.21	9750.37	120	0.01	1.19	97	0.28	34.71	118	0.02
Beta 3820	298.68	108	0.03	8520.55	105	0.54	1.15	93	0.03	28.99	99	0.85
Beta 3945	293.24	106	0.1	8430.24	104	0.64	1.17	95	0.08	28.44	97	0.66
Beta 4811R	294.44	107	0.08	10633.7	131	0	1.16	94	0.06	35.55	121	0.01
Beta 5296	277.12	100	0.93	7388.32	91	0.25	1.23	100	1	27.45	93	0.38
Beta 6863	286.49	104	0.32	9594.48	118	0.02	1.19	97	0.27	33.53	114	0.06
Beta 6904	284.06	103	0.44	7219.91	89	0.16	1.2	98	0.44	25.49	87	0.08
Beta BX960	292.95	106	0.1	9613.95	118	0.02	1.17	95	0.1	32.64	111	0.14
Beta M930	278.77	101	0.81	9707.16	119	0.02	1.23	100	0.9	35.46	121	0.01
Blank 1 (Hilleshog 7057)	278.71	101	0.81	7292.46	90	0.2	1.23	100	0.94	25.16	86	0.06
Blank 2 (Vanderhave H46109)	282.23	102	0.56	9552.49	118	0.03	1.21	98	0.56	33.47	114	0.07
Blank 3 (Beta 6904)	283.78	103	0.46	7965.63	98	0.8	1.21	98	0.44	28.67	98	0.74
Crystal 309	261.44	95	0.15	7072.02	87	0.1	1.29	105	0.13	26.91	92	0.26
Crystal 952	269.05	97	0.48	8388.78	103	0.69	1.26	102	0.42	31.43	107	0.36
Crystal 9744	262.25	95	0.17	6035.54	74	0	1.28	104	0.18	23.71	81	0.01
Crystal 999	285.42	103	0.37	9543.6	117	0.03	1.2	97	0.39	33.61	114	0.06
Hilleshog 7057	261.81	95	0.16	6371.85	78	0.01	1.28	104	0.16	23.57	80	0.01
Hilleshog 7073	257.01	93	0.06	8084.42	99	0.95	1.3	106	0.06	31.26	106	0.4
Hilleshog 7083	280.16	101	0.7	8659.89	107	0.41	1.22	99	0.65	30.92	105	0.49
Hilleshog Hector	275.27	100	0.92	6843.12	84	0.05	1.24	101	0.85	24.65	84	0.03
Hilleshog Resist	264.94	96	0.27	7415.3	91	0.27	1.27	103	0.26	27.99	95	0.52
Hilleshog RH5	259.57	94	0.1	7242.83	89	0.17	1.29	105	0.12	27.48	93	0.38
Holly Hybrid 99HX975	252.23	91	0.02	7333.24	90	0.22	1.31	106	0.04	28.51	97	0.68
Holly Hybrid LM1000	267.81	97	0.4	8463.59	104	0.6	1.27	103	0.3	31.48	107	0.35
Seedex Laser	249.99	90	0.01	5595.38	69	0	1.32	107	0.02	21.62	74	0
Seedex SX1020	279.12	101	0.78	7199.81	89	0.15	1.23	100	0.91	27.07	92	0.29
Vanderhave H46109	263.78	95	0.22	8231.51	101	0.87	1.28	104	0.2	31.61	108	0.32
Vanderhave H46140	292.64	106	0.11	8907.58	110	0.23	1.17	95	0.1	30.6	104	0.58
Vanderhave H46177	296.25	107	0.05	8155.92	100	0.97	1.16	94	0.05	27.46	93	0.38
Vanderhave H68108	270.42	98	0.56	8625.15	106	0.44	1.25	101	0.62	32.61	111	0.15
Check Mean	**276.29**		**8127.96**			**1.23**				**29.4**		
Coeff. of Var. (%)	**6.98**		**15.87**			**5.64**				**14.34**		
F Value	**1.84***		**3.49****			**1.80***				**2.88****		
Mean LSD (0.05)	**28.96**	**10**	**1833.21**	**23**		**0.1**	**8**			**6.26**	**21**	
Mean LSD (0.01)	**38.4**	**14**	**2429.25**	**30**		**0.14**	**11**			**8.3**	**28**	

5606 Maynard - Luschen/Noble **(Continued)**

AMERICAN CRYSTAL SUGAR CO. - TECH SERV. CENTER **SMBSC Commercial (Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Sugar %			Emergence 1			Emergence 2			Tare		
Entry	**Mean**	**%**	**P-Val**	**Mean**	**%**	**P-Val**	**Mean**	**%**	**P-Val**	**Mean**	**%**	**P-Val**
Beta 2200 blend	15.65	104	0.21	38.05	108	0.23	47.67	100	0.95	2.55	87	0.54
Beta 3820	16.09	107	0.03	28.5	81	0	49.77	104	0.32	2.13	72	0.2
Beta 3945	15.83	105	0.1	38.09	108	0.22	50.45	106	0.18	2.5	85	0.48
Beta 4811R	15.89	106	0.08	38.27	108	0.19	49.4	103	0.42	1.72	58	0.06
Beta 5296	15.09	100	0.93	44.03	125	0	55.32	116	0	3.1	105	0.8
Beta 6863	15.52	103	0.32	29.43	83	0.01	39.35	82	0	2.35	80	0.35
Beta 6904	15.41	102	0.45	39.73	113	0.05	54.25	114	0	4.1	139	0.07
Beta BX960	15.82	105	0.1	33.9	96	0.54	51.5	108	0.06	2.63	89	0.62
Beta M930	15.17	101	0.8	40.95	116	0.01	49.75	104	0.32	2.62	89	0.61
Blank 1 (Hilleshog 7057)	15.17	101	0.8	21.19	60	0	44.55	93	0.1	3	102	0.94
Blank 2 (Vanderhave H46109)	15.32	102	0.56	32.5	92	0.22	44.55	93	0.1	3.07	104	0.84
Blank 3 (Beta 6904)	15.39	102	0.46	43.98	125	0	48.72	102	0.64	3.02	103	0.91
Crystal 309	14.36	95	0.15	28.42	80	0	44.9	94	0.15	2.97	101	0.97
Crystal 952	14.72	98	0.48	39.94	113	0.04	48.37	101	0.77	2.9	98	0.94
Crystal 9744	14.39	96	0.17	30.2	86	0.03	42.47	89	0.01	3.3	112	0.58
Crystal 999	15.47	103	0.37	34.98	99	0.88	53.22	111	0.01	3.04	103	0.89
Hilleshog 7057	14.38	96	0.16	26.19	74	0	39.32	82	0	2.57	87	0.56
Hilleshog 7073	14.15	94	0.06	36.07	102	0.74	49.77	104	0.32	2.12	72	0.2
Hilleshog 7083	15.23	101	0.71	41.72	118	0.01	48.35	101	0.78	2.27	77	0.29
Hilleshog Hector	15	100	0.93	35.42	100	0.96	46.97	98	0.68	3.84	130	0.16
Hilleshog Resist	14.52	96	0.27	39.36	111	0.08	55.65	116	0	2.13	72	0.2
Hilleshog RH5	14.27	95	0.1	36.78	104	0.52	43.87	92	0.05	3.18	108	0.72
Holly Hybrid 99HX975	13.92	93	0.02	34.85	99	0.84	37.25	78	0	2.84	96	0.86
Holly Hybrid LM1000	14.66	97	0.41	35.44	100	0.95	49.75	104	0.32	5.17	175	0
Seedex Laser	13.82	92	0.01	32.05	91	0.15	39.7	83	0	4.42	150	0.02
Seedex SX1020	15.19	101	0.77	40.36	114	0.03	52.87	111	0.01	3.43	116	0.45
Vanderhave H46109	14.47	96	0.22	39.37	112	0.08	48.37	101	0.77	2.26	77	0.28
Vanderhave H46140	15.8	105	0.11	43.51	123	0	53.55	112	0	2.94	100	0.99
Vanderhave H46177	15.97	106	0.05	23.79	67	0	46.27	97	0.45	2.87	97	0.9
Vanderhave H68108	14.77	98	0.56	32.2	91	0.17	47.67	100	0.95	3.39	115	0.49
Check Mean	15.05			35.31			47.79			2.95		
Coeff. of Var. (%)	5.95			12.91			8.41			43.61		
F Value	1.84*			6.58**			5.85**			1.27ns		
Mean LSD (0.05)	1.34	9		6.48	18		5.65	12		1.82	62	
Mean LSD (0.01)	1.78	12		8.59	24		7.49	16		2.41	82	

* Significant at 5%. ** Significant at 1%. Ns Not significant.
Mean LSD is only appropriate for comparing entry means with Each other when F value is significant.

2nd column for each trait is percent of check. General Mean used as check.
3rd column for trait is probability that detection of a diff. (from check mean) of this size due to chance.

5607 Bird Island/Rudeen

AMERICAN CRYSTAL SUGAR CO. – TECH SERV. CENTER **SMBSC Commercial (Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Rec/T (lbs)			Rec/A (lbs)			Loss to Mol.			Yield (T/A)		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta 2200 blend	283.8	102	0.47	4536.44	112	0.16	1.21	98	0.46	16.08	111	0.22
Beta 3820	286.3	103	0.28	3766.79	93	0.41	1.2	98	0.29	13.25	91	0.3
Beta 3945	296.7	106	0.01	4286.94	106	0.5	1.16	95	0.01	14.59	100	0.96
Beta 4811R	284.6	102	0.4	5801.35	143	0	1.21	98	0.46	20.39	140	0
Beta 5296	286.4	103	0.27	3869.56	95	0.59	1.2	98	0.25	13.6	94	0.45
Beta 6863	284.7	102	0.4	4113.08	101	0.86	1.2	98	0.41	14.48	100	0.96
Beta 6904	276.2	99	0.7	3679.87	91	0.28	1.23	101	0.8	13.28	91	0.32
Beta BX960	293.8	105	0.03	5223.55	129	0	1.17	96	0.04	17.9	123	0.01
Beta M930	284.3	102	0.43	5960.13	147	0	1.21	99	0.55	21.1	145	0
Blank 1 (Hilleshog 7057)	281.7	101	0.68	3469.76	86	0.09	1.22	100	0.87	12.4	85	0.09
Blank 2 (Vanderhave H46109)	276	99	0.67	4205.18	104	0.66	1.24	101	0.61	15.13	104	0.63
Blank 3 (Beta 6904)	278	100	0.9	3778.85	93	0.43	1.23	100	0.88	13.75	95	0.53
Crystal 309	270.1	97	0.2	3481.02	86	0.1	1.26	103	0.22	12.8	88	0.17
Crystal 952	297.6	107	0.01	4225.48	104	0.62	1.15	94	0	14.26	98	0.82
Crystal 9744	279.2	100	0.96	3919.9	97	0.7	1.23	100	0.97	14.03	97	0.69
Crystal 999	286.3	103	0.28	3977.22	98	0.83	1.2	98	0.23	13.86	95	0.59
Hilleshog 7057	277.6	100	0.86	3167.43	78	0.01	1.22	100	0.95	11.12	77	0.01
Hilleshog 7073	283.1	102	0.53	4271.13	105	0.53	1.21	99	0.63	15.16	104	0.62
Hilleshog 7083	264.1	95	0.03	3921.82	97	0.7	1.28	104	0.04	14.98	103	0.72
Hilleshog Hector	288.6	104	0.16	4055.73	100	0.99	1.19	97	0.14	13.97	96	0.65
Hilleshog Resist	274.2	98	0.5	3543.41	87	0.14	1.25	102	0.44	12.78	88	0.16
Hilleshog RH5	274.5	98	0.52	3499.22	86	0.11	1.24	101	0.48	12.71	87	0.15
Holly Hybrid 99HX975	254.9	91	0	3176.04	78	0.01	1.3	106	0	12.48	86	0.1
Holly Hybrid LM1000	272.4	98	0.34	4096.52	101	0.9	1.25	102	0.35	15.06	104	0.68
Seedex Laser	275.7	99	0.64	3154.91	78	0.01	1.24	102	0.45	11.49	79	0.02
Seedex SX1020	259.3	93	0.01	3420.53	84	0.07	1.29	105	0.01	13.3	91	0.32
Vanderhave H46109	270.3	97	0.21	4013.01	99	0.91	1.26	103	0.13	14.89	102	0.78
Vanderhave H46140	274.4	98	0.51	4324.26	107	0.43	1.24	101	0.48	15.83	109	0.3
Vanderhave H46177	291.1	104	0.08	4431.78	109	0.27	1.18	96	0.07	15.18	104	0.6
Vanderhave H68108	260	93	0.01	4223.59	104	0.62	1.29	106	0.01	16.24	112	0.17
Check Mean	**278.9**			**4053.15**			**1.23**			**14.54**		
Coeff. of Var. (%)	**4.77**			**17.02**			**4**			**17.02**		
F Value	**2.34****			**3.74****			**2.21****			**3.16****		
Mean LSD (0.05)	**19.52**	**7**		**979.73**	**24**		**0.07**	**6**		**3.56**	**24**	
Mean LSD (0.01)	**25.87**	**9**		**1298.22**	**32**		**0.1**	**8**		**4.72**	**32**	

5607 Bird Island/Rudeen **(Continued)**

AMERICAN CRYSTAL SUGAR CO. - TECH SERV. CENTER **SMBSC Commercial (Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Sugar %			Emergence 1			Emergence 2			Tare		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta 2200 blend	15.4	102	0.47	40.53	106	0.44	37.6	104	0.67	2.55	99	0.96
Beta 3820	15.51	102	0.28	34.88	92	0.31	33.2	92	0.32	1.51	58	0.03
Beta 3945	15.99	105	0.01	39.92	105	0.56	35.9	99	0.9	2.8	109	0.64
Beta 4811R	15.44	102	0.4	41.95	110	0.23	41.6	115	0.09	1.95	76	0.2
Beta 5296	15.52	102	0.27	36.41	96	0.6	34.6	95	0.58	3.34	130	0.11
Beta 6863	15.44	102	0.4	35.38	93	0.4	37.8	104	0.62	2.64	103	0.89
Beta 6904	15.04	99	0.69	31.78	83	0.05	29.8	82	0.04	2.51	98	0.9
Beta BX960	15.86	105	0.03	43.2	113	0.11	41.7	115	0.09	2.01	78	0.24
Beta M930	15.43	102	0.42	40.41	106	0.47	39	107	0.39	1.95	76	0.19
Blank 1 (Hilleshog 7057)	15.3	101	0.67	41.5	109	0.29	43	118	0.03	2.94	114	0.44
Blank 2 (Vanderhave H46109)	15.04	99	0.68	40.17	105	0.51	35.2	97	0.72	3.21	125	0.19
Blank 3 (Beta 6904)	15.13	100	0.9	33.79	89	0.18	31.8	88	0.15	2.62	102	0.92
Crystal 309	14.76	97	0.2	43.36	114	0.1	40.7	112	0.16	3.33	130	0.11
Crystal 952	16.03	106	0.01	28.2	74	0	27.5	76	0.01	2.45	95	0.79
Crystal 9744	15.19	100	0.95	48.9	128	0	49.5	136	0	3.68	143	0.02
Crystal 999	15.51	102	0.28	29.8	78	0.01	28.6	79	0.01	2.66	103	0.86
Hilleshog 7057	15.1	100	0.84	45	118	0.03	44.4	122	0.01	2.14	83	0.36
Hilleshog 7073	15.37	101	0.53	40.35	106	0.48	35.8	99	0.88	2.05	80	0.28
Hilleshog 7083	14.49	95	0.03	34.54	91	0.27	32.1	89	0.18	2.33	91	0.61
Hilleshog Hector	15.62	103	0.16	34.61	91	0.28	33.9	93	0.44	1.6	62	0.04
Hilleshog Resist	14.96	99	0.5	45.85	120	0.02	43.4	119	0.03	1.7	66	0.07
Hilleshog RH5	14.97	99	0.53	36.51	96	0.62	34.1	94	0.48	2.04	79	0.27
Holly Hybrid 99HX975	14.04	93	0	27.12	71	0	26	72	0	2.55	99	0.96
Holly Hybrid LM1000	14.87	98	0.34	45.84	120	0.02	41.4	114	0.1	3.27	127	0.15
Seedex Laser	15.03	99	0.66	38.35	101	0.94	35.9	99	0.91	2.39	93	0.7
Seedex SX1020	14.25	94	0	35.64	94	0.44	33.6	93	0.39	3.25	126	0.16
Vanderhave H46109	14.78	97	0.22	35.22	92	0.37	37	102	0.82	3.56	138	0.04
Vanderhave H46140	14.96	99	0.52	41.76	110	0.25	35.4	98	0.77	3.04	118	0.33
Vanderhave H46177	15.74	104	0.08	38.33	101	0.94	37.7	104	0.66	2.92	113	0.47
Vanderhave H68108	14.29	94	0.01	33.37	88	0.14	30.8	85	0.08	2.21	86	0.45
Check Mean	**15.17**			**38.09**			**36.3**			**2.57**		
Coeff. of Var. (%)	**4.07**			**16.26**			**17**			**37.32**		
F Value	**2.35****			**2.81****			**2.91****			**1.49ns**		
Mean LSD (0.05)	**0.9**	**6**		**9.06**	**24**		**8.85**	**24**		**1.36**	**53**	
Mean LSD (0.01)	**1.2**	**8**		**12.01**	**32**		**11.7**	**32**		**1.8**	**70**	

* Significant at 5%. ** Significant at 1%. Ns Not significant.
Mean LSD is only appropriate for comparing entry means with each other when F value is significant.

2nd column for each trait is percent of check. General Mean used as check.
3rd column for trait is probability that detection of a diff. (from check mean) of this size due to chance.

5608 Fischer/Buffalo Lake

AMERICAN CRYSTAL SUGAR CO. – TECH SERV. CENTER **SMBSC Commercial (Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Rec/T (lbs)			Rec/A (lbs)			Loss to Mol.			Yield (T/A)		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta 2200 blend	310.2	98	0.48	5871.24	97	0.74	1.12	102	0.39	18.7	98	0.82
Beta 3820	325	103	0.27	6564.66	109	0.3	1.05	96	0.16	20.52	108	0.34
Beta 3945	335.8	106	0.02	6010.03	100	0.95	1.03	95	0.03	18.21	96	0.58
Beta 4811R	325.7	103	0.23	10615.3	176	0	1.05	96	0.13	32.9	173	0
Beta 5296	312.2	99	0.65	5604.49	93	0.39	1.1	100	0.86	18.13	95	0.55
Beta 6863	318.2	101	0.78	5288.95	88	0.14	1.08	99	0.66	16.38	86	0.08
Beta 6904	326	103	0.22	4816.45	80	0.02	1.06	97	0.22	14.8	78	0.01
Beta BX960	325.7	103	0.23	8274.97	137	0	1.06	97	0.29	25.47	134	0
Beta M930	332.6	105	0.04	9020.75	149	0	1.04	95	0.04	26.97	142	0
Blank 1 (Hilleshog 7057)	295.7	94	0.01	4134.01	68	0	1.16	106	0.02	14.18	74	0
Blank 2 (Vanderhave H46109)	305.1	97	0.18	6890.65	114	0.1	1.12	103	0.26	22.67	119	0.02
Blank 3 (Beta 6904)	327.2	104	0.17	4650.91	77	0.01	1.04	95	0.07	14.33	75	0
Crystal 309	300.9	95	0.07	5973.45	99	0.9	1.14	104	0.11	19.88	104	0.59
Crystal 952	319.6	101	0.66	6254.83	104	0.67	1.07	98	0.49	19.91	104	0.58
Crystal 9744	300.4	95	0.06	3483.62	58	0	1.15	105	0.06	11.27	59	0
Crystal 999	316.3	100	0.96	6554.83	109	0.31	1.09	100	0.92	20.9	110	0.23
Hilleshog 7057	298.5	94	0.03	3555.37	59	0	1.14	105	0.06	12.13	64	0
Hilleshog 7073	334.3	106	0.03	7868.04	130	0	1.03	94	0.03	23.44	123	0.01
Hilleshog 7083	323.2	102	0.38	6875.6	114	0.1	1.07	98	0.38	21.28	112	0.15
Hilleshog Hector	310.5	98	0.5	4646.06	77	0.01	1.11	102	0.48	14.9	78	0.01
Hilleshog Resist	294.7	93	0.01	3695.86	61	0	1.18	108	0	12.04	63	0
Hilleshog RH5	283.3	90	0	4200.66	70	0	1.21	111	0	15.01	79	0.01
Holly Hybrid 99HX975	298.1	94	0.03	6548.96	108	0.32	1.15	105	0.06	22.05	116	0.05
Holly Hybrid LM1000	329.9	104	0.09	6256.56	104	0.67	1.04	95	0.06	19.08	100	0.99
Seedex Laser	287.7	91	0	4265.41	71	0	1.19	109	0	15	79	0.01
Seedex SX1020	294.6	93	0.01	5709.39	95	0.52	1.18	108	0	19.09	100	0.98
Vanderhave H46109	323.7	102	0.34	5721.15	95	0.53	1.06	97	0.22	17.65	93	0.36
Vanderhave H46140	351	111	0	6711.54	111	0.19	1	92	0	19.32	101	0.87
Vanderhave H46177	351.1	111	0	8512.23	141	0	1	91	0	24.79	130	0
Vanderhave H68108	321.5	102	0.5	6589.17	109	0.28	1.06	97	0.31	20.76	109	0.27
Check Mean	**316**			**6038.84**			**1.09**			**19.06**		
Coeff. of Var. (%)	**4.94**			**16.1**			**5.02**			**15.14**		
F Value	**4.43****			**10.82****			**4.16****			**9.73****		
Mean LSD (0.05)	**23.15**	**7**		**1450.07**	**24**		**0.08**	**7**		**4.38**	**23**	
Mean LSD (0.01)	**30.68**	**10**		**1922.24**	**32**		**0.1**	**10**		**5.81**	**30**	

5608 Fischer/Buffalo Lake **(Continued)**

AMERICAN CRYSTAL SUGAR CO. – TECH SERV. CENTER **SMBSC Commercial (Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Sugar %			Emergence 1			Emergence 2			Tare		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta 2200 blend	16.62	98	0.48	31.4	94	0.68	71.5	117	0.05	4.45	125	0.11
Beta 3820	17.3	102	0.28	34.16	102	0.9	58.3	95	0.56	2.11	59	0.01
Beta 3945	17.82	106	0.02	32.89	98	0.91	58	95	0.52	3.62	102	0.91
Beta 4811R	17.34	103	0.24	26.36	79	0.16	57.7	94	0.48	1.95	55	0
Beta 5296	16.71	99	0.63	41.88	125	0.1	70.1	114	0.09	4.55	128	0.08
Beta 6863	16.99	101	0.79	31.7	95	0.72	56.9	93	0.39	5.22	147	0
Beta 6904	17.36	103	0.22	30.17	90	0.51	54.2	88	0.17	4.55	128	0.07
Beta BX960	17.35	103	0.23	31.26	93	0.66	63.2	103	0.72	2	56	0.01
Beta M930	17.67	105	0.04	47.29	141	0.01	60.8	99	0.91	2.31	65	0.03
Blank 1 (Hilleshog 7057)	15.94	94	0.01	29.87	89	0.48	59.4	97	0.7	3.11	87	0.42
Blank 2 (Vanderhave H46109)	16.38	97	0.18	38.78	116	0.3	63.2	103	0.71	4.05	114	0.38
Blank 3 (Beta 6904)	17.4	103	0.18	29.32	88	0.41	59	96	0.65	4.01	113	0.41
Crystal 309	16.18	96	0.07	28.92	86	0.37	60.5	99	0.86	5.29	149	0
Crystal 952	17.05	101	0.67	32.81	98	0.89	59	96	0.65	4.02	113	0.4
Crystal 9744	16.16	96	0.06	25.4	76	0.11	52.8	86	0.1	5.05	142	0.01
Crystal 999	16.91	100	0.97	37.65	112	0.41	52.1	85	0.08	3.4	95	0.77
Hilleshog 7057	16.07	95	0.03	31.87	95	0.75	65.6	107	0.41	4.24	119	0.22
Hilleshog 7073	17.74	105	0.03	41.48	124	0.12	66.7	109	0.3	2.46	69	0.05
Hilleshog 7083	17.23	102	0.38	38.26	114	0.35	55.6	91	0.26	2.25	63	0.02
Hilleshog Hector	16.64	98	0.5	38.17	114	0.36	68.1	111	0.2	4.13	116	0.3
Hilleshog Resist	15.91	94	0.01	28.87	86	0.36	61.8	101	0.93	3.96	111	0.48
Hilleshog RH5	15.38	91	0	34.48	103	0.85	70.2	114	0.09	3.54	99	0.97
Holly Hybrid 99HX975	16.05	95	0.03	28.68	86	0.34	64.6	105	0.53	1.97	55	0.01
Holly Hybrid LM1000	17.54	104	0.09	35.53	106	0.69	63.2	103	0.72	3.73	105	0.75
Seedex Laser	15.57	92	0	33.86	101	0.94	69.1	113	0.14	4.35	122	0.16
Seedex SX1020	15.91	94	0.01	38.41	115	0.33	62.3	101	0.86	3.5	98	0.91
Vanderhave H46109	17.24	102	0.35	28.32	85	0.31	57	93	0.4	4.15	116	0.29
Vanderhave H46140	18.55	110	0	28.51	85	0.33	65.3	106	0.45	3.49	98	0.9
Vanderhave H46177	18.55	110	0	35.84	107	0.64	59	96	0.65	2.81	79	0.18
Vanderhave H68108	17.14	101	0.51	32.62	97	0.86	55.2	90	0.24	2.52	71	0.06
Check Mean	**16.89**			**33.49**			**61.3**			**3.56**		
Coeff. of Var. (%)	**4.31**			**29.19**			**17.1**			**31.54**		
F Value	**4.45****			**0.96ns**			**1.04ns**			**3.21****		
Mean LSD (0.05)	**1.08**	**6**		**14.45**	**43**		**14.7**	**24**		**1.58**	**44**	
Mean LSD (0.01)	**1.43**	**8**		**19.16**	**57**		**19.5**	**32**		**2.09**	**59**	

* Significant at 5%. ** Significant at 1%. Ns Not significant.
Mean LSD is only appropriate for comparing entry means with each other when F value is significant.

2nd column for each trait is percent of check. General Mean used as check.
3rd column for trait is probability that detection of a diff. (from check mean) of this size due to chance.

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5611 Hector/Wehking

AMERICAN CRYSTAL SUGAR CO. - TECH SERV. CENTER **SMBSC Semi Commercial (Non-Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Rec/T (lbs)			Rec/A (lbs)			Loss to Mol.			Yield (T/A)		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta 4811R	259.28	95	0.02	5915.3	100	0.94	1.3	104	0.03	22.61	105	0.32
Beta 6904	282.88	103	0.15	6547.8	111	0.04	1.21	97	0.16	23.19	108	0.14
Beta BM0901	265.68	97	0.2	6430	109	0.09	1.28	103	0.15	24.28	113	0.02
Beta BM0902	266.76	97	0.26	6357.9	108	0.14	1.27	102	0.21	23.93	111	0.03
Beta M813	283.37	103	0.13	6652.6	113	0.02	1.21	97	0.13	23.65	110	0.06
Beta M815	274.9	100	0.86	6627	112	0.02	1.24	100	0.88	23.98	112	0.03
Beta M932	293.86	107	0	6428.8	109	0.09	1.17	94	0	21.94	102	0.69
Crystal 921	290.26	106	0.01	6184.8	105	0.35	1.18	95	0.01	21.38	99	0.92
Crystal 956	283.23	103	0.13	7308.3	124	0	1.21	97	0.13	25.65	119	0
Crystal R828	260.27	95	0.03	5195.4	88	0.03	1.29	104	0.04	19.94	93	0.18
Crystal R932	267.47	98	0.31	5766.5	98	0.69	1.27	102	0.28	21.59	100	0.93
Crystal RZT010	248.9	91	0	4581.4	78	0	1.33	107	0	18.41	86	0.01
Hilleshog 1643	277.14	101	0.59	5563.4	94	0.3	1.23	99	0.51	20.09	94	0.22
Hilleshog 7089	277.07	101	0.6	6318.3	107	0.18	1.24	99	0.72	22.92	107	0.21
Hilleshog 7097	277.48	101	0.56	6334.2	108	0.16	1.23	99	0.6	22.83	106	0.24
Hilleshog 7101	281.73	103	0.21	6324.7	107	0.17	1.22	98	0.19	22.34	104	0.45
Hilleshog 7108	259.89	95	0.03	5125	87	0.02	1.3	104	0.02	19.57	91	0.09
Hilleshog 7111	281.05	103	0.25	5403.4	92	0.12	1.22	98	0.22	19.44	90	0.07
Hilleshog 7114	281.39	103	0.23	6311.1	107	0.19	1.22	98	0.21	22.47	105	0.39
Hilleshog 7118	281.49	103	0.22	5171.6	88	0.02	1.21	98	0.17	18.19	85	0
Hilleshog 7120	262.16	96	0.06	5631.6	96	0.41	1.29	104	0.05	21.28	99	0.85
Hilleshog 7121	265.98	97	0.21	5601.1	95	0.36	1.28	103	0.13	21.17	99	0.78
Holly Hybrid 00HX019	280.89	103	0.26	5969.4	101	0.8	1.22	98	0.25	21.15	98	0.77
Holly Hybrid 00HX026	286.16	105	0.05	5750.1	98	0.65	1.2	96	0.04	20.04	93	0.2
Holly Hybrid 00HX027	260.21	95	0.03	4224.3	72	0	1.28	103	0.16	16.12	75	0
Seedex SX1017	279.29	102	0.38	5374.1	91	0.1	1.23	99	0.53	19.31	90	0.06
Seedex SX1019	282.89	103	0.15	5899.7	100	0.98	1.21	97	0.16	20.69	96	0.48
Vanderhave H46109	278.58	102	0.44	6087.4	103	0.53	1.23	99	0.55	21.76	101	0.81
Vanderhave H68108	253.15	92	0	5592.4	95	0.34	1.32	106	0	22.35	104	0.45
Vanderhave H68211	270.8	99	0.63	6068.1	103	0.58	1.26	101	0.5	22.32	104	0.46
Check Mean	**273.81**			**5891.5**			**1.25**			**21.49**		
Coeff. of Var. (%)	**4.29**			**9.96**			**3.42**			**9.99**		
F Value	**3.32****			**4.31****			**3.38****			**3.24****		
Mean LSD (0.05)	**17.81**	**7**		**899.43**	**15**		**0.06**	**5**		**3.23**	**15**	
Mean LSD (0.01)	**23.61**	**9**		**1192.9**	**20**		**0.09**	**7**		**4.28**	**20**	

5611 Hector/Wehking **(Continued)**

AMERICAN CRYSTAL SUGAR CO. - TECH SERV. CENTER **SMBSC Semi Commercial (Non-Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Sugar %			Vigor			Emergence			Tare		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta 4811R	14.26	95	0.02	49.38	102	0.84	75.33	97	0.54	3.42	109	0.63
Beta 6904	15.36	103	0.15	50.35	104	0.68	79.5	102	0.6	2.89	93	0.71
Beta BM0901	14.56	98	0.2	58.55	121	0.03	87.13	112	0.01	3.16	101	0.96
Beta BM0902	14.61	98	0.27	54.29	112	0.21	76.4	98	0.75	3.37	108	0.7
Beta M813	15.38	103	0.13	52.01	107	0.44	78.13	101	0.88	2.87	92	0.67
Beta M815	14.99	100	0.86	53.52	110	0.27	74.3	96	0.38	3.98	127	0.17
Beta M932	15.86	106	0	36.14	75	0.01	76.05	98	0.68	4.07	130	0.13
Crystal 921	15.7	105	0.01	55.48	115	0.13	86.1	111	0.02	2.53	81	0.33
Crystal 956	15.37	103	0.13	48.9	101	0.92	85.43	110	0.04	2.97	95	0.8
Crystal R828	14.31	96	0.03	53.55	111	0.27	84.03	108	0.08	3.59	115	0.46
Crystal R932	14.64	98	0.31	47.71	98	0.87	72.93	94	0.21	5.43	174	0
Crystal RZT010	13.78	92	0	39.42	81	0.05	72.93	94	0.21	2.48	79	0.3
Hilleshog 1643	15.09	101	0.6	53.11	110	0.31	73.6	95	0.28	3.61	115	0.44
Hilleshog 7089	15.09	101	0.59	55.98	116	0.1	82.65	107	0.17	2.5	80	0.31
Hilleshog 7097	15.11	101	0.55	50.58	104	0.64	77.78	100	0.96	2.39	76	0.24
Hilleshog 7101	15.3	102	0.21	46.43	96	0.66	81.6	105	0.28	2	64	0.07
Hilleshog 7108	14.29	96	0.03	49.7	103	0.79	77.8	100	0.95	3.13	100	1
Hilleshog 7111	15.27	102	0.25	54.45	112	0.19	79.18	102	0.66	1.6	51	0.02
Hilleshog 7114	15.29	102	0.23	54.23	112	0.21	84.73	109	0.06	2.32	74	0.19
Hilleshog 7118	15.29	102	0.22	56.77	117	0.07	81.28	105	0.32	2.39	76	0.24
Hilleshog 7120	14.4	96	0.07	38.58	80	0.03	70.5	91	0.06	1.8	57	0.03
Hilleshog 7121	14.58	98	0.22	33.8	70	0	69.13	89	0.02	2.73	87	0.52
Holly Hybrid 00HX019	15.26	102	0.26	49.6	102	0.8	75.38	97	0.55	3.66	117	0.39
Holly Hybrid 00HX026	15.51	104	0.05	51.21	106	0.55	80.93	104	0.36	2.93	94	0.75
Holly Hybrid 00HX027	14.29	96	0.03	40.59	84	0.09	62.83	81	0	2.48	79	0.3
Seedex SX1017	15.2	102	0.37	56.65	117	0.08	87.13	112	0.01	5	160	0
Seedex SX1019	15.36	103	0.15	20.57	42	0	49.33	64	0	3.89	124	0.22
Vanderhave H46109	15.16	102	0.44	49.01	101	0.9	90.13	116	0	4.21	134	0.08
Vanderhave H68108	13.98	94	0	44.47	92	0.39	78.13	101	0.88	2.53	81	0.34
Vanderhave H68211	14.8	99	0.64	48.27	100	0.97	76.75	99	0.82	3.91	125	0.21
Check Mean	**14.94**			**48.44**			**77.57**			**3.13**		
Coeff. of Var. (%)	**3.65**			**17.42**			**9.66**			**40.17**		
F Value	**3.31****			**3.17****			**4.58****			**2.01****		
Mean LSD (0.05)	**0.83**	**6**		**13.15**	**27**		**10.53**	**14**		**1.77**	**56**	
Mean LSD (0.01)	**1.1**	**7**		**17.45**	**36**		**13.95**	**18**		**2.34**	**75**	

* Significant at 5%. ** Significant at 1%. Ns Not significant.
Mean LSD is only appropriate for comparing entry means with each other when F value is significant.

2nd column for each trait is percent of check. General Mean used as check.
3rd column for trait is probability that detection of a diff. (from check mean) of this size due to chance.

5612 Lake Lillian/Schmoll

AMERICAN CRYSTAL SUGAR CO. - TECH SERV. CENTER **SMBSC Semi Commercial (Non-Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Rec/T (lbs)			Rec/A (lbs)			Loss to Mol.			Yield (T/A)		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta 4811R	286.68	99	0.61	7361.9	112	0.05	1.2	102	0.57	25.68	114	0.01
Beta 6904	285.28	98	0.5	5369.4	82	0	1.2	102	0.57	18.49	82	0
Beta BM0901	277.52	95	0.11	7523.3	115	0.02	1.24	105	0.1	27.08	120	0
Beta BM0902	289.84	100	0.9	6508.7	99	0.9	1.18	100	0.87	21.99	98	0.64
Beta M813	305.92	105	0.08	7435.1	113	0.04	1.12	95	0.07	24.24	107	0.16
Beta M815	300.94	103	0.24	7339.7	112	0.06	1.14	96	0.19	24.26	108	0.15
Beta M932	308.57	106	0.04	6505.4	99	0.89	1.11	94	0.04	21.43	95	0.35
Crystal 921	296.73	102	0.49	6202.2	95	0.38	1.16	98	0.44	20.69	92	0.12
Crystal 956	289.88	100	0.9	7670.5	117	0.01	1.19	101	0.8	26.68	118	0
Crystal R828	289.52	100	0.87	6405.8	98	0.7	1.18	100	0.94	21.78	97	0.52
Crystal R932	295.32	102	0.6	6494.7	99	0.87	1.16	98	0.54	22.3	99	0.83
Crystal RZT010	285.48	98	0.52	6517.2	99	0.91	1.2	102	0.58	22.39	99	0.89
Hilleshog 1643	292.23	100	0.88	5586.6	85	0.02	1.18	99	0.84	19.38	86	0.01
Hilleshog 7089	299.33	103	0.32	7553.2	115	0.02	1.15	97	0.28	25.04	111	0.04
Hilleshog 7097	279.15	96	0.16	7131.1	109	0.17	1.22	103	0.22	25.42	113	0.02
Hilleshog 7101	288.88	99	0.81	6551.3	100	0.98	1.19	101	0.77	23.14	103	0.62
Hilleshog 7108	286.58	99	0.61	7129.4	109	0.17	1.19	101	0.72	24.99	111	0.04
Hilleshog 7111	292.73	101	0.83	7125.9	109	0.17	1.17	99	0.75	23.9	106	0.26
Hilleshog 7114	301.92	104	0.19	7060	108	0.22	1.19	101	0.86	23.27	103	0.55
Hilleshog 7118	293.12	101	0.79	5313.9	81	0	1.17	99	0.79	18.54	82	0
Hilleshog 7120	289.88	100	0.9	6741.1	103	0.66	1.18	100	0.99	23.01	102	0.7
Hilleshog 7121	282.82	97	0.34	6765.5	103	0.62	1.22	103	0.28	23.74	105	0.32
Holly Hybrid 00HX019	302.8	104	0.16	5732.1	87	0.05	1.14	96	0.19	19.22	85	0.01
Holly Hybrid 00HX026	301.51	104	0.21	5928.8	90	0.12	1.14	96	0.2	19.5	86	0.01
Holly Hybrid 00HX027	285.17	98	0.49	6323.1	96	0.56	1.2	102	0.51	22.13	98	0.72
Seedex SX1017	296.56	102	0.5	5058.8	77	0	1.16	98	0.56	17.19	76	0
Seedex SX1019	286.55	98	0.6	6565.5	100	0.99	1.2	101	0.68	22.95	102	0.74
Vanderhave H46109	286.07	98	0.56	5864	89	0.09	1.2	102	0.56	20.39	90	0.07
Vanderhave H68108	269.25	93	0.01	6639.4	101	0.85	1.26	106	0.02	24.66	109	0.08
Vanderhave H68211	281.63	97	0.27	6425.5	98	0.74	1.22	103	0.26	23.07	102	0.66
Check Mean	**290.93**			**6561**			**1.18**			**22.55**		
Coeff. of Var. (%)	**5.68**			**11.46**			**5.49**			**9.73**		
F Value	**1.13ns**			**2.60****			**1.02ns**			**4.03****		
Mean LSD (0.05)	**24.02**	**8**		**1167.3**	**18**		**0.1**	**8**		**3.4**	**15**	
Mean LSD (0.01)	**31.83**	**11**		**1548.6**	**24**		**0.13**	**11**		**4.51**	**20**	

5612 Lake Lillian/Schmoll **(Continued)**

AMERICAN CRYSTAL SUGAR CO. - TECH SERV. CENTER **SMBSC Semi Commercial (Non-Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Sugar %			Vigor			Emergence			Tare		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta 4811R	15.53	99	0.62	35.38	93	0.59	77.1	103	0.48	2.95	92	0.67
Beta 6904	15.46	98	0.5	31.57	83	0.21	68.33	91	0.06	3.03	94	0.76
Beta BM0901	15.11	96	0.12	49.99	131	0.03	79.15	106	0.19	2.34	73	0.15
Beta BM0902	15.67	100	0.88	42.25	110	0.45	66.65	89	0.02	3.13	97	0.89
Beta M813	16.42	104	0.08	42.16	110	0.46	69.11	92	0.1	2.94	92	0.66
Beta M815	16.18	103	0.24	33.53	88	0.37	69.44	93	0.12	2.65	83	0.36
Beta M932	16.54	105	0.04	31.97	84	0.23	67.77	91	0.04	3.19	99	0.97
Crystal 921	15.99	102	0.5	41.3	108	0.56	69.43	93	0.12	3.51	109	0.62
Crystal 956	15.68	100	0.91	40.58	106	0.66	82.97	111	0.02	1.5	47	0.01
Crystal R828	15.66	100	0.85	39.54	103	0.8	81.62	109	0.04	4.25	132	0.09
Crystal R932	15.93	101	0.61	40.23	105	0.71	71.88	96	0.39	2.92	91	0.63
Crystal RZT010	15.47	98	0.51	27.58	72	0.05	60.38	81	0	3.26	102	0.94
Hilleshog 1643	15.79	100	0.88	39.01	102	0.88	69.87	94	0.15	4.58	142	0.03
Hilleshog 7089	16.11	102	0.33	47.75	125	0.07	80.86	108	0.07	2	62	0.05
Hilleshog 7097	15.18	97	0.16	32.71	86	0.29	79.84	107	0.13	2.03	63	0.05
Hilleshog 7101	15.64	99	0.82	40.58	106	0.66	84.72	113	0	3.22	100	0.99
Hilleshog 7108	15.52	99	0.6	50.91	133	0.02	87.82	118	0	3.53	110	0.6
Hilleshog 7111	15.81	100	0.84	52.63	138	0.01	78.16	105	0.3	2.02	63	0.05
Hilleshog 7114	16.28	104	0.16	44.04	115	0.27	84.72	113	0	4.25	132	0.09
Hilleshog 7118	15.83	101	0.79	37.67	99	0.91	79.53	106	0.15	3.4	106	0.76
Hilleshog 7120	15.68	100	0.89	21.1	55	0	80.87	108	0.07	2.36	73	0.16
Hilleshog 7121	15.36	98	0.34	31.55	82	0.21	64.23	86	0	3.36	105	0.81
Holly Hybrid 00HX019	16.28	104	0.16	31.6	83	0.21	71.15	95	0.29	4.88	152	0.01
Holly Hybrid 00HX026	16.21	103	0.21	41.74	109	0.51	81.59	109	0.04	5.81	181	0
Holly Hybrid 00HX027	15.46	98	0.5	28.8	75	0.08	66.33	89	0.01	3.02	94	0.75
Seedex SX1017	15.99	102	0.5	53.83	141	0	85.82	115	0	5.11	159	0
Seedex SX1019	15.52	99	0.6	14.92	39	0	48.27	65	0	1.84	57	0.03
Vanderhave H46109	15.5	99	0.57	36.47	95	0.74	86.75	116	0	4.82	150	0.01
Vanderhave H68108	14.72	94	0.01	45.42	119	0.17	74.66	100	0.99	1.85	58	0.03
Vanderhave H68211	15.3	97	0.27	40.37	106	0.69	72.59	97	0.52	2.62	82	0.33
Check Mean	**15.73**			**38.24**			**74.72**			**3.21**		
Coeff. of Var. (%)	**4.87**			**25.83**			**9.04**			**37.71**		
F Value	**1.13ns**			**2.79****			**7.04****			**3.07****		
Mean LSD (0.05)	**1.11**	**7**		**15**	**39**		**9.52**	**13**		**1.73**	**54**	
Mean LSD (0.01)	**1.47**	**9**		**19.89**	**52**		**12.61**	**17**		**2.29**	**71**	

* Significant at 5%. ** Significant at 1%. Ns Not significant.

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

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

3rd column for trait is probability that detection of a diff. (from check mean) of this size due to chance.

5613 Clara City/Condon

AMERICAN CRYSTAL SUGAR CO. - TECH SERV. CENTER **SMBSC Semi Commercial (Non-Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Rec/T (lbs)			Rec/A (lbs)			Loss to Mol.			Yield (T/A)		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta 4811R	291.87	97	0.2	6089.3	108	0.22	1.17	103	0.22	20.74	111	0.06
Beta 6904	311.85	103	0.18	5787.7	103	0.69	1.1	97	0.3	18.55	99	0.89
Beta BM0901	298.65	99	0.69	6402.8	114	0.04	1.15	101	0.62	21.41	115	0.01
Beta BM0902	304.17	101	0.74	6182.7	110	0.14	1.14	100	0.99	20.32	109	0.13
Beta M813	298.45	99	0.67	5810.7	103	0.64	1.15	101	0.62	19.54	105	0.43
Beta M815	286.53	95	0.05	5112.3	91	0.15	1.2	106	0.04	17.77	95	0.39
Beta M932	307	102	0.48	5633.2	100	0.98	1.08	95	0.08	18.35	98	0.75
Crystal 921	304.63	101	0.69	5068.6	90	0.12	1.13	99	0.78	16.62	89	0.06
Crystal 956	301.66	100	1	5461	97	0.62	1.14	100	0.9	18.14	97	0.61
Crystal R828	287.44	95	0.06	5710.5	101	0.85	1.19	105	0.09	19.8	106	0.3
Crystal R932	303.83	101	0.77	5768.7	102	0.72	1.13	99	0.83	19.04	102	0.75
Crystal RZT010	288.06	95	0.07	5272.2	93	0.31	1.19	105	0.08	18.39	98	0.77
Hilleshog 1643	301.01	100	0.93	4933.8	87	0.05	1.09	96	0.19	16.34	87	0.03
Hilleshog 7089	301.52	100	0.99	6330.8	112	0.06	1.14	100	0.91	21.08	113	0.03
Hilleshog 7097	308.34	102	0.38	5988.3	106	0.34	1.11	98	0.43	19.4	104	0.51
Hilleshog 7101	308.28	102	0.38	5981.5	106	0.35	1.11	98	0.46	19.38	104	0.52
Hilleshog 7108	286.6	95	0.05	6185.8	110	0.14	1.2	105	0.05	21.62	116	0.01
Hilleshog 7111	303.72	101	0.79	6230.9	110	0.11	1.13	100	0.92	20.39	109	0.12
Hilleshog 7114	299.62	99	0.79	6273.4	111	0.08	1.15	101	0.68	20.94	112	0.04
Hilleshog 7118	308.47	102	0.37	4750.5	84	0.02	1.11	98	0.48	15.26	82	0
Hilleshog 7120	307.31	102	0.45	5226.7	93	0.25	1.11	98	0.5	16.99	91	0.11
Hilleshog 7121	296.56	98	0.5	5189.6	92	0.22	1.16	102	0.41	17.43	93	0.24
Holly Hybrid 00HX019	319.52	106	0.02	5714.6	101	0.84	1.05	92	0.01	17.91	96	0.47
Holly Hybrid 00HX026	314.52	104	0.09	5778.9	102	0.7	1.09	96	0.13	18.35	98	0.75
Holly Hybrid 00HX027	310.57	103	0.24	5574.5	99	0.85	1.11	97	0.35	17.83	95	0.42
Seedex SX1017	310.09	103	0.27	5070.7	90	0.12	1.11	98	0.4	16.36	88	0.03
Seedex SX1019	313.2	104	0.13	5580.8	99	0.87	1.09	96	0.17	17.7	95	0.36
Vanderhave H46109	300.15	100	0.84	4908.6	87	0.05	1.14	101	0.76	16.29	87	0.03
Vanderhave H68108	283.36	94	0.02	5529.9	98	0.76	1.21	107	0.01	19.52	104	0.44
Vanderhave H68211	292.74	97	0.24	5675.6	101	0.92	1.17	103	0.29	19.32	103	0.56
Check Mean	**301.66**			**5640.8**			**1.14**			**18.69**		
Coeff. of Var. (%)	**4.95**			**12.81**			**5.45**			**11.42**		
F Value	**1.48ns**			**1.59ns**			**1.56ns**			**2.35****		
Mean LSD (0.05)	**21.52**	**7**		**1033.4**	**18**		**0.09**	**8**		**3.06**	**16**	
Mean LSD (0.01)	**28.52**	**9**		**1369.3**	**24**		**0.12**	**10**		**4.06**	**22**	

5613 Clara City/Condon **(Continued)**

AMERICAN CRYSTAL SUGAR CO. - TECH SERV. CENTER **SMBSC Semi Commercial (Non-Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Sugar %			Vigor			Emergence			Tare		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta M815	15.77	97	0.2	30.38	100	0.99	50.81	81	0.01	1.38	69	0.17
Hilleshog 7097	16.7	103	0.17	15.02	49	0.02	66.3	106	0.38	2.14	107	0.74
Beta M813	16.08	99	0.7	47.95	157	0.01	70.39	113	0.07	1.81	90	0.67
Holly Hybrid 00HX019	16.34	101	0.72	20.76	68	0.13	55.79	89	0.14	2.31	116	0.47
Seedex SX1019	16.07	99	0.68	18.4	60	0.06	46.6	75	0	1.26	63	0.1
Seedex SX1017	15.52	96	0.05	35.02	115	0.48	73.47	118	0.01	3.12	156	0.01
Beta M932	16.43	101	0.54	22.94	75	0.24	56.78	91	0.21	2.44	122	0.31
Beta BM0902	16.36	101	0.69	41.29	135	0.09	66.03	106	0.41	2.53	127	0.23
Crystal RZT010	16.22	100	0.99	15.36	50	0.02	48.04	77	0	2.26	113	0.55
Crystal R828	15.56	96	0.06	31.65	104	0.86	69.03	111	0.14	2.21	111	0.62
Beta 4811R	16.32	101	0.77	40.08	131	0.14	59.16	95	0.47	2.13	107	0.75
Holly Hybrid 00HX027	15.59	96	0.08	36.54	120	0.35	58.38	94	0.37	1.28	64	0.11
Holly Hybrid 00HX026	16.14	100	0.83	39.52	130	0.16	67.29	108	0.27	2.57	129	0.2
Hilleshog 7121	16.21	100	0.99	17.85	59	0.05	58.89	94	0.43	1.39	70	0.18
Beta 6904	16.53	102	0.38	23.38	77	0.27	71.06	114	0.05	1.86	93	0.76
Hilleshog 7120	16.53	102	0.38	14.24	47	0.01	62.13	100	0.95	1.88	94	0.79
Hilleshog 7118	15.53	96	0.05	18.61	61	0.07	61.95	99	0.92	2.82	141	0.06
Vanderhave H68211	16.32	101	0.77	21	69	0.14	57.45	92	0.27	1.78	89	0.63
Hilleshog 7114	16.13	99	0.8	43.64	143	0.04	71.84	115	0.04	2.77	139	0.08
Hilleshog 7108	16.54	102	0.36	48.85	160	0.01	67.96	109	0.21	2.46	123	0.29
Vanderhave H68108	16.48	102	0.45	24.89	82	0.38	46.48	74	0	1.16	58	0.06
Vanderhave H46109	15.99	99	0.51	31.87	104	0.83	74.37	119	0.01	3.14	157	0.01
Beta BM0901	17.03	105	0.02	44.56	146	0.03	60.33	97	0.64	1.51	76	0.27
Hilleshog 1643	16.81	104	0.09	27.65	91	0.66	62.01	99	0.93	2.02	101	0.96
Hilleshog 7111	16.63	103	0.23	57.24	188	0	72.83	117	0.02	1.38	69	0.17
Hilleshog 7089	16.61	102	0.26	28.23	93	0.72	72.12	116	0.03	1.6	80	0.38
Crystal R932	16.75	103	0.13	23.67	78	0.29	53.01	85	0.04	1.22	61	0.08
Crystal 956	16.15	100	0.85	25	82	0.39	63.42	102	0.82	1.96	98	0.94
Hilleshog 7101	15.38	95	0.02	30.98	102	0.94	66.73	107	0.33	1.29	65	0.11
Crystal 921	15.81	97	0.24	38.39	126	0.22	61.18	98	0.78	2.17	109	0.7
Check Mean	**16.22**			**30.5**			**62.39**			**2**		
Coeff. of Var. (%)	**4.26**			**41.57**			**14.13**			**45.1**		
F Value	**1.47ns**			**3.04****			**3.31****			**1.65***		
Mean LSD (0.05)	**0.99**	**6**		**18.27**	**60**		**12.63**	**20**		**1.26**	**63**	
Mean LSD (0.01)	**1.32**	**8**		**24.2**	**79**		**16.73**	**27**		**1.68**	**84**	

* Significant at 5%. ** Significant at 1%. Ns Not significant.

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

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

3rd column for trait is probability that detection of a diff. (from check mean) of this size due to chance.

5614 Montevideo/Payne

AMERICAN CRYSTAL SUGAR CO. - TECH SERV. CENTER **SMBSC Semi Commercial (Non-Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Rec/T (lbs)			Rec/A (lbs)			Loss to Mol.			Yield (T/A)		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta M815	320.81	99	0.72	9434.6	106	0.29	1.07	101	0.71	29.05	105	0.29
Hilleshog 7097	323.65	100	0.99	8507.1	95	0.35	1.07	100	0.97	25.88	93	0.15
Beta M813	328.65	102	0.55	9825.2	110	0.06	1.04	98	0.37	30.07	109	0.06
Holly Hybrid 00HX019	348.5	108	0	8539.4	96	0.39	1	94	0.03	24.89	90	0.03
Seedex SX1019	320.03	99	0.65	9084.7	102	0.76	1.07	101	0.69	27.83	100	0.92
Seedex SX1017	333.39	103	0.24	8066	90	0.06	1.04	98	0.41	24.53	89	0.01
Beta M932	339.54	105	0.06	9157.8	102	0.64	1.02	96	0.14	26.74	97	0.45
Beta BM0902	336.15	104	0.13	8816.5	99	0.79	1.03	97	0.25	26.04	94	0.19
Crystal RZT010	305.05	94	0.03	8290.7	93	0.17	1.09	102	0.32	26.8	97	0.47
Crystal R828	308.81	95	0.07	8055.4	90	0.06	1.12	105	0.04	26.1	94	0.21
Beta 4811R	309.28	96	0.08	9081.4	102	0.76	1.1	104	0.14	29.95	108	0.08
Holly Hybrid 00HX027	308.96	95	0.08	8152.7	91	0.09	1.12	105	0.06	26.45	96	0.32
Holly Hybrid 00HX026	347.3	107	0.01	8442.8	94	0.29	1.02	96	0.14	24.29	88	0.01
Hilleshog 7121	315.92	98	0.34	9732.5	109	0.09	1.09	102	0.36	31.5	114	0
Beta 6904	339.26	105	0.06	8711.7	97	0.62	1.01	95	0.05	25.81	93	0.13
Hilleshog 7120	318.12	98	0.5	9271.6	104	0.48	1.08	102	0.45	28.79	104	0.39
Hilleshog 7118	321.82	99	0.82	7456.3	83	0	1.07	101	0.73	23.56	85	0
Vanderhave H68211	321.78	99	0.81	9559.4	107	0.19	1.06	100	0.86	29.55	107	0.14
Hilleshog 7114	332.5	103	0.29	9390.5	105	0.34	1.01	95	0.05	28.89	104	0.35
Hilleshog 7108	309.11	95	0.08	9545.7	107	0.2	1.09	103	0.25	30.55	110	0.03
Vanderhave H68108	316.74	98	0.4	9751.1	109	0.09	1.09	102	0.43	31.2	113	0.01
Vanderhave H46109	314.98	97	0.29	8193.5	92	0.11	1.09	102	0.39	25.77	93	0.13
Beta BM0901	320.57	99	0.7	10205	114	0.01	1.07	101	0.7	32.45	117	0
Hilleshog 1643	320.17	99	0.67	8464	95	0.31	1.07	101	0.74	26.63	96	0.4
Hilleshog 7111	337.67	104	0.09	10361	116	0	1.04	97	0.28	30.4	110	0.03
Hilleshog 7089	313.73	97	0.23	8870.5	99	0.88	1.1	103	0.25	27.84	101	0.91
Crystal R932	321.44	99	0.78	9059.8	101	0.8	1.06	100	0.86	28.54	103	0.5
Crystal 956	327.24	101	0.67	9548.5	107	0.2	1.05	99	0.64	29.8	108	0.1
Hilleshog 7101	328.49	101	0.56	8367.1	94	0.22	1.05	98	0.49	25.28	91	0.06
Crystal 921	322.05	99	0.84	8280.6	93	0.16	1.08	102	0.47	25.84	93	0.14
Check Mean	**323.72**			**8940.8**			**1.06**			**27.7**		
Coeff. of Var. (%)	**4.84**			**10.42**			**5.05**			**8.57**		
F Value	**1.96***			**2.22****			**1.34ns**			**3.44****		
Mean LSD (0.05)	**23.43**	**7**		**1332.8**	**15**		**0.08**	**7**		**3.59**	**13**	
Mean LSD (0.01)	**31.07**	**10**		**1766.2**	**20**		**0.1**	**9**		**4.76**	**17**	

5614 Montevideo/Payne **(Continued)**

AMERICAN CRYSTAL SUGAR CO. - TECH SERV. CENTER **SMBSC Semi Commercial (Non-Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Sugar %			Vigor			Emergence			Tare		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta M815	17.11	99	0.72	32.96	99	0.94	52.73	74	0	1.68	75	0.27
Hilleshog 7097	17.25	100	0.99	28.33	85	0.33	75.65	106	0.32	1.67	74	0.25
Beta M813	17.47	101	0.57	43.96	132	0.04	65.74	92	0.16	1.16	52	0.04
Holly Hybrid 00HX019	18.44	107	0	31.07	93	0.66	77.6	108	0.14	3.56	158	0.01
Seedex SX1019	17.07	99	0.65	20.51	61	0.01	53.53	75	0	1.9	85	0.5
Seedex SX1017	17.71	103	0.24	41.27	124	0.13	85.92	120	0	1.46	65	0.12
Beta M932	18	104	0.06	29.32	88	0.43	57.92	81	0	2.35	104	0.84
Beta BM0902	17.84	103	0.13	38.63	116	0.31	62.89	88	0.04	1.92	85	0.52
Crystal RZT010	16.34	95	0.02	20.6	62	0.02	59.47	83	0	2.31	103	0.91
Crystal R828	16.56	96	0.08	40.2	120	0.19	87.44	122	0	3.25	145	0.05
Beta 4811R	16.57	96	0.08	25.97	78	0.15	70.03	98	0.72	2.21	98	0.94
Holly Hybrid 00HX027	16.56	96	0.08	21.42	64	0.02	57.48	80	0	1.93	86	0.53
Holly Hybrid 00HX026	18.39	107	0	36.27	109	0.57	72.61	102	0.79	6.39	284	0
Hilleshog 7121	16.89	98	0.35	21.39	64	0.02	67.31	94	0.31	2.09	93	0.75
Beta 6904	17.97	104	0.06	29.66	89	0.47	75.87	106	0.29	2.11	94	0.79
Hilleshog 7120	16.99	98	0.5	22.35	67	0.04	75.67	106	0.32	1.72	76	0.3
Hilleshog 7118	17.17	100	0.83	32.42	97	0.85	78.44	110	0.1	1.67	74	0.26
Vanderhave H68211	17.15	99	0.8	41.67	125	0.11	76.66	107	0.21	1.95	87	0.56
Hilleshog 7114	17.64	102	0.31	34.89	105	0.77	77.4	108	0.16	1.79	80	0.37
Hilleshog 7108	16.55	96	0.07	53.3	160	0	77.81	109	0.13	1.94	86	0.54
Vanderhave H68108	16.92	98	0.4	26.52	79	0.19	67	94	0.27	1.89	84	0.48
Vanderhave H46109	16.83	98	0.28	31.79	95	0.76	82.99	116	0.01	2.52	112	0.59
Beta BM0901	17.1	99	0.7	43.32	130	0.06	83.7	117	0	2.73	121	0.35
Hilleshog 1643	17.08	99	0.66	35.92	108	0.62	66.46	93	0.22	3	133	0.15
Hilleshog 7111	17.91	104	0.09	38.64	116	0.31	74.4	104	0.49	0.98	44	0.01
Hilleshog 7089	16.78	97	0.23	43.56	131	0.05	75.01	105	0.4	4.39	195	0
Crystal R932	17.14	99	0.77	35.6	107	0.67	68.77	96	0.5	1.99	89	0.62
Crystal 956	17.42	101	0.67	29.82	89	0.49	72.8	102	0.76	1.5	67	0.14
Hilleshog 7101	17.47	101	0.57	31.31	94	0.69	76.02	106	0.28	0.84	38	0.01
Crystal 921	17.18	100	0.86	38.46	115	0.33	70.45	98	0.79	2.58	115	0.52
Check Mean	**17.25**			**33.37**			**71.52**			**2.25**		
Coeff. of Var. (%)	**4.26**			**29.2**			**11.37**			**45.16**		
F Value	**1.99****			**2.53****			**4.77****			**4.34****		
Mean LSD (0.05)	**1.1**	**6**		**14.75**	**44**		**11.74**	**16**		**1.45**	**65**	
Mean LSD (0.01)	**1.46**	**8**		**19.55**	**59**		**15.56**	**22**		**1.93**	**86**	

* Significant at 5%. ** Significant at 1%. Ns Not significant.

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

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

3rd column for trait is probability that detection of a diff. (from check mean) of this size due to chance.

5615 DeGraff/Bosch

AMERICAN CRYSTAL SUGAR CO. - TECH. SERV. CENTER **SMBSC Semi Commercial (Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

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Entry	Rec/T (lbs)			Rec/A (lbs)			Loss to Mol.			Yield (T/A)		
	Mean	%Test Mean	P-Val	Mean	%Test Mean	P-Val	Mean	%Test Mean	P-Val	Mean	%Test Mean	P-Val
Beta 4811R	301.81	96	0.13	8792.7	141	0	1.14	103	0.15	28.96	147	0
Beta 6904	299.05	96	0.06	4681.4	75	0	1.15	105	0.05	15.76	80	0.01
Beta BM0901	324.73	104	0.12	9063.6	146	0	1.05	96	0.1	27.64	140	0
Beta BM0902	309.95	99	0.67	6915.5	111	0.13	1.11	101	0.67	22.68	115	0.05
Beta M813	322.36	103	0.21	7958.2	128	0	1.07	97	0.27	24.72	125	0
Beta M815	305.15	97	0.29	5130.2	83	0.02	1.12	102	0.34	16.76	85	0.04
Beta M932	323.29	103	0.17	5933.3	95	0.54	1.06	97	0.15	18.31	93	0.32
Crystal 921	312.26	100	0.91	5265	85	0.04	1.1	100	0.95	16.73	85	0.04
Crystal 956	306.22	98	0.36	5758.7	93	0.32	1.12	102	0.38	18.63	94	0.44
Crystal R828	332.19	106	0.01	9152.1	147	0	1.04	94	0.02	27.7	140	0
Crystal R932	324.83	104	0.12	8436.8	136	0	1.06	97	0.21	26.77	135	0
Crystal RZT010	314.29	100	0.87	7374.7	119	0.01	1.09	99	0.7	23.19	117	0.02
Hilleshog 1643	288.51	92	0	2852.3	46	0	1.19	108	0	9.95	50	0
Hilleshog 7089	309.16	99	0.6	5471.3	88	0.11	1.11	101	0.7	17.6	89	0.14
Hilleshog 7097	318.55	102	0.46	4807.6	77	0	1.08	98	0.41	15.09	76	0
Hilleshog 7101	306.48	98	0.37	4555.5	73	0	1.12	102	0.4	14.76	75	0
Hilleshog 7108	324.86	104	0.12	9291.8	150	0	1.05	96	0.08	28.55	145	0
Hilleshog 7111	339.13	108	0	7587.6	122	0	1.02	93	0	22.06	112	0.11
Hilleshog 7114	295.63	94	0.02	4767.1	77	0	1.16	106	0.01	16.28	82	0.02
Hilleshog 7118	317.43	101	0.56	3812.4	61	0	1.08	98	0.46	11.99	61	0
Hilleshog 7120	304.87	97	0.27	3985.5	64	0	1.13	103	0.3	13.17	67	0
Hilleshog 7121	303.56	97	0.2	7580.7	122	0	1.13	103	0.2	24.92	126	0
Holly Hybrid 00HX019	329.84	105	0.03	6939.6	112	0.12	1.03	94	0.02	21.05	107	0.37
Holly Hybrid 00HX026	322.61	103	0.2	5352.7	86	0.06	1.06	97	0.17	16.42	83	0.02
Holly Hybrid 00HX027	335.07	107	0	7654.3	123	0	1.03	93	0.01	22.69	115	0.04
Seedex SX1017	307.82	98	0.48	5157.8	83	0.02	1.12	102	0.48	16.77	85	0.04
Seedex SX1019	317.42	101	0.56	5381.1	87	0.07	1.08	98	0.43	17.03	86	0.06
Vanderhave H46109	308.87	99	0.57	5936.3	96	0.55	1.11	101	0.66	19.21	97	0.71
Vanderhave H68108	291.85	93	0.01	5908	95	0.51	1.18	107	0	20.51	104	0.6
Vanderhave H68211	295.14	94	0.02	4938.3	79	0.01	1.16	106	0.02	16.74	85	0.04
Check Mean	**313.1**			**6214.7**			**1.1**			**19.76**		
Coeff. of Var. (%)	**4.52**			**14.93**			**4.63**			**14.84**		
F Value	**2.90****			**13.79****			**2.81****			**12.22****		
Mean LSD (0.05)	**21.21**	**7**		**1314.4**	**21**		**0.08**	**7**		**4.12**	**21**	
Mean LSD (0.01)	**28.11**	**9**		**1741.6**	**28**		**0.1**	**9**		**5.46**	**28**	

5615 DeGraff/Bosch **(Continued)**

AMERICAN CRYSTAL SUGAR CO. - TECH. SERV. CENTER **SMBSC Semi Commercial (Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Sugar %			Emergence 1			Emergence 2 (%)			Tare %		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta 4811R	16.23	97	0.13	29.15	86	0.4	56.62	78	0	1.34	78	0.42
Beta 6904	16.1	96	0.06	22.92	68	0.05	52.45	72	0	1.42	83	0.53
Beta BM0901	17.29	103	0.12	48.97	145	0.01	73.17	100	0.94	1.11	65	0.21
Beta BM0902	16.61	99	0.67	36.1	107	0.69	65.62	90	0.11	1.68	98	0.93
Beta M813	17.19	103	0.21	36.47	108	0.64	75.7	104	0.52	1.59	93	0.79
Beta M815	16.38	98	0.28	39.92	118	0.28	71.17	98	0.72	1.13	66	0.21
Beta M932	17.22	103	0.17	28.12	83	0.31	78.12	107	0.24	2.18	127	0.33
Crystal 921	16.71	100	0.91	25.35	75	0.13	75	103	0.63	2.56	149	0.08
Crystal 956	16.43	98	0.36	45.5	134	0.04	91.67	126	0	1.53	89	0.69
Crystal R828	17.65	105	0.01	45.85	135	0.03	83.32	114	0.02	2.39	139	0.16
Crystal R932	17.31	103	0.11	36.45	108	0.64	75.7	104	0.52	1.45	84	0.57
Crystal RZT010	16.8	100	0.89	30.2	89	0.51	73.6	101	0.86	1.41	82	0.52
Hilleshog 1643	15.62	93	0	38.2	113	0.44	77.45	106	0.31	1.73	100	0.99
Hilleshog 7089	16.57	99	0.59	26.4	78	0.18	74.32	102	0.74	2.03	118	0.51
Hilleshog 7097	17	101	0.47	27.07	80	0.23	78.1	107	0.24	1.69	98	0.95
Hilleshog 7101	16.44	98	0.37	35.45	105	0.78	81.57	112	0.06	0.98	57	0.12
Hilleshog 7108	17.3	103	0.12	41.7	123	0.16	79.5	109	0.14	1.39	81	0.49
Hilleshog 7111	17.98	107	0	41.32	122	0.18	73.97	102	0.8	1.27	74	0.35
Hilleshog 7114	15.95	95	0.02	42.7	126	0.12	79.87	110	0.12	2.34	136	0.19
Hilleshog 7118	16.95	101	0.57	43.07	127	0.1	84	115	0.01	1.42	83	0.54
Hilleshog 7120	16.37	98	0.27	20.15	60	0.02	77.07	106	0.35	1.7	99	0.98
Hilleshog 7121	16.31	97	0.2	23.65	70	0.07	64.57	89	0.07	1.85	108	0.77
Holly Hybrid 00HX019	17.53	105	0.03	34	100	0.98	65.97	91	0.13	1.86	108	0.77
Holly Hybrid 00HX026	17.19	103	0.21	33.35	98	0.93	79.17	109	0.16	2.96	173	0.01
Holly Hybrid 00HX027	17.78	106	0	16.67	49	0	48.92	67	0	1.01	59	0.14
Seedex SX1017	16.51	99	0.48	53.47	158	0	81.27	112	0.06	3.37	196	0
Seedex SX1019	16.95	101	0.57	16.65	49	0	58.65	81	0	1.45	84	0.57
Vanderhave H46109	16.55	99	0.56	31.95	94	0.73	68.42	94	0.33	1.68	98	0.94
Vanderhave H68108	15.77	94	0.01	29.87	88	0.48	63.17	87	0.03	1.64	96	0.87
Vanderhave H68211	15.92	95	0.02	35.1	104	0.82	76.37	105	0.43	1.34	78	0.43
Check Mean	**16.75**			**33.86**			**72.82**			**1.72**		
Coeff. of Var. (%)	**3.92**			**33.5**			**12.58**			**55.18**		
F Value	**2.91****			**2.70****			**4.50****			**1.36ns**		
Mean LSD (0.05)	**0.99**	**6**		**15.94**	**47**		**12.87**	**18**		**1.35**	**79**	
Mean LSD (0.01)	**1.31**	**8**		**21.13**	**62**		**17.05**	**23**		**1.79**	**105**	

* Significant at 5%. ** Significant at 1%. Ns Not significant.
Mean LSD is only appropriate for comparing entry means with each other when F value is significant.

2nd column for each trait is percent of check. General Mean used as check.
3rd column for trait is probability that detection of a diff. (from check mean) of this size due to chance.

5616 Lueschen & Noble

AMERICAN CRYSTAL SUGAR CO. - TECH SERV. CENTER **SMBSC Semi Commercial (Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Rec/T (lbs)			Rec/A (lbs)			Loss to Mol.			Yield (T/A)		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta 4811R	289.95	104	0.22	9030.3	110	0.12	1.19	97	0.26	30.8	105	0.37
Beta 6904	281.53	101	0.79	6514.5	79	0	1.22	100	0.85	23.36	80	0
Beta BM0901	270.9	97	0.34	9324.1	114	0.04	1.26	103	0.19	34.45	117	0
Beta BM0902	290.8	104	0.18	9165.2	112	0.07	1.18	96	0.15	31.79	108	0.13
Beta M813	300.3	108	0.02	9345.3	114	0.03	1.15	94	0.01	31.07	106	0.28
Beta M815	255.77	92	0.01	7641.9	93	0.3	1.31	107	0.01	29.48	100	0.93
Beta M932	278.74	100	0.96	8201.9	100	0.99	1.22	100	0.97	29.37	100	0.98
Crystal 921	289.97	104	0.22	7520.9	92	0.21	1.18	97	0.22	26.04	89	0.04
Crystal 956	278.47	100	0.93	8827.7	108	0.24	1.22	100	0.99	31.46	107	0.19
Crystal R828	288.7	103	0.28	8807.6	107	0.25	1.19	97	0.29	30.28	103	0.56
Crystal R932	277.88	100	0.88	8115.6	99	0.88	1.23	101	0.79	29.04	99	0.85
Crystal RZT010	272.9	98	0.47	9343.4	114	0.03	1.25	102	0.43	34.3	117	0
Hilleshog 1643	269.39	96	0.26	6103.9	74	0	1.27	104	0.13	22.68	77	0
Hilleshog 7089	277.66	99	0.86	8757.2	107	0.29	1.23	101	0.78	31.51	107	0.18
Hilleshog 7097	286.63	103	0.39	9506	116	0.02	1.2	98	0.39	33.05	113	0.02
Hilleshog 7101	276.73	99	0.78	8493.7	104	0.58	1.23	101	0.79	30.68	105	0.41
Hilleshog 7108	289.73	104	0.23	8999.7	110	0.13	1.18	97	0.2	31.29	107	0.23
Hilleshog 7111	302.33	108	0.01	9346.5	114	0.03	1.14	93	0.01	30.99	106	0.31
Hilleshog 7114	268.08	96	0.2	7241.4	88	0.08	1.27	104	0.1	26.95	92	0.14
Hilleshog 7118	263.31	94	0.07	6588.4	80	0	1.27	104	0.14	25.15	86	0.01
Hilleshog 7120	288.46	103	0.29	8728.7	106	0.32	1.19	97	0.28	30.21	103	0.59
Hilleshog 7121	275.91	99	0.7	7742.6	94	0.39	1.24	101	0.58	28.17	96	0.47
Holly Hybrid 00HX019	279.55	100	0.97	6888.4	84	0.02	1.22	100	0.94	24.68	84	0
Holly Hybrid 00HX026	305.32	109	0	8032.3	98	0.76	1.12	92	0	26.23	89	0.06
Holly Hybrid 00HX027	292.74	105	0.12	8733	107	0.31	1.17	96	0.09	29.88	102	0.74
Seedex SX1017	262.68	94	0.06	5955.5	73	0	1.28	105	0.06	22.76	78	0
Seedex SX1019	285.66	102	0.46	9913.8	121	0	1.2	98	0.46	34.94	119	0
Vanderhave H46109	276.77	99	0.78	7618.4	93	0.28	1.24	101	0.64	27.57	94	0.28
Vanderhave H68108	236.15	85	0	6637.1	81	0	1.34	110	0	28.48	97	0.6
Vanderhave H68211	262.88	94	0.06	8768.1	107	0.28	1.29	105	0.04	33.42	114	0.01
Check Mean	**279.2**			**8196.4**			**1.22**			**29.34**		
Coeff. of Var. (%)	**5.93**			**12.58**			**4.71**			**10.79**		
F Value	**2.63****			**4.05****			**2.51****			**4.25****		
Mean LSD (0.05)	**24.74**	**9**		**1517.5**	**19**		**0.09**	**7**		**4.62**	**16**	
Mean LSD (0.01)	**32.8**	**12**		**2011.1**	**25**		**0.11**	**9**		**6.12**	**21**	

5616 Lueschen & Noble **(Continued)**

AMERICAN CRYSTAL SUGAR CO. - TECH SERV. CENTER **SMBSC Semi Commercial (Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

Entry	Sugar %			Emergence 1			Emergence 2 (%)			Tare %		
	Mean	%Test Mean	P-Val	Mean	%Test Mean	P-Val	Mean	%Test Mean	P-Val	Mean	%Test Mean	P-Val
Beta 4811R	15.69	103	0.21	37.6	84	0.05	57.57	107	0.38	2.12	79	0.4
Beta 6904	15.29	101	0.78	32.75	73	0	52.7	98	0.76	2.34	88	0.61
Beta BM0901	14.81	98	0.35	41.07	91	0.29	59.27	110	0.19	1.32	49	0.04
Beta BM0902	15.72	104	0.19	59.12	132	0	48.55	90	0.19	2.07	78	0.36
Beta M813	16.16	106	0.02	33.42	74	0	55.5	103	0.7	1.92	72	0.25
Beta M815	14.1	93	0.01	47.32	105	0.52	55.45	103	0.71	2.28	85	0.55
Beta M932	15.16	100	0.96	40.75	91	0.25	54.47	101	0.9	2.37	89	0.65
Crystal 921	15.68	103	0.22	54.62	122	0.01	65.2	121	0.01	3.27	123	0.35
Crystal 956	15.15	100	0.93	36.22	81	0.02	36.7	68	0	1.94	73	0.26
Crystal R828	15.63	103	0.27	51.15	114	0.09	41.97	78	0	2.96	111	0.65
Crystal R932	15.12	100	0.89	34.82	77	0.01	51.65	96	0.57	3.18	119	0.43
Crystal RZT010	14.89	98	0.47	37.6	84	0.05	57.57	107	0.38	2.33	87	0.6
Hilleshog 1643	14.74	97	0.27	45.22	101	0.94	60.35	112	0.12	4.24	159	0.02
Hilleshog 7089	15.11	100	0.87	39.02	87	0.11	37.4	69	0	2.65	99	0.98
Hilleshog 7097	15.53	102	0.39	52.85	118	0.03	41.6	77	0	1.85	69	0.21
Hilleshog 7101	15.07	99	0.78	48.35	108	0.35	67.6	125	0	2.31	87	0.58
Hilleshog 7108	15.67	103	0.23	51.82	115	0.06	69.7	129	0	2.61	98	0.93
Hilleshog 7111	16.26	107	0.01	46.62	104	0.65	35	65	0	1.81	68	0.19
Hilleshog 7114	14.68	97	0.21	53.25	118	0.03	67.97	126	0	2.55	96	0.86
Hilleshog 7118	14.43	95	0.07	40.37	90	0.21	52.37	97	0.7	4.04	151	0.04
Hilleshog 7120	15.61	103	0.29	47.67	106	0.46	18.7	35	0	1.41	53	0.05
Hilleshog 7121	15.03	99	0.71	41.77	93	0.38	56.9	105	0.47	4.04	151	0.04
Holly Hybrid 00HX019	15.2	100	0.96	40.05	89	0.18	60.35	112	0.12	3.28	123	0.34
Holly Hybrid 00HX026	16.39	108	0	48.37	108	0.35	66.6	123	0	4.63	174	0
Holly Hybrid 00HX027	15.81	104	0.12	54.6	121	0.01	66.6	123	0	1.83	69	0.2
Seedex SX1017	14.41	95	0.06	52.52	117	0.04	60	111	0.14	4.01	150	0.04
Seedex SX1019	15.48	102	0.46	63.32	141	0	78.72	146	0	1.96	74	0.28
Vanderhave H46109	15.07	99	0.79	50.45	112	0.13	53.77	100	0.97	4.33	162	0.01
Vanderhave H68108	13.15	87	0	41.77	93	0.38	39.52	73	0	2.26	85	0.53
Vanderhave H68211	14.43	95	0.07	24.07	54	0	48.55	90	0.19	2.11	79	0.39
Check Mean	**15.18**			**44.95**			**53.94**			**2.67**		
Coeff. of Var. (%)	**5.08**			**16.47**			**15.36**			**49.46**		
F Value	**2.64****			**5.55****			**9.29****			**1.95****		
Mean LSD (0.05)	**1.15**	**8**		**10.4**	**23**		**11.65**	**22**		**1.85**	**69**	
Mean LSD (0.01)	**1.53**	**10**		**13.78**	**31**		**15.43**	**29**		**2.45**	**92**	

* Significant at 5%. ** Significant at 1%. Ns Not significant.

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

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

3rd column for trait is probability that detection of a diff. (from check mean) of this size due to chance.

5617 Rudeen/Bird Island

AMERICAN CRYSTAL SUGAR CO. - TECH SERV. CENTER **SMBSC Semi Commercial (Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Rec/T (lbs)			Rec/A (lbs)			Loss to Mol.			Yield (T/A)		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta 4811R	281.63	98	0.51	5763.6	142	0	1.22	101	0.6	20.41	144	0
Beta 6904	287.63	100	0.84	3175.3	78	0	1.19	99	0.81	10.93	77	0
Beta BM0901	291.97	102	0.41	5866.8	145	0	1.18	98	0.41	20.1	142	0
Beta BM0902	290.02	101	0.59	4551.5	112	0.1	1.18	98	0.51	15.69	111	0.1
Beta M813	299.01	104	0.07	5226.2	129	0	1.15	96	0.09	17.5	124	0
Beta M815	285.55	100	0.92	3829	94	0.45	1.2	100	0.99	13.32	94	0.38
Beta M932	291.99	102	0.41	3644	90	0.17	1.18	98	0.45	12.55	89	0.09
Crystal 921	296.52	104	0.14	3865.3	95	0.53	1.15	96	0.12	13.1	93	0.27
Crystal 956	292.43	102	0.38	3761.5	93	0.33	1.18	98	0.4	12.71	90	0.13
Crystal R828	273.73	96	0.07	5243.1	129	0	1.25	104	0.14	19.24	136	0
Crystal R932	299.46	105	0.06	5439.6	134	0	1.14	95	0.06	18.14	128	0
Crystal RZT010	277.22	97	0.2	4905	121	0.01	1.24	103	0.24	17.65	125	0
Hilleshog 1643	268.38	94	0.01	2303.2	57	0	1.27	106	0.03	8.55	60	0
Hilleshog 7089	281.32	98	0.48	3467.6	86	0.05	1.22	101	0.59	12.3	87	0.05
Hilleshog 7097	296.49	104	0.14	3248.6	80	0.01	1.21	101	0.81	11	78	0
Hilleshog 7101	294.29	103	0.25	3462.7	85	0.05	1.17	97	0.25	11.75	83	0.01
Hilleshog 7108	276.04	96	0.14	5041.9	124	0	1.24	103	0.2	18.22	129	0
Hilleshog 7111	296.65	104	0.14	5348.4	132	0	1.16	96	0.15	18.09	128	0
Hilleshog 7114	279.63	98	0.34	3252.2	80	0.01	1.22	102	0.49	11.56	82	0.01
Hilleshog 7118	306.96	107	0	2651.8	65	0	1.17	97	0.28	8.62	61	0
Hilleshog 7120	281.75	98	0.52	2896.2	71	0	1.22	101	0.65	10.21	72	0
Hilleshog 7121	277.11	97	0.19	3568.3	88	0.11	1.23	103	0.3	12.86	91	0.17
Holly Hybrid 00HX019	292.78	102	0.35	4691.2	116	0.04	1.17	98	0.35	16.01	113	0.05
Holly Hybrid 00HX026	274.35	96	0.09	3377.2	83	0.03	1.24	103	0.17	12.24	86	0.05
Holly Hybrid 00HX027	285.91	100	0.96	4103.5	101	0.87	1.19	99	0.81	14.46	102	0.74
Seedex SX1017	289.47	101	0.64	3206.6	79	0.01	1.19	99	0.62	11.1	78	0
Seedex SX1019	289.99	101	0.59	3934.7	97	0.69	1.19	99	0.65	13.53	96	0.51
Vanderhave H46109	279.38	98	0.33	3878.8	96	0.56	1.22	102	0.45	13.89	98	0.78
Vanderhave H68108	269.8	94	0.02	4450.1	110	0.19	1.26	104	0.08	16.44	116	0.02
Vanderhave H68211	280.23	98	0.39	3468.5	86	0.05	1.22	102	0.49	12.37	87	0.06
Check Mean	**286.26**			**4054.1**			**1.2**			**14.15**		
Coeff. of Var. (%)	**4.83**			**14.76**			**4.97**			**13.14**		
F Value	**1.85***			**9.92****			**1.21ns**			**12.23****		
Mean LSD (0.05)	**19.86**	**7**		**853.75**	**21**		**0.09**	**7**		**2.69**	**19**	
Mean LSD (0.01)	**26.32**	**9**		**1131.3**	**28**		**0.11**	**9**		**3.57**	**25**	

5617 Rudeen/Bird Island **(Continued)**

AMERICAN CRYSTAL SUGAR CO. - TECH SERV. CENTER **SMBSC Semi Commercial (Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

Entry	Sugar %			Emergence 1			Emergence 2 (%)			Tare %		
	Mean	%Test Mean	P-Val	Mean	%Test Mean	P-Val	Mean	%Test Mean	P-Val	Mean	%Test Mean	P-Val
Beta 4811R	15.3	99	0.5	47.74	86	0.12	52.92	90	0.29	2.09	59	0.05
Beta 6904	15.58	100	0.85	38.99	70	0	37.51	64	0	3.8	108	0.72
Beta BM0901	15.78	102	0.42	75.16	135	0	70.85	120	0.04	3.34	94	0.79
Beta BM0902	15.68	101	0.6	53.43	96	0.68	50.75	86	0.15	3.78	107	0.74
Beta M813	16.1	104	0.07	52.37	94	0.53	58.17	99	0.89	2.97	84	0.45
Beta M815	15.48	100	0.91	60.98	110	0.28	64.11	109	0.36	2.06	58	0.05
Beta M932	15.78	102	0.41	52.39	94	0.53	57.15	97	0.75	3.95	112	0.58
Crystal 921	15.98	103	0.15	58.52	105	0.55	61.9	105	0.6	3.03	86	0.5
Crystal 956	15.8	102	0.38	66.51	120	0.03	68.2	116	0.1	2	57	0.04
Crystal R828	14.93	96	0.07	68.45	123	0.01	74.9	127	0.01	3.5	99	0.96
Crystal R932	16.12	104	0.06	53.39	96	0.67	60.83	103	0.74	3.01	85	0.48
Crystal RZT010	15.1	97	0.2	52.19	94	0.51	59.94	102	0.86	3.62	102	0.91
Hilleshog 1643	14.69	95	0.01	52.13	94	0.5	52.36	89	0.25	5.5	155	0.01
Hilleshog 7089	15.28	99	0.47	60.91	110	0.28	65.83	112	0.23	5.38	152	0.02
Hilleshog 7097	16.03	103	0.11	59.48	107	0.43	63.97	109	0.38	2.28	64	0.09
Hilleshog 7101	15.88	102	0.25	58.94	106	0.5	62.06	105	0.58	4.03	114	0.51
Hilleshog 7108	15.04	97	0.14	55.23	99	0.95	58.81	100	0.98	2.26	64	0.09
Hilleshog 7111	15.99	103	0.14	58.22	105	0.59	57.97	98	0.86	1.68	47	0.01
Hilleshog 7114	15.2	98	0.34	64.04	115	0.09	75.92	129	0	4.89	138	0.07
Hilleshog 7118	16.52	106	0	67.26	121	0.02	73.1	124	0.01	4.57	129	0.17
Hilleshog 7120	15.3	99	0.51	50.75	91	0.34	56.81	96	0.71	1.97	56	0.04
Hilleshog 7121	15.09	97	0.19	35.63	64	0	41.51	70	0	3.32	94	0.77
Holly Hybrid 00HX019	15.81	102	0.36	45.71	82	0.05	47.28	80	0.04	5.14	145	0.03
Holly Hybrid 00HX026	14.96	96	0.09	57.41	103	0.71	59.74	101	0.89	4.01	113	0.53
Holly Hybrid 00HX027	15.49	100	0.94	49.93	90	0.27	55.16	94	0.5	3.19	90	0.64
Seedex SX1017	15.66	101	0.65	67.2	121	0.02	72.44	123	0.02	4.94	140	0.06
Seedex SX1019	15.69	101	0.59	36.44	66	0	34.99	59	0	3.29	93	0.74
Vanderhave H46109	15.19	98	0.32	66.5	120	0.03	69.97	119	0.05	3.68	104	0.85
Vanderhave H68108	14.75	95	0.02	48.8	88	0.18	53.02	90	0.3	4.17	118	0.4
Vanderhave H68211	15.23	98	0.38	51.01	92	0.37	50.08	85	0.12	4.67	132	0.13
Check Mean	**15.51**			**55.52**			**58.94**			**3.54**		
Coeff. of Var. (%)	**4.12**			**17.97**			**18.79**			**40.72**		
F Value	**1.90***			**3.49****			**3.28****			**2.03****		
Mean LSD (0.05)	**0.92**	**6**		**14.27**	**26**		**16.17**	**27**		**2.13**	**60**	
Mean LSD (0.01)	**1.21**	**8**		**18.91**	**34**		**21.42**	**36**		**2.82**	**80**	

* Significant at 5%. ** Significant at 1%. Ns Not significant.

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

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

3rd column for trait is probability that detection of a diff. (from check mean) of this size due to chance.

5618 Fischer/Buffalo Lake

AMERICAN CRYSTAL SUGAR CO. - TECH SERV. CENTER **SMBSC Semi Commercial (Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Rec/T (lbs)			Rec/A (lbs)			Loss to Mol.			Yield (T/A)		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta 4811R	319.51	101	0.65	10187	155	0	1.07	98	0.5	31.61	153	0
Beta 6904	322.64	102	0.4	4743.1	72	0	1.06	97	0.34	14.86	72	0
Beta BM0901	333.08	105	0.03	9275.1	141	0	1.03	94	0.04	27.77	134	0
Beta BM0902	309.82	98	0.45	7640.2	116	0.02	1.1	101	0.66	24.85	120	0
Beta M813	334.31	106	0.02	9183.9	140	0	1.03	94	0.04	27.23	131	0
Beta M815	304.22	96	0.15	5897.5	90	0.13	1.13	104	0.17	19.39	94	0.32
Beta M932	320.24	101	0.59	6102.4	93	0.29	1.07	99	0.57	18.68	90	0.13
Crystal 921	319.48	101	0.65	5973.5	91	0.18	1.08	99	0.7	18.44	89	0.09
Crystal 956	314.58	100	0.87	5060.3	77	0	1.09	100	0.93	16.36	79	0
Crystal R828	321.37	102	0.49	9403.8	143	0	1.07	98	0.4	29.52	142	0
Crystal R932	327.25	104	0.16	10087	153	0	1.05	96	0.16	30.76	148	0
Crystal RZT010	315.64	100	0.98	8056.6	122	0	1.09	100	0.94	25.85	125	0
Hilleshog 1643	284.55	90	0	3822.3	58	0	1.21	111	0	13.31	64	0
Hilleshog 7089	320.37	101	0.57	6316.8	96	0.56	1.07	98	0.44	19.3	93	0.28
Hilleshog 7097	312.79	99	0.7	5585.4	85	0.03	1.1	101	0.76	17.48	84	0.02
Hilleshog 7101	308.52	98	0.36	5034.2	77	0	1.11	102	0.47	16.25	78	0
Hilleshog 7108	339.9	108	0	9978.5	152	0	1.01	93	0.01	28.98	140	0
Hilleshog 7111	332.48	105	0.04	9460	144	0	1.03	94	0.04	28.67	138	0
Hilleshog 7114	297.66	94	0.03	4364	66	0	1.16	106	0.03	14.94	72	0
Hilleshog 7118	312.53	99	0.68	3940.5	60	0	1.1	101	0.72	12.75	61	0
Hilleshog 7120	292.35	93	0	3244.1	49	0	1.17	108	0	11.48	55	0
Hilleshog 7121	293.16	93	0.01	6562.8	100	0.97	1.17	108	0	22.59	109	0.16
Holly Hybrid 00HX019	345.89	110	0	7767.7	118	0.01	1.01	92	0	23.01	111	0.09
Holly Hybrid 00HX026	342.87	109	0	4816.7	73	0	1.01	92	0	14.73	71	0
Holly Hybrid 00HX027	314.11	99	0.83	8284	126	0	1.1	101	0.78	26.45	128	0
Seedex SX1017	316.58	100	0.93	4312.4	66	0	1.08	99	0.78	13.33	64	0
Seedex SX1019	315.46	100	0.96	6024.9	92	0.22	1.09	100	0.99	19.13	92	0.23
Vanderhave H46109	302.25	96	0.09	5113.7	78	0	1.14	104	0.12	17.08	82	0.01
Vanderhave H68108	301.7	96	0.08	5867	89	0.12	1.14	104	0.09	19.61	95	0.4
Vanderhave H68211	300.17	95	0.05	5289.4	80	0.01	1.14	105	0.06	17.4	84	0.01
Check Mean	**315.85**			**6579.8**			**1.09**			**20.73**		
Coeff. of Var. (%)	**5.06**			**12.87**			**5.29**			**11.83**		
F Value	**3.43****			**21.64****			**3.07****			**20.60****		
Mean LSD (0.05)	**22.94**	**7**		**1282.7**	**19**		**0.08**	**8**		**3.79**	**18**	
Mean LSD (0.01)	**30.4**	**10**		**1700.7**	**26**		**0.11**	**10**		**5.03**	**24**	

5618 Fischer/Buffalo Lake **(Continued)**

AMERICAN CRYSTAL SUGAR CO. - TECH SERV. CENTER **SMBSC Semi Commercial (Disease)**

30 Entries 4 Reps X Loc 2 Rows/Plot 1 Samples/Plot **Coded Trial - Lattice**

	Sugar %			Emergence 1			Emergence 2 (%)			Tare %		
Entry	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**	**Mean**	**%Test Mean**	**P-Val**
Beta 4811R	17.05	101	0.66	23.29	99	0.96	55.2	88	0.18	2.57	64	0.07
Beta 6904	17.19	102	0.4	22.81	97	0.89	49.3	78	0.02	4.68	117	0.39
Beta BM0901	17.68	105	0.03	38.67	164	0	68.08	108	0.39	2.94	73	0.17
Beta BM0902	16.59	98	0.44	29.39	125	0.25	52.1	83	0.06	2.97	74	0.19
Beta M813	17.74	105	0.02	30.69	130	0.16	67.35	107	0.46	3.63	91	0.63
Beta M815	16.34	97	0.15	24.61	105	0.83	59.73	95	0.57	3.56	89	0.57
Beta M932	17.09	101	0.59	25.36	108	0.72	58.68	93	0.45	4.54	113	0.49
Crystal 921	17.05	101	0.65	23.52	100	1	64.58	102	0.79	3.8	95	0.79
Crystal 956	16.82	100	0.86	25.54	109	0.69	54.5	86	0.14	2.4	60	0.04
Crystal R828	17.13	101	0.5	35.34	150	0.02	77.43	123	0.01	3.54	88	0.55
Crystal R932	17.41	103	0.16	19.55	83	0.44	52.1	83	0.06	2.58	64	0.07
Crystal RZT010	16.87	100	0.97	26.34	112	0.58	54.5	86	0.14	3.32	83	0.38
Hilleshog 1643	15.43	91	0	26.24	112	0.6	65.3	104	0.7	8.84	221	0
Hilleshog 7089	17.09	101	0.59	27.07	115	0.49	77.45	123	0.01	3.15	79	0.28
Hilleshog 7097	16.74	99	0.7	23.6	100	0.99	72.93	116	0.09	3.73	93	0.72
Hilleshog 7101	16.54	98	0.36	18.83	80	0.36	64.6	102	0.79	3.12	78	0.26
Hilleshog 7108	18.01	107	0	32.02	136	0.1	77.1	122	0.02	2.96	74	0.18
Hilleshog 7111	17.65	105	0.04	30.8	131	0.16	69.1	110	0.3	1.59	40	0
Hilleshog 7114	16.04	95	0.03	27.71	118	0.41	67.35	107	0.46	3.41	85	0.45
Hilleshog 7118	16.73	99	0.68	25.59	109	0.69	79.18	126	0.01	4.99	125	0.21
Hilleshog 7120	15.79	94	0	17.61	75	0.25	66.68	106	0.53	4.86	121	0.27
Hilleshog 7121	15.83	94	0.01	11.85	50	0.02	62.15	99	0.88	6.01	150	0.01
Holly Hybrid 00HX019	18.3	108	0	16.25	69	0.16	51.03	81	0.04	3.58	89	0.58
Holly Hybrid 00HX026	18.15	108	0	14.72	63	0.09	63.88	101	0.89	8.28	207	0
Holly Hybrid 00HX027	16.8	100	0.83	7.95	34	0	44.45	71	0	1.7	43	0
Seedex SX1017	16.91	100	0.94	39.48	168	0	75.7	120	0.03	5.89	147	0.02
Seedex SX1019	16.86	100	0.96	8.19	35	0	44.1	70	0	3.17	79	0.29
Vanderhave H46109	16.25	96	0.09	17.06	73	0.21	73.28	116	0.08	6.12	153	0.01
Vanderhave H68108	16.22	96	0.08	14.5	62	0.08	62.85	100	0.97	3.62	90	0.62
Vanderhave H68211	16.15	96	0.05	21.39	91	0.67	60.75	96	0.69	4.63	116	0.43
Check Mean	**16.88**			**23.53**			**63.05**			**4.01**		
Coeff. of Var. (%)	**4.4**			**42.62**			**18.62**			**38.77**		
F Value	**3.45****			**2.34****			**2.88****			**4.47****		
Mean LSD (0.05)	**1.07**	**6**		**14.53**	**62**		**16.49**	**26**		**2.23**	**56**	
Mean LSD (0.01)	**1.41**	**8**		**19.26**	**82**		**21.84**	**35**		**2.95**	**74**	

* Significant at 5%. ** Significant at 1%. Ns Not significant.

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

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

3rd column for trait is probability that detection of a diff. (from check mean) of this size due to chance.

OBJECTIVE:

Evaluate and compare the influence of variable rates of Betamix and application timing on the Micro-rate in addition to the effect of using preplant incorporated and lay-by products with the Micro-rate to the performance of the standard Micro-rate program.

EXPERIMENT PROCEDURE:

The experimental design was a randomized complete block with four replicates. Efficacy data was collected from each of three locations planted in 2000 while yield data was collected only at the Gluek and Buffalo Lake locations. The variety at the harvested locations was Beta 5014. Applications were made to the center four rows of six row by 30 ft experimental units with a bicycle wheel-type sprayer delivering 8.5 gpa at 40 p.s.i. through 8001 flat fan nozzles. Treatments included the Micro-rate at various application timings and intervals with and without Dual PPI and Dual or Frontier applied as lay-by with the first Micro-rate application. A list of treatment dates, evaluation dates, and harvest dates for each location can be found in table 1. A separate grass control application of Select herbicide at 6 oz./A was made to each plot on June 23. Weed control, sugar beet injury, and yield data for each site can be found in tables two through six.

Table 1. Specifications for the Additions, Variations, and Modifications to the Micro-rate experiment.

Exp. #	Location	PPI Dual Trts	Plant Date	POST Micro-rate Based Treatments				Evaluation Dates		Hand Harv Date
				1	2	3	4	Eval 1	Eval 2	
0021	Gluek	4/25	4/25	5/23	5/30	6/6	6/13	6/20	7/7	9/13
0022	Renville	4/24	4/25	5/23	5/30	6/6	6/13	6/30	7/13	9/14
0023	Buff Lake	4/25	5/1	5/29	6/5	6/13	6/20	6/22	7/7	9/18

SUMMARY:

- Initiating the Micro-rate program at cotyledon weed stage and applying four times at a 7-day interval maximized efficacy and recoverable sugar per acre from beets treated with the Micro-rate program.
- Incremental increases of Betamix in the Micro-rate in each of three applications may provide equal weed control with similar cost to the standard Micro-rate program applied four times.
- Dual II Magnum used pre-plant incorporated followed by three postemergence Micro-rate applications when compared to the standard Micro-rate applied four times gave equal or better weed control and recoverable sugar per acre at similar product cost.
- Frontier at 25 oz/A or Dual II Magnum at 1qt/A applied as a lay-by in the first of three Micro-rate applications when compared to the standard Micro-rate applied four times provided equal weed control and recoverable sugar per acre at slightly less or equal cost, respectively.

Please remember to read and follow label instructions as Dual, Frontier, and some increased rates of Betamix in the Micro-rate are not labeled for use on sugar beet.

[a] Abbreviations for Tables 2-6:
Colq, common lambsquarters; Rrpw, redroot pigweed; Vema, venice mallow; Grft, green foxtail; Gift, giant foxtail; am sp., amaranthus species; Inj., sugar beet injury; LTM, loss to molasses; RST, recoverable sugar per ton; RSA, recoverable sugar per acre; EBN, eastern black nightshade

Table 2. Efficacy and injury data for the Additions, Variations, and Modifications to the Micro-rate trial, Gluek location.

TREATMENT	RATE	Colq 1a	% mean	Rr pw1	% mean	Ve ma1	% mean	Gr ft1	% mean	Colq 2	% mean	Rr pw2	% mean	Ve ma2	% mean	Inj.	% Mean
Weed Free Check		91.8	104.1	89.3	103.2	93.0	115.1	95.5	107.3	94.5	120.6	94.5	124.7	94.5	135.0	0.0	0.0
Betamix+Upbeet+Stinger+MSO (2X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	51.3	58.2	35.0	40.5	41.3	51.1	46.3	52.0	36.3	46.3	36.3	47.8	20.0	28.6	1.3	18.5
Betamix+Upbeet+Stinger+MSO (3X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	77.5	88.0	76.8	88.8	66.3	82.0	73.8	82.8	70.0	89.3	63.8	84.1	60.0	85.7	3.8	55.6
Betamix+Upbeet+Stinger+MSO (4X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	87.5	99.3	90.5	104.7	81.3	100.6	94.0	105.6	82.5	105.3	75.0	98.9	71.3	101.8	6.3	92.6
Betamix+Upbeet+Stinger+MSO (3X)	12 oz.+1/8 oz.+1.3 oz.+1.5% MSO	90.8	103.0	88.8	102.6	86.8	107.4	94.5	106.1	76.3	97.3	77.5	102.2	78.8	112.5	8.8	129.6
a) Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO																
b) Betamix+Upbeet+Stinger+MSO	12 oz.+1/8 oz.+1.3 oz.+1.5% MSO	88.5	100.5	88.8	102.6	80.8	100.0	91.3	102.5	63.8	81.4	56.3	74.2	60.0	85.7	8.8	129.6
c) Betamix+Upbeet+Stinger+MSO	16 oz.+1/8 oz.+1.3 oz.+1.5% MSO																
a) Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO																
b) Betamix+Upbeet+Stinger+MSO	16 oz.+1/8 oz.+1.3 oz.+1.5% MSO	88.3	100.2	89.5	103.5	83.8	103.7	93.5	105.0	75.0	95.7	76.3	100.6	81.3	116.1	3.8	55.6
c) Betamix+Upbeet+Stinger+MSO	24 oz.+1/8 oz.+1.3 oz.+1.5% MSO																
a) Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO																
b) Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	93.3	105.8	93.8	108.4	87.0	107.7	93.3	104.7	61.3	78.2	63.8	84.1	63.8	91.1	10.0	148.1
c) Betamix+Upbeet+Stinger+MSO	12 oz.+1/8 oz.+1.3 oz.+1.5% MSO																
a) Betamix+Upbeet+Stinger+MSO - Cotyledon	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO																
b) Betamix+Upbeet+Stinger+MSO - Cotyl+7d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	90.8	103.0	86.3	99.8	83.8	103.7	87.3	98.0	53.8	68.6	55.0	72.6	52.5	75.0	6.3	92.6
c) Betamix+Upbeet+Stinger+MSO - Cotyl+21d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO																
a) Betamix+Upbeet+Stinger+MSO - Cotyl+7d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO																
b) Betamix+Upbeet+Stinger+MSO - Cotyl+14d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	88.0	99.9	76.3	88.2	85.0	105.2	86.3	96.9	63.8	81.4	57.5	75.9	57.5	82.2	6.3	92.6
c) Betamix+Upbeet+Stinger+MSO - Cotyl+21d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO																
a) Betamix+Upbeet+Stinger+MSO	12 oz.+1/8 oz.+1.3 oz.+1.5% MSO																
b) Betamix+Upbeet+Stinger+MSO	16 oz.+1/8 oz.+1.3 oz.+1.5% MSO	88.0	99.9	87.5	101.2	84.3	104.3	87.5	98.3	81.0	103.4	75.0	98.9	89.8	128.3	5.0	74.1
c) Betamix+Upbeet+Stinger+MSO	16 oz.+1/8 oz.+1.3 oz.+1.5% MSO																
a) Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO	1qt./ 12oz.+1/8 oz.+1.3 oz.+1.5% MSO																
b) Betamix+Upbeet+Stinger+MSO	16oz.+1/8 oz.+1.3 oz.+1.5% MSO	98.0	111.2	96.5	111.6	87.5	108.3	96.3	108.1	90.0	114.9	90.0	118.7	80.8	115.4	7.5	111.1
c) Betamix+Upbeet+Stinger+MSO	16oz.+1/8 oz.+1.3 oz.+1.5% MSO																
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO(2X)	1qt./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	86.0	97.6	82.3	95.1	73.8	91.3	81.3	91.3	87.5	111.7	85.0	112.1	63.8	91.1	5.0	74.1
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO(3X)	1qt./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	95.0	107.8	94.3	109.0	82.0	101.5	94.8	106.4	92.3	117.7	91.0	120.1	70.0	100.0	12.5	185.2
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO(4X)	1qt./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	99.0	112.4	97.3	112.5	93.5	115.8	97.5	109.5	94.5	120.6	90.0	118.7	84.8	121.1	12.5	185.2
Dual II Mag+Betamix+Upbeet+Stinger+MSO/	1 qt.+8 oz.+1/8 oz.+1.3 oz.+1.5% MSO/	88.0	99.9	95.8	110.7	81.5	100.9	92.5	103.9	85.0	108.5	76.3	100.6	61.3	87.5	8.8	129.6
Betamix+Upbeet+Stinger+MSO (2X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO																
Frontier+B'mix+Upbeet+Stinger+MSO/	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/	84.0	95.3	88.5	102.4	73.8	91.3	96.0	107.8	71.3	90.9	70.0	92.3	57.5	82.2	7.5	111.1
Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO																
Frontier+B'mix+Upbeet+Stinger+MSO/	25 oz.+12 oz+1/8 oz+1.3 oz+1.5% MSO/	92.3	104.7	92.5	107.0	86.3	106.8	95.3	107.0	96.0	122.5	94.8	125.0	91.3	130.4	3.8	55.6
Betamix+Upbeet+Stinger+MSO (2X)	16 oz.+1/8 oz.+1.3 oz.+1.5% MSO																
Frontier+B'mix+Upbeet+Stinger+MSO/	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/	91.8	104.1	90.8	105.0	88.0	108.9	89.8	100.8	93.5	119.3	94.8	125.0	94.8	135.4	7.5	111.1
Betamix+Upbeet+Stinger+MSO (3X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO																
Frontier+B'mix+Upbeet+Stinger+MSO/	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/	92.5	105.0	89.3	103.2	76.3	94.4	94.3	105.9	99.0	126.4	93.5	123.4	66.3	94.7	10.0	148.1
Betamix+Upbeet+Stinger+MSO (2X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO																
Mean		88.1		86.5		80.8		89.0		78.4		75.8		70.0		6.8	
C.V. %		12.2		13.1		13.6		11.8		19.9		19.4		22.4		96.8	
LSD (0.05)		15.2		16.0		15.5		14.8		22.1		20.8		22.2		9.2	

Table 3. Yield and quality data for the Additions, Variations, and Modifications to the Micro-rate trial, Gluek location.

TREATMENT	RATE	Tons	Tons % mean	Sugar %	Sugar % mean	LTM[a]	LTM % mean	RST LBS	RST % mean	RSA LBS	RSA % mean
Weed Free Check		26.2	97.83	14.93	97.64	1.25	102.42	273.6	97.23	7188.6	95.56
Betamix+Upbeet+Stinger+MSO (2X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	21.66	80.89	15.8	103.34	1.18	96.75	292.4	103.91	6233.9	82.87
Betamix+Upbeet+Stinger+MSO (3X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	25.37	94.74	14.78	96.70	1.25	103.00	270.6	96.16	6875.6	91.40
Betamix+Upbeet+Stinger+MSO (4X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	26.21	97.89	15.13	98.98	1.22	100.45	278.2	98.85	7293.7	96.96
Betamix+Upbeet+Stinger+MSO (3X)	12 oz.+1/8 oz.+1.3 oz.+1.5% MSO	26.27	98.10	14.66	95.88	1.27	104.31	267.8	95.15	7026.4	93.40
a) Betamix+Upbeet+Stinger+MSO b) Betamix+Upbeet+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 12 oz.+1/8 oz.+1.3 oz.+1.5% MSO 16 oz.+1/8 oz.+1.3 oz.+1.5% MSO	27.33	102.08	15.43	100.95	1.21	99.05	284.5	101.11	7758.2	103.13
a) Betamix+Upbeet+Stinger+MSO b) Betamix+Upbeet+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 16 oz.+1/8 oz.+1.3 oz.+1.5% MSO 24 oz.+1/8 oz.+1.3 oz.+1.5% MSO	27.95	104.39	14.81	96.89	1.25	102.83	271.2	96.37	7620.2	101.30
a) Betamix+Upbeet+Stinger+MSO b) Betamix+Upbeet+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 12 oz.+1/8 oz.+1.3 oz.+1.5% MSO	27.22	101.66	15.34	100.34	1.22	99.87	282.5	100.38	7694.5	102.29
a) Betamix+Upbeet+Stinger+MSO – Cotyledon b) Betamix+Upbeet+Stinger+MSO - Cotyl+7d c) Betamix+Upbeet+Stinger+MSO - Cotyl+21d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 12 oz.+1/8 oz.+1.3 oz.+1.5% MSO	25.77	96.22	15.2	99.42	1.23	100.69	279.5	99.32	7188.8	95.56
a) Betamix+Upbeet+Stinger+MSO - Cotyl+7d b) Betamix+Upbeet+Stinger+MSO - Cotyl+14d c) Betamix+Upbeet+Stinger+MSO - Cotyl+21d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 12 oz.+1/8 oz.+1.3 oz.+1.5% MSO	26.21	97.90	15.34	100.33	1.22	99.95	282.4	100.37	7385.9	98.18
a) Betamix+Upbeet+Stinger+MSO b) Betamix+Upbeet+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	12 oz.+1/8 oz.+1.3 oz.+1.5% MSO 16 oz.+1/8 oz.+1.3 oz.+1.5% MSO 16 oz.+1/8 oz.+1.3 oz.+1.5% MSO	27.63	103.20	15.94	104.28	1.16	95.60	295.6	105.03	8111.1	107.82
a) Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO b) Betamix+Upbeet+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	1qt./ 12oz.+1/8 oz.+1.3 oz.+1.5% MSO 16oz.+1/8 oz.+1.3 oz.+1.5% MSO 16oz.+1/8 oz.+1.3 oz.+1.5% MSO	30.49	113.87	15.74	102.94	1.18	97.16	291.1	103.44	8853.6	117.69
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (2X)	1qt./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	27.15	101.41	14.58	95.36	1.28	104.97	266	94.53	7213.1	95.89
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (3X)	1qt./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	30.11	112.43	15.59	102.01	1.20	98.31	288	102.34	8670	115.25
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (4X)	1qt./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	27.98	104.50	15.77	103.13	1.18	97.00	291.7	103.66	8166.3	108.56
Dual II Mag+Betamix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (2X)	1 qt.+8 oz.+1/8 oz.+1.3 oz.+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	23.52	87.82	15.08	98.65	1.23	100.78	277.1	98.47	6473.3	86.05
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	23.39	87.34	16.17	105.77	1.14	94.04	300.5	106.79	7030.2	93.45
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (2X)	25 oz.+12 oz+1/8 oz+1.3 oz+1.5% MSO/ 16 oz.+1/8 oz.+1.3 oz.+1.5% MSO	27.98	104.50	15.27	99.90	1.22	100.45	280.9	99.83	7853.9	104.40
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (3X)	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	28.29	105.65	15.25	99.77	1.22	100.28	280.6	99.73	7941.9	105.57
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (2X)	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	28.81	107.60	14.94	97.71	1.24	102.09	273.9	97.33	7872.7	104.65
Mean		26.78		15.29		1.2		281.4		7522.6	
C.V. %		10.03		6.07		6.09		7.12		10.96	
LSD (0.05)		3.80		1.31		1.10		28.35		1165.90	

Table 4. Efficacy and injury data for the Additions, Variations, and Modifications to the Micro-rate trial, Renville location.

TREATMENT	RATE	Gift1[a]	% mean	am sp.1	% mean	Inj1	% mean	am sp.2	% mean	Gift2	% mean	Inj.2	% mean
Weed Free Check		74.0	102.8	69.6	95.2	0.0	0.0	92.8	145.9	77.8	112.3	0.0	0.0
Betamix+Upbeet+Stinger+MSO (2X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	42.5	59.0	43.8	59.8	0.0	0.0	22.5	35.4	40.0	57.8	0.0	0.0
Betamix+Upbeet+Stinger+MSO (3X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	72.5	100.7	72.8	99.5	0.0	0.0	57.0	89.7	61.3	88.5	0.0	0.0
Betamix+Upbeet+Stinger+MSO (4X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	80.8	112.2	77.5	106.0	0.0	0.0	72.3	113.6	81.3	117.4	0.0	0.0
Betamix+Upbeet+Stinger+MSO (3X)	12 oz.+1/8 oz.+1.3 oz.+1.5% MSO	70.3	97.6	67.3	92.0	0.0	0.0	43.3	68.0	61.8	89.2	0.0	0.0
a) Betamix+Upbeet+Stinger+MSO b) Betamix+Upbeet+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 12 oz.+1/8 oz.+1.3 oz.+1.5% MSO 16 oz.+1/8 oz.+1.3 oz.+1.5% MSO	69.0	95.8	68.5	93.7	0.0	0.0	59.8	94.0	66.0	95.4	0.0	0.0
a) Betamix+Upbeet+Stinger+MSO b) Betamix+Upbeet+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 16 oz.+1/8 oz.+1.3 oz.+1.5% MSO 24 oz.+1/8 oz.+1.3 oz.+1.5% MSO	82.0	113.9	79.8	109.0	1.3	55.2	69.3	108.9	87.5	126.4	0.0	0.0
a) Betamix+Upbeet+Stinger+MSO b) Betamix+Upbeet+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 12 oz.+1/8 oz.+1.3 oz.+1.5% MSO	77.3	107.3	78.9	107.9	0.0	0.0	64.0	100.7	71.0	102.6	0.0	0.0
a) Betamix+Upbeet+Stinger+MSO - Cotyledon b) Betamix+Upbeet+Stinger+MSO - Cotyl+7d c) Betamix+Upbeet+Stinger+MSO - Cotyl+21d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	57.0	79.2	62.4	85.3	0.0	0.0	49.0	77.1	53.5	77.3	0.0	0.0
a) Betamix+Upbeet+Stinger+MSO - Cotyl+7d b) Betamix+Upbeet+Stinger+MSO - Cotyl+14d c) Betamix+Upbeet+Stinger+MSO - Cotyl+21d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	59.8	83.0	65.5	89.6	0.0	0.0	42.5	66.9	51.8	74.8	0.0	0.0
a) Betamix+Upbeet+Stinger+MSO b) Betamix+Upbeet+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	12 oz.+1/8 oz.+1.3 oz.+1.5% MSO 16 oz.+1/8 oz.+1.3 oz.+1.5% MSO 16 oz.+1/8 oz.+1.3 oz.+1.5% MSO	78.5	109.0	81.9	112.0	0.0	0.0	76.8	120.7	80.0	115.6	0.0	0.0
a) Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO b) Betamix+Upbeet+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	1qt./ 12oz.+1/8 oz.+1.3 oz.+1.5% MSO 16oz.+1/8 oz.+1.3 oz.+1.5% MSO 16oz.+1/8 oz.+1.3 oz.+1.5% MSO	84.0	116.7	86.5	118.3	13.3	585.6	88.3	138.8	84.8	122.4	4.3	971.4
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (2X)	1qt./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	77.8	108.0	76.9	105.1	0.0	0.0	68.5	107.7	74.8	108.0	0.0	0.0
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (3X)	1qt./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	86.3	119.8	91.9	125.6	2.3	99.4	89.0	140.0	85.3	123.2	0.0	0.0
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (4X)	1qt./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	88.0	122.2	90.9	124.3	5.5	243.1	92.3	145.1	87.0	125.7	0.8	171.4
Dual II Mag+Betamix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (2X)	1 qt.+8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	81.0	112.5	83.3	113.8	2.5	110.5	68.3	107.4	70.0	101.1	0.0	0.0
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	44.3	61.5	32.3	44.1	0.0	0.0	13.8	21.6	38.5	55.6	0.0	0.0
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (2X)	25 oz.+12 oz+1/8 oz+1.3 oz+1.5% MSO 16 oz.+1/8 oz.+1.3 oz.+1.5% MSO	63.8	88.6	70.8	96.7	1.3	55.2	64.0	100.7	66.0	95.4	0.0	0.0
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (3X)	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	67.8	94.1	77.1	105.5	1.3	55.2	63.8	100.3	65.5	94.6	0.0	0.0
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (2X)	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	83.5	116.0	85.4	116.7	18.0	795.6	74.8	117.6	80.8	116.7	3.8	857.1
Mean		72.0		73.1		2.3		63.6		69.2		0.4	
C.V. %		23.3		21.4		225.5		35.5		29.0		449.7	
LSD (0.05)		23.8		22.2		7.2		31.9		28.4		2.8	

Table 5. Efficacy and injury data for the Additions, Variations, and Modifications to the Micro-rate trial, Buffalo Lake location.

TREATMENT	RATE	Colq1[a]	% mean	am sp.1	% mean	EBN1	% mean	Colq 2	% mean	am sp.2	% mean	EBN2	% mean	Inj.	% mean
Weed Free Check		99.0	120.8	99.0	129.5	99.0	101.3	99.0	114.3	99.0	124.9	99.0	101.8	0.0	0.0
Betamix+Upbeet+Stinger+MSO (2X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	63.5	77.5	62.0	81.1	96.8	99.0	75.0	86.6	64.0	80.7	93.0	95.7	0.8	56.1
Betamix+Upbeet+Stinger+MSO (3X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	67.5	82.4	63.0	82.4	99.0	101.3	73.5	84.8	62.5	78.8	94.3	96.9	0.3	18.7
Betamix+Upbeet+Stinger+MSO (4X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	87.3	106.5	78.5	102.7	99.0	101.3	91.5	105.6	80.0	100.9	99.0	101.8	0.3	18.7
Betamix+Upbeet+Stinger+MSO (3X)	12 oz.+1/8 oz.+1.3 oz.+1.5% MSO	79.0	96.4	71.5	93.5	99.0	101.3	84.5	97.5	76.0	95.9	94.3	96.9	1.5	112.1
a) Betamix+Upbeet+Stinger+MSO b) Betamix+Upbeet+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 12 oz.+1/8 oz.+1.3 oz.+1.5% MSO 16 oz.+1/8 oz.+1.3 oz.+1.5% MSO	80.5	98.2	79.5	104.0	99.0	101.3	83.8	96.7	81.3	102.5	95.5	98.2	3.0	224.3
a) Betamix+Upbeet+Stinger+MSO b) Betamix+Upbeet+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 16 oz.+1/8 oz.+1.3 oz.+1.5% MSO 24 oz.+1/8 oz.+1.3 oz.+1.5% MSO	95.8	116.8	87.0	113.8	99.0	101.3	94.5	109.1	89.0	112.3	95.5	98.2	2.0	149.5
a) Betamix+Upbeet+Stinger+MSO b) Betamix+Upbeet+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 12 oz.+1/8 oz.+1.3 oz.+1.5% MSO	73.0	89.1	69.5	90.9	90.8	92.9	82.3	94.9	69.0	87.0	94.3	96.9	0.8	56.1
a) Betamix+Upbeet+Stinger+MSO - Cotyledon b) Betamix+Upbeet+Stinger+MSO - Cotyl+7d c) Betamix+Upbeet+Stinger+MSO - Cotyl+21d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	84.5	103.1	68.8	89.9	96.8	99.0	89.8	103.6	79.3	100.0	96.8	99.5	0.5	37.4
a) Betamix+Upbeet+Stinger+MSO - Cotyl+7d b) Betamix+Upbeet+Stinger+MSO - Cotyl+14d c) Betamix+Upbeet+Stinger+MSO - Cotyl+21d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	74.3	90.6	69.5	90.9	96.8	99.0	77.3	89.2	71.5	90.2	99.0	101.8	0.8	56.1
a) Betamix+Upbeet+Stinger+MSO b) Betamix+Upbeet+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	12 oz.+1/8 oz.+1.3 oz.+1.5% MSO 16 oz.+1/8 oz.+1.3 oz.+1.5% MSO 16 oz.+1/8 oz.+1.3 oz.+1.5% MSO	90.3	110.1	82.0	107.3	99.0	101.3	94.0	108.5	86.0	108.5	99.0	101.8	2.8	205.6
a) Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO b) Betamix+Upbeet+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	1qt./ 12oz.+1/8 oz.+1.3 oz.+1.5% MSO 16oz.+1/8 oz.+1.3 oz.+1.5% MSO 16oz.+1/8 oz.+1.3 oz.+1.5% MSO	89.0	108.6	81.5	106.6	99.0	101.3	89.5	103.3	81.5	102.8	99.0	101.8	3.0	224.3
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (2X)	1qt./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	73.3	89.4	71.8	93.9	99.0	101.3	75.3	86.9	71.8	90.5	99.0	101.8	0.8	56.1
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (3X)	1qt./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	84.8	103.4	84.5	110.5	99.0	101.3	91.0	105.1	88.3	111.3	99.0	101.8	2.0	149.5
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (4X)	1qt./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	91.5	111.6	83.0	108.6	99.0	101.3	94.8	109.4	88.3	111.3	99.0	101.8	1.8	130.8
Dual II Mag+Betamix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (2X)	1 qt.+8 oz.+1/8 oz.+1.3 oz.+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	72.5	88.5	68.8	89.9	93.0	95.2	80.0	92.4	73.8	93.0	99.0	101.8	0.5	37.4
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	68.0	83.0	64.5	84.4	94.3	96.5	79.8	92.1	70.8	89.2	93.0	95.7	0.3	18.7
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (2X)	25 oz.+12 oz+1/8 oz+1.3 oz+1.5% MSO/ 16 oz.+1/8 oz.+1.3 oz.+1.5% MSO	91.5	111.6	82.0	107.3	99.0	101.3	95.5	110.2	83.8	105.6	99.0	101.8	3.8	280.4
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (3X)	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	93.8	114.4	86.3	112.8	99.0	101.3	95.8	110.5	88.8	112.0	99.0	101.8	2.3	168.2
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (2X)	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	80.5	98.2	76.3	99.8	99.0	101.3	86.0	99.3	81.3	102.5	99.0	101.8	0.0	0.0
Mean		82.0		76.4		97.7		86.6		79.3		97.2		1.3	
C.V. %		9.9		12.7		5.1		10.6		13.8		6.0		118.7	
LSD (0.05)		14.0		13.8		7.0		14.9		15.5		8.2		2.3	

Table 6. Yield and quality data for the Additions, Variations, and Modifications to the Micro-rate trial, Buffalo Lake location.

TREATMENT	RATE	Tons	Tons % mean	Sugar %	Sugar % mean	LTM[a]	LTM % mean	RST LBS	RST % mean	RSA LBS	RSA % mean
Weed Free Check		29.56	110.38	15.59	98.79	1.19	101.38	287.8	98.58	8466.2	108.16
Betamix+Upbeet+Stinger+MSO (2X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	20.24	75.58	15.1	95.72	1.24	104.95	277.3	94.97	5625.7	71.87
Betamix+Upbeet+Stinger+MSO (3X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	23.71	88.53	15.66	99.26	1.19	100.87	289.4	99.13	6796.8	86.84
Betamix+Upbeet+Stinger+MSO (4X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	29.31	109.44	15.76	99.90	1.18	100.37	291.6	99.86	8534.7	109.04
Betamix+Upbeet+Stinger+MSO (3X)	12 oz.+1/8 oz.+1.3 oz.+1.5% MSO	23.5	87.73	15.61	98.97	1.19	100.96	288.5	98.81	6796.6	86.83
a) Betamix+Upbeet+Stinger+MSO b) Betamix+Upbeet+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 12 oz.+1/8 oz.+1.3 oz.+1.5% MSO 16 oz.+1/8 oz.+1.3 oz.+1.5% MSO	27.34	102.10	15	95.05	1.24	105.54	275	94.21	7514.9	96.01
a) Betamix+Upbeet+Stinger+MSO b) Betamix+Upbeet+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 16 oz.+1/8 oz.+1.3 oz.+1.5% MSO 24 oz.+1/8 oz.+1.3 oz.+1.5% MSO	30.23	112.89	15.77	99.97	1.18	100.03	291.9	99.97	8825.3	112.75
a) Betamix+Upbeet+Stinger+MSO b) Betamix+Upbeet+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 12 oz.+1/8 oz.+1.3 oz.+1.5% MSO	29.52	110.24	15.35	97.30	1.22	103.25	282.7	96.83	8325.3	106.36
a) Betamix+Upbeet+Stinger+MSO - Cotyledon b) Betamix+Upbeet+Stinger+MSO - Cotyl+7d c) Betamix+Upbeet+Stinger+MSO - Cotyl+21d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 12 oz.+1/8 oz.+1.3 oz.+1.5% MSO	26.05	97.27	15.94	101.03	1.16	98.84	295.5	101.21	7681	98.13
a) Betamix+Upbeet+Stinger+MSO - Cotyl+7d b) Betamix+Upbeet+Stinger+MSO - Cotyl+14d c) Betamix+Upbeet+Stinger+MSO - Cotyl+21d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 12 oz.+1/8 oz.+1.3 oz.+1.5% MSO	23.63	88.25	15.43	97.84	1.21	102.49	284.5	97.46	6732	86.01
a) Betamix+Upbeet+Stinger+MSO b) Betamix+Upbeet+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	12 oz.+1/8 oz.+1.3 oz.+1.5% MSO 16 oz.+1/8 oz.+1.3 oz.+1.5% MSO 16 oz.+1/8 oz.+1.3 oz.+1.5% MSO	24.55	91.67	15.81	100.22	1.18	99.77	292.7	100.26	7206.3	92.07
a) Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO b) Betamix+Upbeet+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	1qt./ 12oz.+1/8 oz.+1.3 oz.+1.5% MSO 16oz.+1/8 oz.+1.3 oz.+1.5% MSO 16oz.+1/8 oz.+1.3 oz.+1.5% MSO	28.93	108.02	15.95	101.10	1.16	98.84	295.7	101.29	8627.4	110.22
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (2X)	1qt./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	31.82	118.80	15.81	100.23	1.17	99.35	292.8	100.30	9243.5	118.09
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (3X)	1qt./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	26.24	97.96	16.42	104.09	1.12	95.44	305.9	104.78	8002.3	102.24
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (4X)	1qt./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	30.8	115.01	16.08	101.94	1.15	97.82	298.6	102.27	9231.4	117.94
Dual II Mag+Betamix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (2X)	1 qt.+8 oz.+1/8 oz.+1.3 oz.+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	27.91	104.21	16.06	101.83	1.16	98.07	298.2	102.13	8386.3	107.14
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	21.76	81.25	16.07	101.85	1.15	97.90	298.3	102.17	6514.2	83.23
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (2X)	25 oz.+12 oz+1/8 oz+1.3 oz+1.5% MSO/ 16 oz.+1/8 oz.+1.3 oz.+1.5% MSO	25.95	96.90	15.58	98.77	1.19	101.21	287.8	98.57	7514.2	96.00
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (3X)	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	24.7	92.21	16.11	102.14	1.15	97.39	299.3	102.52	7365.8	94.11
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (2X)	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	29.87	111.55	16.4	103.99	1.13	95.53	305.6	104.67	9154.3	116.95
Mean		26.78		15.78		1.2		292		7827.21	
C.V. %		12.73		5.91		6.56		6.91		14.91	
LSD (0.05)		4.82		1.32		0.11		28.55		1651.20	

MICRO-RATE ECONOMICS

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OBJECTIVE:

Evaluate and compare the weed control efficacy and economic viability of the standard Micro-rate and the Micro-rate when specific components are eliminated from the first two applications to reduce cost.

EXPERIMENT PROCEDURE:

The experimental design was a randomized complete block with four replicates. Treatment applications made to the center four rows of 6-row by 30ft long experimental units with a bicycle whee-type sprayer delivering 8.5 gpa at 40 p.s.i. through 8001 flat fan nozzles. Treatments consisted of the standard Micro-rate applied three times, the Micro-rate without Upbeet in the first two of three applications, and the Micro-rate without Stinger in the first two of three applications. At the Raymond site an additional rescue-type treatment was applied on June 16 which consisted of Betamix+Upbeet+Stinger+ MSO at 2pt + ¼ oz. + 2.6 oz. + 1.5% because of poor weed control due to interference from an oat cover crop. A list of planting dates, treatments dates, and evaluation dates can be found in table 1. The treatment list, rates, weed control, sugar beet injury, and the relative product cost of each treatment per acre can be found in tables two and three.

Table 1. Specifications for the Micro-rate economics weed control experiment.

Exp. #	Location	Planting Date	POST weed control trtm nts			Evaluation Dates	
			1	2	3	1	2
0036	Raymond	4/26	5/20	5/27	6/2	6/20	6/27
0037	Buff Lake	4/29	6/7	6/14	6/21	7/7	7/19

RESULTS AND DISCUSSION:

Weed control from herbicide treatments at the Raymond site was somewhat confounded by aggressive growth of an oat cover crop. At both locations, leaving the Stinger out of the first two of three micro-rate applications tended to provide better weed control than the standard micro-rate. It is now known why this would occur since one would expect the addition of Stinger to each applicaton to increase weed control. Future experiments intend to look at this further.

SUMMARY:

- Results from the two locations were similar in regard to the tendency for greater control from the Micro-rate when Stinger was left out of the first two of three applications.
- However, at the Raymond site there was no advantage to late season common lambsquarters control among any of the treatments except at the rescue-type treatment rate. (At the Buffalo Lake site the common lambsquarters infestation was not as heavy).
- This data appears to indicate that if a product can be left out of the Micro-rate to cut cost it might be Stinger in one or both of the first two applications. However, doing so may result in less common lambsquarters control.
- Increasing rates of each component of the Micro-rate to beyond economic levels was able to achieve good late season weed control but at much increased financial and phytotoxilogical risk.

Table 2. Influence of Micro-rate modifications of weed control, sugar beet injury, and cost, Raymond.

TREATMENT	RATE	Am sp.1[a]	Am sp. % mean	Colq	Colq % mean	Cover Crop	Cover Crop % mean	Am. sp.2	Am sp.2 % mean	Co lq2	Colq2 % mean	Inj.	Inj. % mean	Relative Product Cost per Acre
Weed free check		75.50	107.32	76.00	99.80	76.00	102.84	99.00	140.13	99.00	140.13	0.00	0.00	
a) Betamix+Upbeet+Stinger+MSO (3X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	67.75	96.30	75.25	98.82	68.75	93.03	52.00	73.60	50.00	70.77	0.00	0.00	$57.75
a) Betamix+Upbeet+MSO b) Betamix+Upbeet+MSO b) Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.5% MSO 8 oz.+1/8 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	74.50	105.90	77.00	101.12	78.25	105.89	66.00	93.42	53.50	75.73	0.00	0.00	$47.67
a) Betamix+Stinger+MSO b) Betamix+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	8 oz.+1.3 oz.+1.5% MSO 8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	65.75	93.46	75.25	98.82	71.50	96.75	53.75	76.08	52.50	74.31	0.00	0.00	$46.51
a) Betamix+Upbeet+Stinger+MSO - Cotyl b) Betamix+Upbeet+Stinger+MSO - Cotyl+7d b) Betamix+Upbeet+Stinger+MSO - Cotyl+14d c) Betamix+Upbeet+Stinger+MSO - Cotyl+28d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 2pt.+1/4 oz.+2.6 oz.+1.5% MSO	68.26	97.02	77.25	101.44	75.00	101.49	82.50	116.77	86.50	122.43	17.50	500.00	$107.04
Mean		70.35		76.15		73.90		70.65		68.30		3.50		
C.V. %		6.30		5.66		6.12		17.59		19.65		110.66		
LSD (0.05)		6.83		6.65		6.96		19.14		20.68		5.97		

[a] Abbreviations: Amsp, amaranthus species; Colq, common lambsquarters; Inj., Injury.

Table 3. Influence of Micro-rate modifications of weed control, sugar beet injury, and cost, Buffalo Lake.

TREATMENT	RATE	Rrpw1[a]	Rrpw1 % mean	Colq1	Colq1 % mean	Grft1	Grft1 % mean	Rr pw2	Rrpw2 % mean	Co lq2	Colq2 % mean	Grft2	Grft2 % mean	Relative Product Cost per Acre
Weed free check		88.25	113.32	95.50	101.26	88.75	108.98	98.50	119.21	99.00	100.51	98.25	113.83	
a) Betamix+Upbeet+Stinger+MSO (3X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	73.50	94.38	92.25	97.81	78.75	96.70	80.75	97.73	98.00	99.49	86.25	99.93	$57.75
a) Betamix+Upbeet+MSO b) Betamix+Upbeet+MSO b) Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.5% MSO 8 oz.+1/8 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	77.50	99.52	96.75	102.58	82.25	101.00	77.75	94.10	98.00	99.49	82.25	95.29	$47.67
a) Betamix+Stinger+MSO b) Betamix+Stinger+MSO c) Betamix+Upbeet+Stinger+MSO	8 oz.+1.3 oz.+1.5% MSO 8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	72.25	92.78	92.75	98.34	76.00	93.32	73.50	88.96	99.00	100.51	78.50	90.95	$46.51
Mean		77.88		94.31		81.44		82.63		98.50		86.31		
C.V. %		8.95		5.40		6.20		5.72		1.51		5.41		
LSD (0.05)		11.15		8.15		8.08		7.55		2.38		7.47		

[a] Abbreviations: Rrpw, redroot pigweed; Colq, common lambsquarters; Grft, green foxtail.

MICRO-RATE APPLICATION TIMING

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OBJECTIVE:

Determine the influence of application timing of the Micro-rate and/or Betamix rate in the Micro-rate on weed control.

Table 1. Specifications for the Micro-rate application timing trial.

Task Performed	Date
Cotyledon Applic.	5/15
Cotyl + 5d Applic.	5/20
Cotyl + 7d Applic.	5/22
Cotyl + 10d Applic.	5/25
Cotyl + 12d Applic.	5/27
Cotyl + 14d Applic.	5/29
Cotyl + 15d Applic.	5/30
Cotyl + 17d Applic.	6/1
Cotyl + 19d Applic.	6/3
Cotyl + 22d Applic.	6/6
Cotyl + 24d Applic.	6/8
Cotyl + 29d Applic.	6/13
Evaluation date	6/27

EXPERIMENT PROCEDURE:

The experiment was a randomized complete block design near Raymond. The experiment was planted on April 24. Applications were made to the center four rows of six-row by 30 ft experimental units with a bicycle wheel-type sprayer delivering 8.5 gpa at 40 p.s.i. through 8001 flat fan nozzles. The list of treatment dates and evaluation date can be found in table 1.

Treatments included the standard Micro-rate or the Micro-rate with increased rates of Betamix initiated at the following beet stages…cotyledon, cotyledon plus 5 days, cotyledon plus 10 days, or cotyledon plus 15 days followed by either one or two more applications at a seven day interval. Treatments, rates, weed control, and analysis are presented in table 2.

SUMMARY:

- Herbicide weed control efficacy levels were generally low due to the relative late evaluation date. The evaluation was taken at this time to provide adequate time for the cotyledon plus 29 day application to exhibit full herbicide potential.
- The Micro-rate initiated at cotyledon plus 5 days beet stage and applied twice more at cotyledon plus 12 and the cotyledon plus 19 days provided the best control of both the amaranthus species (71%) and common lambsquarters (85.5%).
- Delaying the standard Micro-rate generally did not influence amaranthus control when the Micro-rate was applied three times. This appears to indicate that Upbeet activity on pigweed species is sufficient to allow for delayed program initiation without affecting control.
- Delaying the standard Micro-rate beyond 5 days after cotyledon beet stage had a detrimental influence on common lambsquarters control. The reduction in control increased as delay in initiating the program increased beyond 5 days. This indicates that the components of the Micro-rate that have activity on common lambsquarters are not sufficient to allow for delay in program initiation.
- Increasing Betamix rate in the Micro-rate in each of two applications was only partially able to offset the influence of delaying program initiation on common lambsquarters control.
- Determination of what stage designates cotyledon beets or weeds is subject to the interpretation of the observer. However, this data may indicate that delaying the initiation of the Micro-rate program 5 days after cotyledon sugar beet was long enough to move out of a very cool weather period into a period more suitable for weed control, or possibly extended the period of applications in order to control late emerging weeds.

Table 2. Amaranthus and lambsquarter control from various Micro-rate timings, Raymond.

TREATMENT	RATE	Am sp.[a]	Am sp. % mean	Colq	Colq % mean
a) Betamix+Upbeet+Stinger+MSO - Cotyl b) Betamix+Upbeet+Stinger+MSO - Cotyl+7d c) Betamix+Upbeet+Stinger+MSO - Cotyl+14d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	62.3	93.2	60.0	85.0
a) Betamix+Upbeet+Stinger+MSO - Cotyl+5d b) Betamix+Upbeet+Stinger+MSO - Cotyl+12d b) Betamix+Upbeet+Stinger+MSO - Cotyl+17d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	71.0	106.3	85.5	121.1
a) Betamix+Upbeet+Stinger+MSO - Cotyl+10d b) Betamix+Upbeet+Stinger+MSO - Cotyl+17d c) Betamix+Upbeet+Stinger+MSO - Cotyl+24d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	68.3	102.1	75.5	106.9
a) Betamix+Upbeet+Stinger+MSO - Cotyl+15d b) Betamix+Upbeet+Stinger+MSO - Cotyl+22d c) Betamix+Upbeet+Stinger+MSO - Cotyl+29d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	70.0	104.8	68.8	97.4
a) Betamix+Upbeet+Stinger+MSO - Cotyl+5d b) Betamix+Upbeet+Stinger+MSO - Cotyl+12d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 12 oz.+1/8 oz.+1.3 oz.+1.5% MSO	65.8	98.4	57.5	81.4
a) Betamix+Upbeet+Stinger+MSO - Cotyl+10d b) Betamix+Upbeet+Stinger+MSO - Cotyl+17d	12 oz.+1/8 oz.+1.3 oz.+1.5% MSO 12 oz.+1/8 oz.+1.3 oz.+1.5% MSO	58.8	87.9	74.8	105.9
a) Betamix+Upbeet+Stinger+MSO - Cotyl+15d b) Betamix+Upbeet+Stinger+MSO - Cotyl+22d	12 oz.+1/8 oz.+1.3 oz.+1.5% MSO 16 oz.+1/8 oz.+1.3 oz.+1.5% MSO	71.8	107.4	72.3	102.3
Mean		66.8		70.6	
C.V. %		20.0		15.8	
LSD (0.05)		19.6		16.4	

[a] Abbreviations: Amsp, amaranthus species; Colq, common lambsquarters.

CONTROL OPTIONS FOR EASTERN BLACK NIGHTSHADE AND OTHER WEED SPECIES

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OBJECTIVE:

Assess the performance of various weed control programs and application timings in a field with an inherently heavy infestation of Eastern Black Nightshade in addition to other weed problems.

Table 1. Specifications for the Control options for Eastern Black Nightshade and other weeds trial.

Task Performed	Date
POST Trtmt # 1	5/6
POST Trtmt # 2	5/12
POST Trtmt # 3	5/19
Evaluation Date 1	6/2
Evaluation Date 2	6/16

EXPERIMENT PROCEDURE:

The experiment was a randomized complete block design with four replicates set into a previously planted field of sugar beet near Olivia. Applications were made to the center four rows of six-row by 30 ft experimental units with a bicycle wheel-type sprayer delivering 8.5 gpa at 40 p.s.i. through 8001 flat fan nozzles. The list of treatment dates and evaluation dates can be found in table 1. Treatments included the Micro-rate at three timings, Dual II Magnum lay-by in the first Micro-rate at two rates and timings, Dual II lay-by in the last of three Micro-rates, and Frontier lay-by at 25 oz in the first Micro-rate at two timings. Treatments, rates, sugar beet injury, weed control, and analysis are presented in table 2.

SUMMARY:

- As indicated in other trials, it appears that weed control programs that are Micro-rate based require program initiation near the cotyledon weed stage to be most effective.
- Addition of Dual II Magnum or Frontier in the first Micro-rate application did not provide increased weed control such that program initiation could be delayed nor the number of applications be reduced without adverse affect to weed control. This is to be expected since neither Dual nor Frontier have activity on previously emerged weeds.
- The treatments that provided the most consistent weed control were the micro-rate beginning at cotyledon weed stage followed by two more applications seven days apart, and the Micro-rate beginning at cotyledon weed stage followed by two more applications seven days apart with Dual II Magnum in the third application.
- The Micro-rate beginning at cotyledon weed stage followed by two more applications seven days apart and the Micro-rate beginning at cotyledon weed stage followed by two more applications seven days apart with Dual II Magnum in the third application were nearly identical in control of each species evaluated.
- Dual II Magnum or Frontier when applied in the first of only two Micro-rates beginning at the cotyledon plus 7-day weed stage provided the poorest late season redroot pigweed and common lambsquarters control. This indicates that the residual activity from either Dual or Frontier alone will not compensate for reducing micro-rate applications to less than three.
- Redroot pigweed and common lambsquarters control by the second evaluation date was significantly lower than other herbicide programs tested when either Dual II Magnum or Frontier were applied in the first of just two Micro-rate applications beginning at the cotyledon plus 7-day weed stage.

Table 2. Eastern Black Nightshade control options, Olivia.

TREATMENT	RATE	EBN1[a]	Ebn1 % mean	RR PW1	RRPW1 % mean	INJ1	INJ1 % mean	EBN2	Ebn2 % mean	YE FT2	YEFT2 % mean	RR PW2	RRPW2 % mean	CO LQ2	COLQ2 % mean
a) Betamix+Upbeet+Stinger+MSO - Cotyl b) Betamix+Upbeet+Stinger+MSO - Cotyl+7d c) Betamix+Upbeet+Stinger+MSO - Cotyl+14d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	98.75	104.12	96.75	110.335	2.5	76.19	99.00	104.83	93.75	109.81	92.00	135.4809	94.00	138.426
a) Betamix+Upbeet+Stinger+MSO - Cotyl+7d b) Betamix+Upbeet+Stinger+MSO - Cotyl+14d c) Betamix+Upbeet+Stinger+MSO - Cotyl+21d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	87.00	91.73	84.50	96.3649	3.75	114.29	75.00	79.418	83.00	97.2182	28.75	42.33778	74.00	108.974
b) Betamix+Upbeet+Stinger+MSO - Cotyl+14d c) Betamix+Upbeet+Stinger+MSO - Cotyl+21d a) Betamix+Upbeet+Stinger+MSO - Cotyl+28d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	96.25	101.48	88.50	100.927	1.25	38.095	95.00	100.6	72.00	84.3338	53.75	79.15324	94.25	138.794
a) Dual II Mag+B'mix+Upbeet+Stinger+MSO/ - Cotyl b) Betamix+Upbeet+Stinger+MSO - Cotyl+7d c) Betamix+Upbeet+Stinger+MSO - Cotyl+14d	27 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/ 8 oz.+1/8 oz+1.3 oz.+1.5% MSO 8 oz.+1/8 oz+1.3 oz.+1.5% MSO	98.00	103.33	82.75	94.3692	2.50	76.19	98.00	103.77	80.25	93.9971	77.50	114.1279	94.50	139.162
a) Dual II Mag+B'mix+Upbeet+Stinger+MSO/ - Cotyl+7d b) Betamix+Upbeet+Stinger+MSO - Cotyl+14d	1 qt.+8 oz+1/8 oz+1.3 oz+1.5% MSO/ 8 oz.+1/8 oz+1.3 oz.+1.5% MSO	94.25	99.374	71.00	80.9694	1.25	38.095	96.75	102.45	90.75	106.296	67.00	98.66544	38.50	56.6958
a) Frontier+B'mix+Upbeet+Stinger+MSO/ - Cotyl b) Betamix+Upbeet+Stinger+MSO - Cotyl+7d c) Betamix+Upbeet+Stinger+MSO - Cotyl+14d	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/ 8 oz.+1/8 oz+1.3 oz.+1.5% MSO 8 oz.+1/8 oz+1.3 oz.+1.5% MSO	86.50	91.203	89.50	102.067	2.50	76.19	96.00	101.65	78.00	91.3616	76.75	113.0235	91.25	134.376
a) Frontier+B'mix+Upbeet+Stinger+MSO/ - Cotyl+7d b) Betamix+Upbeet+Stinger+MSO - Cotyl+14d	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/ 8 oz.+1/8 oz+1.3 oz.+1.5% MSO	99.00	104.38	95.50	108.909	5.00	152.38	96.75	102.45	88.50	103.66	55.00	80.99402	32.50	47.8601
a) Betamix+Upbeet+Stinger+MSO - Cotyl b) Betamix+Upbeet+Stinger+MSO - Cotyl+7d c) Dual II Mag+B'mix+Upbeet+Stinger+MSO - Cotyl+14d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO 27 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/	99.00	104.38	93.00	106.058	7.50	228.57	99.00	104.83	96.75	113.324	92.50	136.2172	91.25	134.376
Mean		94.84		87.69		3.28		94.44		85.38		67.91		76.28	
C.V. %		12.06		20.49		153.17		8.31		23.80		30.42		32.49	
LSD (0.05)		16.70		26.22		7.33		11.45		29.66		30.15		36.164	

[a] Abbreviations: EBN, eastern black nightshade; RRPW, redroot pigweed; INJ, sugar beet injury; YEFT, yellow foxtail; COLQ, common lambsquarters.

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COVER CROP CONTROL OPTIONS WITH MICRO-RATE MODIFICATIONS

OBJECTIVE:

The initial objective of this experiment was to expound upon another experiment that was investigating weed control efficacy of additions and modifications to the Micro-rate through incorporation of additional herbicide variations. The test was placed into a field seeded with an oat cover crop. However, the oat cover crop was more aggressive than expected and confounded weed control observations such that the only data that was representative of the treatments was the control of the oat cover crop.

Table 1. Specifications for the Cover crop control options with Micro-rate modifications trial.

Task Performed	Date
Planting Date	4/24
POST Trtmt # 1	5/15
POST Trtmt # 2	5/22
POST Trtmt # 3	5/30
POST Trtmt # 4	6/6
Evaluation Date	6/16

EXPERIMENT PROCEDURE:

The experiment was a randomized complete block design with four replicates near Raymond. Applications were made to the center four rows of six-row by 30 ft experimental units with a bicycle wheel-type sprayer delivering 8.5 gpa at 40 p.s.i. through 8001 flat fan nozzles. The list of treatment dates and evaluation date can be found in table 1. Treatments included the Micro-rate at various application timings and intervals with and without Dual or Frontier applied lay-by in the first application. In addition, Select was added at 2 oz in various applications and timings. Treatments, rates, and oat cover crop control are presented in table 2.

SUMMARY:

- Oat cover crop control when the standard Micro-rate was applied two, three, and four times was 51, 62, and 70%, respectively.
- Oat cover crop control from Select grass herbicide at 2 oz when applied with the Micro-rate in the first three of four, the second and third of four, or the third of four applications was 95, 98, and 91%, respectively.
- Oat cover crop control in this experiment was not significantly different regardless of whether Select grass herbicide at 2 oz was added to the Micro-rate in the first three of four, the second and third of four, or the third of four applications.

Table 2. Cover crop control with modifications to the Micro-rate.

TREATMENT	RATE	Cover Crop Control	Cover Crop % mean
Weed Free Check		83.00	126.9
Betamix+Upbeet+Stinger+MSO (2X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	50.50	77.2
Betamix+Upbeet+Stinger+MSO (3X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	62.25	95.1
Betamix+Upbeet+Stinger+MSO (4X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	70.00	107.0
Betamix+Upbeet+Stinger+MSO (3X)	12 oz.+1/8 oz.+1.3 oz.+1.5% MSO	72.00	110.0
Betamix+Upbeet+Stinger+MSO - Cotyl+14d	16 oz.+1/4oz.+2oz.+1.5% MSO	57.00	87.1
Betamix+Upbeet+Stinger+MSO - Cotyl+21d	16 oz.+1/4oz.+2oz.+1.5% MSO		
Betamix+Upbeet+Stinger+MSO - Cotyl+28d	16 oz.+1/4oz.+2oz.+1.5% MSO		
Betamix+Upbeet+Stinger+MSO - Cotyl+21d	16 oz.+1/4oz.+2oz.+1.5% MSO	5.00	7.6
Betamix+Upbeet+Stinger+MSO - Cotyl+28d	16 oz.+1/4oz.+2oz.+1.5% MSO		
a) Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	66.00	100.9
b) Betamix+Upbeet+Stinger+MSO	12 oz.+1/8 oz.+1.3 oz.+1.5% MSO		
c) Betamix+Upbeet+Stinger+MSO (3X)	16 oz.+1/8 oz.+1.3 oz.+1.5% MSO		
a) Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	73.75	112.7
b) Betamix+Upbeet+Stinger+MSO	16 oz.+1/8 oz.+1.3 oz.+1.5% MSO		
c) Betamix+Upbeet+Stinger+MSO	24 oz.+1/8 oz.+1.3 oz.+1.5% MSO		
a) Betamix+Upbeet+MSO	8 oz.+1/8 oz.+1.5% MSO	67.50	103.2
b) Betamix+Upbeet+MSO	8 oz.+1/8 oz.+1.5% MSO		
c) Betamix+Upbeet+Stinger+MSO	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO		
a) Betamix+Stinger+MSO - Cotyledon	8 oz.+1.3 oz.+1.5% MSO	52.25	79.9
b) Betamix+Stinger+MSO - Cotyl+7d	8 oz.+1.3 oz.+1.5% MSO		
c) Betamix+Upbeet+Stinger+MSO - Cotyl+21d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO		
a) Betamix+Upbeet+Stinger+MSO - Cotyl+7d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	63.75	97.4
b) Betamix+Upbeet+Stinger+MSO - Cotyl+14d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO		
c) Betamix+Upbeet+Stinger+MSO - Cotyl+21d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO		
a) Betamix+Upbeet+Stinger+MSO+Select - Cotyl+7d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO+2oz.	95.00	145.2
b) Betamix+Upbeet+Stinger+MSO+Select - Cotyl+14d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO+2oz.		
c) Betamix+Upbeet+Stinger+MSO+Select - Cotyl+21d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO+2oz.		
c) Betamix+Upbeet+Stinger+MSO - Cotyl+28d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO		
a) Betamix+Upbeet+Stinger+MSO - Cotyl+7d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	97.75	149.4
b) Betamix+Upbeet+Stinger+MSO+Select - Cotyl+14d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO+2oz.		
c) Betamix+Upbeet+Stinger+MSO+Select - Cotyl+21d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO+2oz.		
c) Betamix+Upbeet+Stinger+MSO - Cotyl+28d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO		
a) Betamix+Upbeet+Stinger+MSO - Cotyl+7d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	90.75	138.7
b) Betamix+Upbeet+Stinger+MSO - Cotyl+14d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO		
c) Betamix+Upbeet+Stinger+MSO+Select - Cotyl+21d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO+2oz.		
c) Betamix+Upbeet+Stinger+MSO - Cotyl+28d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO		
Dual II Mag+Betamix+Upbeet+Stinger+MSO/	1 qt.+8 oz.+1/8 oz.+1.3 oz.+1.5% MSO/	73.75	112.7
Betamix+Upbeet+Stinger+MSO (2X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO		
Frontier+Betamix+Upbeet+Stinger+MSO/	25 oz.+8 oz.+1/8 oz.+1.3 oz.+1.5% MSO/	67.50	103.2
Betamix+Upbeet+Stinger+MSO (2X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO		
Frontier+B'mix+Upbeet+Stinger+MSO - Cotyl+7d	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO	48.00	73.4
Betamix+Upbeet+Stinger+MSO - Cotyl+14d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO		
Frontier+B'mix+Upbeet+Stinger+MSO - Cotyl+7d	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO	62.25	95.1
Betamix+Upbeet+Stinger+MSO - Cotyl+14d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO		
Betamix+Upbeet+Stinger+MSO - Cotyl+21d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO		
Betamix+Upbeet+Stinger+MSO - Cotyl+28d	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO		
Frontier+B'mix+Upbeet+Stinger+MSO - Cotyl+14d	25 oz.+12 oz+1/8 oz+1.3 oz+1.5% MSO	50.50	77.2
Betamix+Upbeet+Stinger+MSO - Cotyl+21d	16 oz.+1/8 oz.+1.3 oz.+1.5% MSO		
Betamix+Upbeet+Stinger+MSO - Cotyl+28d	16 oz.+1/8 oz.+1.3 oz.+1.5% MSO		
Mean		65.4	
C.V. %		18.0	
LSD (0.05)		16.7	

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INFLUENCE OF DUAL II MAGNUM RATE AND TIMING ON SUGAR BEET PHYTOTOXICITY AND WEED CONTROL

OBJECTIVE:

Determine best management practices for application rate and timing of Dual II Magnum in regard to weed control, sugar beet injury, and sugar beet yield to assist with management decisions in the occurrence of a Dual label for sugarbeet.

EXPERIMENT PROCEDURE:

The experimental design was a randomized complete block with four replicates. Emergence, percent stand, efficacy, and yield data was collected from each of two locations planted in 2000. Dual treatments were applied to 11 ft wide by 30 ft long experimental units. Dual applications were made with a bicycle wheel-type sprayer delivering 8.5 gpa at 40 p.s.i. through 8001 flat fan nozzles. Treatments consisted of Dual II Magnum at 27, 32, and 37 oz./A each applied in the fall and in the spring and were not incorporated to simulate commercial use of fall applied Dual. All experimental units were treated with three post-emerge Micro-rate applications to maintain weed control. The Micro-rate applications consisted of Betamix + Upbeet + Stinger at 8 + 1/8 + 1.3 oz./A and MSO at 1.5% v/v. Post-emergence Micro-rate treatments were applied to the whole plot with a 33 ft. plot sprayer sprayed perpendicular to rows. The varieties were Beta 5014 at Raymond and Beta 4705 at Buffalo Lake. A list of treatment dates, evaluation dates, and harvest dates for each location can be found in table 1. Weed control, sugar beet injury, and yield data for each site can be found in tables two through five.

Table 1. Specifications for the Influence of Dual II Magnum rate and timing on sugar beet phytotoxicity and weed control experiment.

Exp. #	Location	Fall Dual Trts	Spr. Dual Trts	Plant Date	POST weed control trtmnts			Evaluation Dates			Hand Harv Date
					1	2	3	1	2	3	
0027	Raymond	11/1	4/25	4/26	5/24	5/31	6/7	5/23	6/4	6/21	9/15
0028	Buff Lake	11/1	4/12	4/29	5/24	5/31	6/7	5/22	5/31	6/13	9/18

RESULTS AND DISCUSSION:

Results from the 37 oz/A spring Dual treatment at Buffalo Lake was not consistent with weed control and emergence trends observed from increased Dual rates of other treatments and sites. Thus, this specific data (shaded in table 4) is suspect. It appears that an application was missed or may have been misapplied.

SUMMARY:

- Weed or cover crop control increased or tended to increase as Dual rate increased regardless of timing.
- Weed or cover crop control at a specific Dual rate was generally greater when applied in the spring vs. fall.
- Sugar beet emergence and percent stand generally decreased as Dual rate increased regardless of spring or fall application.
- RSA generally increased with Dual rate regardless of Dual application timing thus indicating yield was more strongly related weed control than sugar beet emergence.
- RSA from fall applications of Dual was generally greater than from spring applications at Buffalo Lake but was similar at Raymond when averaged across Dual rates.

* **Dual is not labeled for use on sugar beet.**

Table 2. Emergence and stand count data for the Dual by Rate by Timing trial, Raymond location. 0027

TREATMENT	Timing	Emerge* 23-May	Emrg 5/23 % mean	% Stand 23-May	% Stnd 5/23 % mean	Cover Crop Control 23-May	Cover Crop Cntrl 5/23 % mean	% Stand 4-Jun	% Stnd 6/4 % mean	Inj 21-Jun	Inj 6/21 % mean
Dual II Magnum: 27 oz./A	Fall/not incorporated	48.65	106.90	84.50	100.42	23	73.99	42.908	101.14	1.25	70.00
Dual II Magnum: 32 oz./A	Fall/not incorporated	42.23	92.79	88.00	104.58	23.75	76.41	44.253	104.31	1.25	70.00
Dual II Magnum: 37 oz./A	Fall/not incorporated	45.95	100.95	86.00	102.21	34	109.38	44.598	105.13	2.50	140.00
Dual II Magnum: 27 oz./A	Spring / PRE	46.29	101.70	85.25	101.32	23.25	74.80	45.945	108.30	2.25	126.00
Dual II Magnum: 32 oz./A	Spring / PRE	40.88	89.82	83.00	98.64	33.75	108.58	38.515	90.79	2.00	112.00
Dual II Magnum: 37 oz./A	Spring / PRE	50.00	109.86	78.25	93.00	48.75	156.84	39.865	93.97	1.25	70.00
Weed-free Check	N/A	44.60	97.99	84.00	99.83	0	0.00	40.878	96.36	2.00	112.00
Mean		45.51		84.14		31.08		42.42		1.79	
C.V. %		11.55563		7.337595		32.87918		16.005		128.1666	
LSD (0.05)		7.7336		9.079		13.659		9.9844		3.3655	

* Emerge = emerged and living sugar beet plants per 24 ft. row.

Stand = visual estimate of percent of the original planted seed.

Table 3. Yield and quality data for the Dual by Rate by Timing trial, Raymond location. 0027

TREATMENT	Timing	Tons	Tons % mean	Sugar %	Sugar % mean	LTM*	LTM % mean	RST LBS	RST % mean	RSA LBS	RSA % mean
Dual II Magnum: 27 oz./A	Fall/not incorporated	26	95.41	15.95	101.40	1.16	98.31	295.83	101.66	7668	96.96
Dual II Magnum: 32 oz./A	Fall/not incorporated	26.09	95.74	15.48	98.41	1.2	101.69	285.65	98.16	7433.9	94.00
Dual II Magnum: 37 oz./A	Fall/not incorporated	28.83	105.80	15.74	100.06	1.18	100.00	291.25	100.08	8378.6	105.95
Dual II Magnum: 27 oz./A	Spring / PRE	26.76	98.20	15.21	96.69	1.22	103.39	279.75	96.13	7464.8	94.39
Dual II Magnum: 32 oz./A	Spring / PRE	23.83	87.45	16.1	102.35	1.15	97.46	299.03	102.76	7074.7	89.46
Dual II Magnum: 37 oz./A	Spring / PRE	31.46	115.45	15.59	99.11	1.19	100.85	287.88	98.92	9062	114.59
Weed-free Check	N/A	27.8	102.02	16.04	101.97	1.16	98.31	297.7	102.30	8274.9	104.64
Mean		27.25		15.73		1.18		291.01		7908.13	
C.V. %		13.77		4.61		5.12		5.39		13	
LSD (0.05)		5.52		1.07		0.09		23.08		1511.4	

* Abbreviations: LTM, loss to molasses; RST, recoverable sugar per ton, RSA, recoverable sugar per acre.

Table 4. Emergence, stand count, and weed control data for the Dual by Rate by Timing trial, Buffalo Lake. 0028

TREATMENT	Timing	Emerge 22-May	Emrg 5/22 % mean	Stand 22-May	Stnd 5/22 % mean	Colq	Colq % mean	EBN	EBN % mean	Rrpw	Rrpw % mean	% Emerge 31-May	Emrg 5/31 % mean	% Emerge 13-Jun	Emrg 6/13 % mean
Dual II Magnum: 27 oz./A	Fall/not incorporated	67.34	107.55	88.17	107.03	90.67	103.42	85.50	93.95	93.00	97.72	66.89	111.47	54.96	110.06
Dual II Magnum: 32 oz./A	Fall/not incorporated	70.05	111.88	87.67	106.42	88.83	101.33	93.00	102.20	96.50	101.40	58.33	97.21	46.17	92.46
Dual II Magnum: 37 oz./A	Fall/not incorporated	60.14	96.05	74.50	90.43	93.50	106.66	97.67	107.33	99.00	104.03	57.66	96.09	48.88	97.89
Dual II Magnum: 27 oz./A	Spring PRE	52.70	84.17	80.50	97.72	77.00	87.83	85.17	93.59	92.67	97.37	54.06	90.09	43.24	86.59
Dual II Magnum: 32 oz./A	Spring PRE	56.31	89.93	70.67	85.78	91.33	104.18	95.17	104.58	95.84	100.71	61.04	101.72	52.25	104.63
Dual II Magnum: 37 oz./A	Spring PRE	62.39	99.64	86.33	104.79	84.67	96.58	89.50	98.35	94.00	98.77	61.26	102.09	55.18	110.50
Weed-free Check	N/A	69.37	110.79	88.83	107.83	76.17	N/A	67.50	N/A	76.00	N/A	60.81	101.34	48.87	97.87
Mean		62.61		82.38		87.67		91.00		95.17		60.01		49.94	
C.V. %		24.6		21.89		12.71		10.82		9.58		17.53		21.57	
LSD (0.05)		18.05		21.13		12.81		11.12		10.38		12.33		12.63	

* Abbreviations: Colq, common lambsquarters; EBN, eastern black nightshade; Rrpw, redroot pigweed.
Emerge = emerged and living sugar beet plants per 24 ft row.
Stand= visual estimate of percent of the original planted seed.

Table 5. Yield and quality data for the Dual by Rate by Timing trial, Buffalo Lake. 0028

TREATMENT	Timing	Tons	Tons % mean	Sugar %	Sugar % mean	LTM*	LTM % mean	RST LBS	RST % mean	RSA LBS	RSA % mean
Dual II Magnum: 27 oz./A	Fall/not incorporated	19.845	130.93	12.97	102.11	1.356	99.27	232.36	102.46	4608.3	132.39
Dual II Magnum: 32 oz./A	Fall/not incorporated	16.523	109.01	12.91	101.61	1.357	99.34	231.06	101.88	3859.8	110.88
Dual II Magnum: 37 oz./A	Fall/not incorporated	15.828	104.43	13.14	103.44	1.297	94.95	236.92	104.47	3766.1	108.19
Dual II Magnum: 27 oz./A	Spring PRE	10.26	67.69	11.84	93.21	1.428	104.54	208.29	91.84	2229.8	64.06
Dual II Magnum: 32 oz./A	Spring PRE	12.67	83.59	12.57	98.96	1.379	100.95	223.89	98.72	2845.3	81.74
Dual II Magnum: 37 oz./A	Spring PRE	14.758	97.37	12.75	100.32	1.377	100.81	227.39	100.27	3375.2	96.96
Weed-free Check	N/A	16.218	107.00	12.75	100.33	1.367	100.07	227.62	100.37	3681.8	105.77
Mean		15.16		12.71		1.37		226.79		3480.91	
C.V. %		24.98		9.61		6.47		11.37		29.10	
LSD (0.05)		4.44		1.43		0.10		30.22		1187.40	

* Abbreviations: LTM, loss to molasses; RST, recoverable sugar per ton, RSA, recoverable sugar per acre.

INFLUENCE OF SPRING TIMING ON DUAL II MAGNUM PERFORMANCE

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OBJECTIVE:

Determine the best timing for spring applied Dual II Magnum applications to maximize sugar beet yield, weed control, and minimize sugar beet pytotoxicity in the occurrence of a Dual label in sugar beet.

Table 1. Specifications for the Influence of Spring Timing on Dual II Magnum Performance.

Task Performed	Date
PPI Dual	4/25
Planting Date	5/3
POST Trtmt # 1	5/30
POST Trtmt # 2	6/6
POST Trtmt # 3	6/13
Evaluation Date 1	6/20
Evaluation Date 2	7/6
Harvest Date	9/15

EXPERIMENT PROCEDURE:

The experiment was a randomized complete block design established at one location. Injury, weed control, and yield data were collected from the experiment. All treatments were applied to center seven feet of 11 ft wide by 30 ft long experimental units and were made with a bicycle wheel-type sprayer delivering 8.5 gpa at 40 p.s.i. through 8001 flat fan nozzles. The list of planting date, treatment dates, evaluation dates, and harvest date can be found in table 1. All treatments consisted of three post-emergence Micro-rate applications with Dual at 1qt/A applied either spring PPI or as lay-by in the first, second, or third Micro-rate application. The Micro-rate applications consisted of Betamix + Upbeet + Stinger at 8 + 1/8 + 1.3 oz/A plus MSO adjuvant at 1.5.% v/v. The variety planted was Beta 5296. The treatments, rates, sugar beet injury, weed control, yield data, and analysis are presented in Tables 2 & 3.

SUMMARY:

- Dual II Magnum applied PPI caused the greatest sugar beet injury at both evaluation dates.
- At the first evaluation date, Dual II Magnum applied lay-by in the first of three Micro-rates caused greater sugar beet injury than when Dual II Magnum was applied in either the second or third of three Micro-rates.
- By the second evaluation date, Dual II Magnum injury was similar when applied lay-by regardless of which POST Micro-rate it was applied with.
- Weed control when averaged across weed species was generally equal between Dual II Magnum applied PPI followed by three Micro-rates and Dual II Magnum lay-by in the first of three Micro-rates.
- Dual II Magnum PPI followed by three Micro-rate applications and Dual II Magnum lay-by in the first of three Micro-rates gave greater weed control than Dual II Magnum in the second or third of three Micro-rate applications when averaged across weed species.
- RSA tended to be greatest when Dual II Magnum was used lay-by in the first of three Micro-rate applications.
- It appears that when comparing Dual II Magnum PPI followed by three Micro-rate applications to Dual II Magnum in the first of three Micro-rates each at 1 qt/A; the negative influence from the excessive injury caused by Dual II Magnum PPI followed by three Micro-rate applications was more important in determining yield than the weed control that it obtained (refer to summary point # 1or table 2).

Table 2 . Dual spring timing trial, 0031

TREATMENT	RATE	Inj 1*	Inj 1 % mean	RRPW 1	RRPW 1 % mean	GIFT 1	GIFT1 % mean	EBN 1	EBN % mean	LTSW 1	Ltsw % mean	Inj 2	Inj 2 % mean	RRPW 2	RRPW 2 % mean	GIFT 2	GIFT2 % mean
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (3X)	1 qt / 8oz+1/8oz+1.3oz+1.5%	31.25	222.22	95	109.43	94.50	104.42	99.00	100.00	99.00	100.00	19.25	172.07	74	109.12	75.75	97.12
Dual II Mag+ Betamix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (2X)	1 qt + 8oz+1/8oz+1.3oz+1.5%/ 8oz+1/8oz+1.3oz+1.5%	17.50	124.44	94.75	109.14	95.50	105.52	99.00	100.00	99.00	100.00	8.75	78.21	74	109.12	81.75	104.81
Betamix+Upbeet+Stinger+MSO/ Dual II Mag+ Betamix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO	8oz+1/8oz+1.3oz+1.5%/ 1 qt + 8oz+1/8oz+1.3oz+1.5%/ 8oz+1/8oz+1.3oz+1.5%	2.50	17.78	76.25	87.83	87.50	96.69	99.00	100.00	99.00	100.00	6.75	60.34	61	89.95	77	98.72
Betamix+Upbeet+Stinger+MSO (2X)/ Dual II Mag+ Betamix+Upbeet+Stinger+MSO	8oz+1/8oz+1.3oz+1.5%/ 1 qt + 8oz+1/8oz+1.3oz+1.5%/	5.00	35.56	81.25	93.59	84.50	93.37	99.00	100.00	99.00	100.00	10.00	89.39	62.25	91.80	77.5	99.36
Mean		14.06		86.81		90.50		99.00		99.00		11.19		67.81		78.00	
C.V. %		82.59		4.31		2.67		0.00		0.00		152.92		19.92		13.15	
LSD (0.05)		17.89		5.77		3.72		0.00		0.00		26.36		20.82		15.80	

* Abbreviations: Inj., sugar beet injury; RRPW, redroot pigweed; GIFT, giant foxtail; EBN, eastern black nightshade; LTSW, ladysthumb smartweed.

Table 3 . Dual spring timing trial, 0031

TREATMENT	RATE	Tons	Tons % mean	Sugar %	Sugar % mean	LTM*	LTM % mean	RST LBS	RST % mean	RSA LBS	RSA % mean
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (3X)	1 qt / 8oz+1/8oz+1.3oz+1.5%	20.59	98.89	15.90	100.04	1.17	100.04	294.50	100.00	6066.3	98.92
Betamix+ Dual II Mag+ Upbeet+Stinger+MSO Betamix+Upbeet+Stinger+MSO (2X)	1 qt + 8oz+1/8oz+1.3oz+1.5%/ 8oz+1/8oz+1.3oz+1.5%	22.22	106.70	15.80	99.44	1.17	100.60	292.50	99.32	6498.3	105.97
Betamix+Upbeet+Stinger+MSO Dual II Mag+ Betamix+Upbeet+Stinger+MSO Betamix+Upbeet+Stinger+MSO	8oz+1/8oz+1.3oz+1.5%/ 1 qt + 8oz+1/8oz+1.3oz+1.5%/ 8oz+1/8oz+1.3oz+1.5%	20.49	98.42	15.94	100.27	1.16	99.66	295.50	100.34	6059.5	98.81
Betamix+Upbeet+Stinger+MSO (2X) Dual II Mag+ Betamix+Upbeet+Stinger+MSO	8oz+1/8oz+1.3oz+1.5%/ 1 qt + 8oz+1/8oz+1.3oz+1.5%/	19.99	95.99	15.93	100.26	1.16	99.70	295.50	100.34	5905.8	96.30
Mean		20.82		15.89		1.17		294.50		6132.48	
C.V. %		6.47		1.62		2.18		1.92		7.42	
LSD (0.05)		2.08		0.40		0.04		8.69		701.17	

* Abbreviations: LTM, loss to molasses; RST, recoverable sugar per ton, RSA, recoverable sugar per acre.

ECONOMIC VIABILITY OF DUAL OR FRONTIER WEED CONTROL PROGRAMS.

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OBJECTIVE:

Determine the most efficient use of Dual II Magnum or Frontier in regard to product rate when used in combination with two or three Micro-rate applications.

Table 1. Specifications for the Economic viability of Dual or Frontier trial.

Task Performed	Date
PPI Dual	4/18
Planting Date	4/19
POST Trtmt # 1	5/9
POST Trtmt # 2	5/16
POST Trtmt # 3	5/23
Evaluation Date	6/6
Harvest Date	9/20

EXPERIMENT PROCEDURE:

The experiment was a randomized complete block design at Belgrade. Applications were made to the center seven feet of 11-ft wide 35-ft experimental units with a bicycle wheel-type sprayer delivering 8.5 gpa at 40 p.s.i. through 8001 flat fan nozzles. The list of planting date, treatment dates, evaluation date, and harvest date can be found in table 1. Treatments included Dual II Magnum applied either PPI at 27, 32, or 37 oz/A followed by two or three Micro-rate applications or applied lay-by at 27 or 32 oz/A in the first of two or three Micro-rate applications. Frontier was applied lay-by at 25oz/A in the first of two or three Micro-rate applications. Sugar beet yield data was obtained from hand harvesting ten feet of row from each of the center two rows. The treatments, rates, sugar beet injury, weed control, yield data, and analysis are presented in tables 2 and 3.

SUMMARY:

- The site was north of Belgrade on a sandy textured soil with little or no weed pressure.
- There was no significant yield difference in terms of RSA among the treatments.
- It is likely that the insignificance of yield response to herbicide treatments was due to the relative lack of weed pressure within the plot.
- Sugar beet injury was generally greatest from the treatments involving Dual II Magnum applied PPI. (This is consistent with other tests that suggest that spring Dual PPI has greatest injury potential).
- Three vs. two Micro-rate applications following Dual II Magnum PPI did not appear to increase sugarbeet injury.
- In fields with low weed pressure, the inability to achieve additional weed control from higher Dual II Magnum or Frontier rates limits any increase in yield response due to the increase in occurrence of sugar beet injury. This is contrary to the results of trials with heavier weed pressure where the yield benefits of increased weed control outweigh the occurrence of increased injury from increased Dual or Frontier rates, (refer to the Influence of Spring Timing on Dual II Magnum Performance trial).

[a] Abbreviations for Tables 2 & 3:
LTM, loss to molasses; RST, recoverable sugar per ton; RSA, recoverable sugar per acre; COLQ, common lambsquarters; INJ, injury

Table 2. Yield and quality data from sugar beet treated with the Micro-rate with and without Frontier or Dual II Magnum, Belgrade.

TREATMENT	RATE	Tons	Tons % mean	Sugar %	Sugar % mean	LTM[a]	LTM % mean	RST LBS	RST % mean	RSA LBS	RSA % mean
Betamix+Upbeet+Stinger+MSO (3X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	25.453	107.64	17.62	100.28	1.03	99.62	331.67	100.47	8422	107.98
Betamix+Upbeet+Stinger+MSO (2X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	22.123	93.56	17.74	100.98	1.04	100.51	327.94	99.34	7223	92.60
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (3X)	27 oz./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	24.413	103.24	17.29	98.45	1.05	101.74	324.78	98.39	7963	102.09
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (3X)	32 oz./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	22.408	94.76	17.9	101.87	1.01	97.66	337.65	102.29	7567	97.01
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (3X)	37 oz./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	24.923	105.40	17.13	97.48	1.06	102.63	321.22	97.31	7992	102.46
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (2X)	27oz./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	19.358	81.87	17.61	100.27	1.03	99.62	331.62	100.46	6419	82.30
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (2X)	32 oz./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	24.945	105.49	17.71	100.81	1.02	98.82	333.69	101.09	8335	106.86
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (2X)	37oz./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	21.505	90.95	17.81	101.40	1.02	98.15	335.9	101.76	7230	92.69
Dual II Mag+Betamix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (2X)	27 oz.+8 oz.+1/8 oz.+1.3 oz.+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	25.668	108.55	17.54	99.83	1.04	100.00	330.02	99.97	8454	108.39
Dual II Mag+Betamix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO	32oz.+8 oz.+1/8 oz.+1.3 oz.+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	23.578	99.71	17.76	101.07	1.02	98.56	334.67	101.38	7896	101.23
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (2X)	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	24.98	105.64	17.18	97.79	1.07	102.87	322.25	97.62	8044	103.13
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	24.398	103.18	17.53	99.78	1.04	99.83	329.85	99.92	8053	103.25
Mean		23.646		17.57		1.04		330.1		7799.83	
C.V. %		18.25		2.66		3.03		3.01		18.35	
LSD (0.05)		6.19		0.67		0.05		14.26		2052.40	

Table 3. Weed control, percent stand, sugar beet injury and economics of Micro-rate with and without Frontier or Dual, Belgrade.

TREATMENT	RATE	COLQ[a]	COLQ % mean	% STAND	STAND % mean	INJ.	INJURY % mean		Relative Product Cost per Acre
Betamix+Upbeet+Stinger+MSO (3X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	96.5	99.81	98	100.66	0.25	10.34		$57.75/Acre
Betamix+Upbeet+Stinger+MSO (2X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	91.75	94.89	99	101.69	0.00	0.00		$38.50/Acre
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (3X)	27 oz./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	98.5	101.87	97.25	99.89	1.75	72.41		$77.20/Acre
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (3X)	32 oz./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	97.25	100.58	98	100.66	1.50	62.07		$80.80/Acre
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (3X)	37 oz./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	99	102.39	97.25	99.89	2.50	103.45		$84.40/acre
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (2X)	27oz./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	98	101.36	96.5	99.12	5.00	206.90		$57.95/Acre
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (2X)	32 oz./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	97	100.32	96.75	99.38	2.75	113.79		$61.55/Acre
Dual II Mag PPI/ Betamix+Upbeet+Stinger+MSO (2X)	37oz./ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	96.75	100.06	94.5	97.07	6.25	258.62		$65.15/Acre
Dual II Mag+Betamix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (2X)	27 oz.+8 oz.+1/8 oz.+1.3 oz.+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	95	98.25	98	100.66	0.75	31.03		$77.20/Acre
Dual II Mag+Betamix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO	32oz.+8 oz.+1/8 oz.+1.3 oz.+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	98	101.36	97.5	100.15	1.75	72.41		$61.55/Acre
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (2X)	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	98	101.36	97.75	100.41	1.75	72.41		$73.00/Acre
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	94.5	97.74	97.75	100.41	4.75	196.55		$53.75/Acre
Mean		96.6875		97.35		2.42			
C.V. %		3.73		1.50		116.22			
LSD (0.05)		5.18		2.09		4.03			

ECONOMIC VIABILITY AND EFFICACY OF FRONTIER WEED CONTROL PROGRAMS.

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OBJECTIVE:

Examine the influence of Frontier specifically with the Micro-rate and various modifications of the Micro-rate to determine the most efficient and economical use of this product should it ever have applications to the SMBSC growing area.

Table 1. Specifications for the Economic viability and Efficacy of Frontier weed control programs trial.

Task Performed	Date
Planting Date	5/3
POST Trtmt # 1	5/22
POST Trtmt # 2	5/30
POST Trtmt # 3	6/6
Evaluation Date 1	6/21
Evaluation Date 2	7/7
Harvest Date	9/15

EXPERIMENT PROCEDURE:

The experiment was a randomized complete block design near Renville. Applications were made to the center four rows of 6-row by 30 ft experimental units with a bicycle wheel-type sprayer delivering 8.5 gpa at 40 p.s.i. through 8001 flat fan nozzles. All treatments included the standard Micro-rate or some variation of the Micro-rate less individual components. Frontier was included in the first of three applications and compared to the Micro-rate or Micro-rate variation. The list of planting date, treatment dates, evaluation dates, and harvest date can be found in table 1. The variety planted was Beta 5296. Sugar beet yield data was obtained from hand harvesting ten feet of row from each of the center two rows. The treatments, rates, sugar beet injury, weed control, yield data, and analysis are presented in tables 2 and 3.

SUMMARY:

- Weed control data when averaged across weed species indicated the standard Micro-rate minus Stinger gave equal weed control to the standard Micro-rate (Betamix + Upbeet + Stinger + MSO at 8oz + 1/8oz + 1.3oz + 1.5%). This is consistent with other weed control data from 2000 and will be investigated further in 2001.
- The standard Micro-rate and the Micro-rate less Stinger provided greater weed control and tended to provide greater RSA than the Micro-rate when either Betamix or Upbeet were left out.
- When Frontier was used in the first of three Micro-rate or Micro-rate variation applications, weed control when averaged across weed species indicated the standard Micro-rate and the Micro-rate less Upbeet tended to give greater weed control and RSA than Frontier plus the Micro-rate when either Betamix or Stinger were left out.
- The previous summary points suggest that Frontier when used in combination with the Micro-rate may control the weeds that Upbeet is currently controlling in the standard Micro-rate.
- Frontier + Betamix + Stinger + MSO at 25 oz + 8oz + 1.3oz + 1.5% in the first of three Micro-rate applications (each without Upbeet), tended to provide weed control that produced the greatest RSA. This treatment was followed by Frontier in the first of three standard Micro-rates which was followed by three standard Micro-rate applications without Stinger.

Table 2. Influence of Frontier on the Micro-rate weed control program and quality data, Renville

TREATMENT	RATE	Tons	Tons % mean	Sugar %	Sugar % mean	LTM[a]	LTM % mean	RST LBS	RST % mean	RSA LBS	RSA % mean
Betamix+Upbeet+Stinger+MSO (3X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	19.163	97.76	15.06	98.76	1.24	101.44	276.3	98.53	2650.2	96.59
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (2X)	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	21.185	108.08	15.15	99.39	1.23	100.75	278.4	99.27	2915.7	106.27
Frontier+B'mix+Stinger+MSO/ Betamix+Stinger+MSO (2X)	25 oz.+8 oz+1.3 oz+1.5% MSO/ 8 oz.+1.3 oz.+1.5% MSO	23.37	119.23	15.59	102.25	1.19	97.66	287.85	102.65	3380.2	123.20
Frontier+B'mix+Upbeet+MSO/ Betamix+Upbeet+MSO (2X)	25 oz.+8 oz+1/8 oz+1.5% MSO/ 8 oz.+1/8 oz.+1.5% MSO	17.153	87.51	15.23	99.88	1.23	100.28	280.01	99.85	2395.8	87.32
Frontier+Upbeet+Stinger+MSO/ Upbeet+Stinger+MSO (2X)	25 oz.+1/8 oz+1.3 oz+1.5% MSO/ 1/8 oz.+1.3 oz.+1.5% MSO	19.735	100.68	15.32	100.47	1.22	99.44	281.99	100.56	2797.8	101.97
Betamix+Stinger+MSO (3X)	8 oz.+1.3 oz.+1.5% MSO	18.438	94.06	15.05	98.73	1.24	101.26	276.25	98.51	2551.9	93.01
Betamix+Upbeet+MSO (3X)	8 oz.+1/8 oz.+1.5% MSO	21.125	107.77	15.10	99.03	1.23	100.81	277.28	98.88	2895.3	105.52
Upbeet+Stinger+MSO (3X)	1/8 oz.+1.3 oz.+1.5% MSO	16.643	84.91	15.47	101.49	1.20	98.37	285.38	101.76	2363.1	86.13
Mean		19.60		15.24		1.22		280.43		2743.8	
C.V. %		33.29		3.15		3.31		3.72		32.1	
LSD (0.05)		9.52		0.70		0.06		15.21		1286.2	

[a] Abbreviations: LTM, loss to molasses; RST, recoverable sugar per ton; RSA, recoverable sugar per acre.

Table 3. Influence of Rontiner on the Micro-rate weed control program for injury, weed control and cost, Renville

TREATMENT	RATE	INJ[a]	INJ % mean	RR PW1	RRPW1 % mean	GI FT1	GIFT1 % mean	RR PW2	RRPW2 % mean	GI FT2	GIFT2 % mean	Relative Product Cost / Acre
Betamix+Upbeet+Stinger+MSO (3X)	8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	2.50	50.00	70.75	91.59	73.75	96.41	73.75	113.95	73.75	101.55	$57.75
Frontier+B'mix+Upbeet+Stinger+MSO/ Betamix+Upbeet+Stinger+MSO (2X)	25 oz.+8 oz+1/8 oz+1.3 oz+1.5% MSO/ 8 oz.+1/8 oz.+1.3 oz.+1.5% MSO	6.25	125.00	93.50	121.04	94.75	123.86	73.25	113.18	85.75	118.07	$73.00
Frontier+B'mix+Stinger+MSO/ Betamix+Stinger+MSO (2X)	25 oz.+8 oz+1.3 oz+1.5% MSO/ 8 oz.+1.3 oz.+1.5% MSO	12.50	250.00	84.75	109.71	94.25	123.20	73.50	113.57	84.00	115.66	$56.14
Frontier+B'mix+Upbeet+MSO/ Betamix+Upbeet+MSO (2X)	25 oz.+8 oz+1/8 oz+1.5% MSO/ 8 oz.+1/8 oz.+1.5% MSO	6.25	125.00	87.00	112.62	97.50	127.45	66.25	102.37	74.00	101.89	$57.88
Frontier+Upbeet+Stinger+MSO/ Upbeet+Stinger+MSO (2X)	25 oz.+1/8 oz+1.3 oz+1.5% MSO/ 1/8 oz.+1.3 oz.+1.5% MSO	2.50	50.00	88.25	114.24	74.25	97.06	68.50	105.84	67.00	92.25	$53.50
Betamix+Stinger+MSO (3X)	8 oz.+1.3 oz.+1.5% MSO	3.75	75.00	62.50	80.91	57.50	75.16	52.50	81.12	66.25	91.22	$40.89
Betamix+Upbeet+MSO (3X)	8 oz.+1/8 oz.+1.5% MSO	2.50	50.00	71.25	92.23	81.25	106.21	63.75	98.50	77.75	107.06	$42.63
Upbeet+Stinger+MSO (3X)	1/8 oz.+1.3 oz.+1.5% MSO	3.75	75.00	60.00	77.67	38.75	50.65	46.25	71.46	52.50	72.29	$38.25
Mean		5.00		77.25		76.50		64.72		72.63		
C.V. %		190.39		19.94		9.45		32.81		23.38		
LSD (0.05)		13.89		22.48		10.55		30.99		24.78		

[a] Abbreviations: INJ, injury; RRPW, redroot pigweed; GIFT, giant foxtail.

NITROGEN FERTILITY, LIME, OR MANURE AND VIRAL DISEASES

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OBJECTIVE:

Evaluate the influence of nitrogen rate, application of spent factory lime, or turkey manure on severity of Rhizomania or Beet Soil-Borne Mosaic virus infection and resulting sugar beet yield.

EXPERIMENT PROCEDURE:

The experimental design was a randomized complete block with six replicates at three locations in the Southern Minnesota Beet Sugar Cooperative Growing area. In each case the proceeding crop was field corn. Experiments were set out in the fall of 1999. Experimental units were 11 ft wide by 30 ft long. The lime was SMBSC factory spent lime that had an effective neutralizing index of approximately 75% and was hand applied to entire experimental units at a 4 ton per acre equivalent. Manure was Turkey pack litter with an analysis of 60-40-40 (N-P-K) per ton. Manure was also hand applied to entire experimental units at a 5 ton per acre equivalent. The University of Minnesota guidelines for losses to non-incorporated manure were used to estimate available nitrogen and calculate total available crop N. Applied Nitrogen was in the form of Urea (46-0-0) and was applied prior to spring tillage. The sugar beet variety was Beta 5014 at DeGraff and Maynard, and Beta 5296 at Bird Island. The specifications including application dates, planting dates, nitrogen levels average pH, and harvest date for each location can be found in table 1. Treatments, total available nitrogen, and yield information can be found in tables 2 through 5.

Table 1. Specifications for the N-Fertility, Lime, or Manure and Viral Diseases trial

Exp. #	Location	Manure/ Lime Applic Date	Nitrogen Fertility Date	Plant Date	Total Resid Nit.	Avg. plot pH	Harvest Date
0046	DeGraff	11/4	4/7	4/27	172	7.95	9/30
0047	Maynard	11/4	4/7	4/26	133	7.68	10/2
0048	Bird Island*	11/4	4/7	5/31	81	7.37	10/3

* The Bird Island site was replanted.

RESULTS AND DISCUSSION:

The respective sites differed in level of disease pressure. The DeGraff site had Rhizomania and Beet Soil-Borne Mosaic virus to a severe to moderate degree and had high nitrogen fertility. The Maynard site had slight to moderate Rhizomania pressure and had moderate nitrogen fertility but very high phosphorus and potassium fertility. The Bird Island site had moderate Rhizomania pressure and the lowest nitrogen fertility of the three sites. All three sites had neutral to slightly alkaline pH.

SUMMARY:

- At the DeGraff site with the highest degree of disease pressure, the manure, lime, or 40# N treatments provided significantly greater RSA than the higher nitrogen rates (Table 2).
- At Maynard with high fertility and relatively low disease pressure, there were no statistical difference between treatments to RSA and no apparent trend for improvement from manure or lime (Table 3).
- At Bird Island, replants and wind left a thin beet stand and disease pressure was moderate. Results appeared random with no real trend. RSA treatment results were statistically insignificant (Table 4).
- Combining the data provided indication that manure or lime and/or low N treatments provided greater RSA than high nitrogen applications (Table 5). The combined results however, were heavily influenced by the data from the DeGraff site where both viral diseases existed. One year of data appears to indicate that nitrogen fertilization will not overcome viral diseases and may in fact reduce RSA at an increased cost to the producer. Further long-term testing of manure and lime is planned.

Table 2. Sugar beet yield and quality in the presence of Rhizomania and Beet Soil-borne Mosaic Virus as influenced by manure, lime, and nitrogen rates, Exp. 0046. DeGraff, MN location

TREATMENT	Residual plus Applied Nitrogen	Tons	Tons % mean	Sugar %	Sugar % mean	LTM*	LTM % mean	RST LBS	RST % mean	RSA LBS	RSA % mean
Check	172	16.20	105.59	15.67	112.35	1.18	90.46	290.00	114.67	4681.70	106.76
Manure	247	17.81	116.09	15.62	111.99	1.19	91.22	288.67	114.14	5138.20	117.17
Lime	172	17.83	116.22	15.36	110.13	1.21	92.76	283.17	111.97	5045.50	115.05
40 Lbs. Nitrogen	212	18.12	118.11	15.34	109.95	1.21	92.76	282.50	111.70	5170.70	117.91
80 Lbs. Nitrogen	252	13.70	89.30	15.68	112.42	1.19	91.22	289.67	114.54	3976.20	90.67
120 Lbs. Nitrogen	292	12.12	79.00	14.46	103.67	1.27	97.36	263.67	104.26	3223.70	73.51
160 Lbs. Nitrogen	332	11.62	75.71	16.00	114.72	1.16	88.92	296.67	117.30	3462.00	78.94
Mean		15.34		13.95		1.30		252.91		4385.43	
C.V. %		20.98		5.53		5.65		6.47		23.50	
LSD (0.05)		3.77		1.00		0.08		21.61		1207.90	

* Abbreviations: LTM, loss to molasses; RST, recoverable sugar per ton, RSA, recoverable sugar per acre.

Table 3. Sugar beet yield and quality in the presence of Rhizomania as influenced by manure, lime and nitrogen rates, Exp. 0047. Maynard, MN location

TREATMENT	Applied plus Residual Nitrogen based on fall test	Tons	Tons % mean	Sugar %	Sugar % mean	LTM*	LTM % mean	RST LBS	RST % mean	RSA LBS	RSA % mean
Check	133	23.32	103.86	15.71	112.64	1.18	90.46	290.83	114.99	6775.50	106.17
Manure	208	21.74	96.81	15.32	109.84	1.22	93.52	282.00	111.50	6062.00	94.99
Lime	133	22.21	98.90	15.73	112.78	1.18	90.46	290.83	114.99	6472.70	101.43
40 Lbs. Nitrogen	173	21.22	94.51	15.18	108.84	1.22	93.52	279.00	110.32	5900.80	92.47
80 Lbs. Nitrogen	213	22.22	98.95	15.78	113.14	1.17	89.69	292.00	115.46	6483.50	101.60
120 Lbs. Nitrogen	253	22.80	101.56	15.14	108.55	1.23	94.29	278.33	110.05	6330.50	99.20
160 Lbs. Nitrogen	293	23.67	105.41	15.30	109.70	1.21	92.76	281.67	111.37	6646.30	104.15
200 Lbs. Nitrogen	333	21.24	94.61	15.10	108.26	1.23	94.29	277.67	109.79	5901.20	92.47
Mean		22.45		13.95		1.30		252.91		6381.61	
C.V. %		19.95		5.96		6.11		6.99		19.87	
LSD (0.05)		5.19		1.07		0.08		23.16		1465.90	

* Abbreviations: LTM, loss to molasses; RST, recoverable sugar per ton, RSA, recoverable sugar per acre.

Table 4. Sugar beet yield and quality in the presence of Rhizomania as influenced by manure, lime and nitrogen rates, Exp. 0048. Bird Island, MN location

TREATMENT	Applied plus Residual Nitrogen based on fall test	Tons	Tons % mean	Sugar %	Sugar % mean	LTM*	LTM % mean	RST LBS	RST % mean	RSA LBS	RSA % mean
Check	81	12.75	94.76	15.05	107.90	1.37	105.02	273.50	108.14	3491.00	91.73
Manure	156	13.51	100.40	15.39	110.34	1.33	101.95	281.83	111.44	3805.00	99.98
Lime	81	13.54	100.63	15.61	111.92	1.32	101.19	285.50	112.89	3872.20	101.75
40 Lbs. Nitrogen	121	13.77	102.34	15.28	109.55	1.31	100.42	279.33	110.45	3842.00	100.96
80 Lbs. Nitrogen	161	13.61	101.15	15.70	112.56	1.33	101.95	287.50	113.68	3918.70	102.97
120 Lbs. Nitrogen	201	12.57	93.42	15.38	110.27	1.36	104.25	287.67	113.75	3741.00	98.30
160 Lbs. Nitrogen	241	14.44	107.32	15.01	107.62	1.30	99.66	274.29	108.45	3969.49	104.31
Mean		13.46		13.95		1.30		252.91		3805.63	
C.V. %		8.73		7.27		4.44		7.45		12.54	
LSD (0.05)		1.38		1.32		0.07		24.66		562.66	

* Abbreviations: LTM, loss to molasses; RST, recoverable sugar per ton, RSA, recoverable sugar per acre.

Table 5. Combined Sugar beet yield and quality in the presence of Rhizomania as influenced by manure, lime and nitrogen rates, Exp. 0046, 0047, 0048.

TREATMENT	Average applied + Residual N across sites based on fall test	Tons	Tons % mean	Sugar %	Sugar % mean	LTM*	LTM % mean	RST LBS	RST % mean	RSA LBS	RSA % mean
Check	129	17.42	101.97	15.48	100.44	1.24	99.31	284.80	100.56	4961.22	102.48
Manure	204	17.69	103.55	15.44	100.18	1.25	100.11	283.80	100.21	5020.42	103.71
Lime	129	17.86	104.54	15.56	100.95	1.24	99.31	286.40	101.13	5115.10	105.66
40 Lbs. Nitrogen	169	17.70	103.60	15.27	99.07	1.25	100.11	280.40	99.01	4963.08	102.52
80 Lbs. Nitrogen	209	16.51	96.64	15.72	101.99	1.23	98.51	289.80	102.33	4784.60	98.83
120 Lbs. Nitrogen	249	15.83	92.66	14.99	97.26	1.29	103.32	274.00	96.75	4337.42	89.60
160 Lbs. Nitrogen	289	16.58	97.05	15.43	100.11	1.24	99.31	283.80	100.21	4705.40	97.20
Mean		17.08		15.41		1.25		283.20		4841.03	

* Abbreviations: LTM, loss to molasses; RST, recoverable sugar per ton, RSA, recoverable sugar per acre.

NITROGEN FERTILITY ON SANDY SOILS OF THE NORTHERN SMBSC GROWING AREA

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OBJECTIVE:

Determine best management strategies for nitrogen fertilization on the sandy irrigated soils of the northern SMBSC growing area.

EXPERIMENT PROCEDURE:

The experimental design was a randomized complete block with four replicates. The experiment was conducted at two locations in 2000 and one location in 1999. The nitrogen source was ammonium nitrate fertilizer and was spread by hand to the entire experimental unit area in all cases. Fertilizer applications were made to 11 ft wide by 35 ft long experimental units. Preplant fertilization was performed on April 13 at Belgrade and April 15 at the Hancock site in 2000 and on April 28 at Hancock in 1999. The side-dress applications were made at the determined rates and times (see yield tables). In 2000 the Belgrade site was planted on April 25, and the Hancock site on April 28. The Hancock site in 1999 was planted on April 28. The varieties were ACH 309 at Belgrade and HM 7057 at Hancock in 2000 and Vanderhave 46109 at Hancock in 1999. Yield data was collected from each of the experiments in 1999 and 2000. Yield was determined by harvesting ten feet of row from each of the center two of six-row experimental units and converted to tons/acre. A list of fertilizer application dates, rates and yield data can be found in tables one through three.

SUMMARY:

- At Belgrade, the 120 pound total nitrogen program (TNP) made up of three applications of 40 pounds, and the 200 pound TNP provided equal sugar beet tons/acre and RSA and each were significantly greater than all other treatments.
- At the Hancock site, the 40 pound TNP, the 120 pound TNP made up of three 40 pound applications, and the 80 pounds TNP provided equal RSA and were greater than all other nitrogen fertilization programs.
- At the Hancock site, the 120 pound TNP from three 40 lbs. applications provided greater tons/acre than all other treatments.
- The same experiment conducted at Hancock in 1999 indicated that the 120 pound TNP made up of three 40 pound applications, the 120 pound TNP from 40 pounds N preplant and 80 pounds on June 1, the 160 pound TNP from four 40 pound applications, and the 40 pound TNP program provided equal RSA and were greater than all other treatments.
- When 1999 and 2000 data were combined the 120 pound TNP from three 40 pound applications applied pre-plant, June 1, and July1 tended strongly to provide the greatest RSA versus the other nitrogen management programs. In addition, this same treatment was consistently among the top programs at each site and in each year.

Table 1. Fertilization on sand strategies, Belgrade - 2000

Total Nitrogen	N application timing				Tons/ Acre	Tons/ Acre % mean	Sugar %	Sugar % mean	LTM[a]	LTM % mean	RST	RST % mean	RSA	RSA % mean
	Pre-plant	6/1	7/1	8/1										
40	40				20.92	85.32	17.35	101.82	1.056	98.17	325.89	102.07	6819.9	87.28
80	40	40			25.95	105.85	17.05	100.06	1.074	99.87	319.50	100.07	8296.1	106.17
120	40	80			24.48	99.85	17.00	99.76	1.076	100.10	318.43	99.73	7777.6	99.54
160	40	120			24.91	101.59	16.96	99.56	1.083	100.70	317.62	99.48	7927.3	101.45
200	40	160			26.62	108.59	16.91	99.24	1.083	100.74	316.54	99.14	8409.7	107.63
120	40	40	40		30.14	122.90	16.85	98.89	1.088	101.17	315.25	98.73	9490.8	121.46
160	40	40	40	40	25.30	103.17	16.81	98.63	1.097	102.01	314.17	98.40	7930.3	101.49
160	40	80	40		25.22	102.87	17.11	100.39	1.068	99.30	320.77	100.46	8095.3	103.60
0	0	0	0	0	17.13	69.87	17.32	101.65	1.053	97.92	325.45	101.93	5576.2	71.36
Mean					24.52		17.04		1.075		319.29		7813.69	
C.V. %					14.94		4.54		5.39		5.21		15.08	
LSD (0.05)					3.66		0.77		0.058		16.64		1178.20	

[a] Abbreviations: LTM, loss to molasses; RST, recoverable sugar per ton; RSA, recoverable sugar per acre.

Table 2. Fertilization on sand strategies, Hancock - 2000

Total Nitrogen	N application timing				Tons/ Acre	Tons/ Acre % mean	Sugar %	Sugar % mean	LTM[a]	LTM % mean	RST	RST % mean	RSA	RSA % mean
	Pre-plant	6/1	7/1	8/1										
40	40				27.70	107.59	17.37	104.05	1.069	96.78	325.96	104.56	9026.7	112.50
80	40	40			26.26	102.01	17.14	102.68	1.066	96.44	321.46	103.12	8430.1	105.06
120	40	80			24.28	94.31	16.94	101.46	1.091	98.73	316.91	101.66	7705.1	96.03
160	40	120			23.99	93.21	16.72	100.16	1.104	99.87	312.31	100.18	7499.4	93.47
200	40	160			25.29	98.25	16.18	96.92	1.144	103.49	300.68	96.45	7603.3	94.76
120	40	40	40		29.29	113.80	16.51	98.90	1.113	100.70	307.92	98.78	9017.4	112.38
160	40	40	40	40	26.23	101.88	16.10	96.44	1.149	103.94	298.98	95.91	7835.2	97.65
160	40	80	40		25.69	99.80	16.21	97.10	1.141	103.22	301.34	96.66	7742.8	96.50
0	0	0	0	0	22.94	89.13	17.07	102.29	1.070	96.84	320.08	102.67	7353.6	91.65
Mean					25.74		16.69		1.105		311.74		8023.73	
C.V. %					5.41		4.80		5.32		5.50		7.56	
LSD (0.05)					1.39		0.80		0.06		17.15		606.88	

[a] Abbreviations: LTM, loss to molasses; RST, recoverable sugar per ton; RSA, recoverable sugar per acre.

Table 3. Fertilization on sand strategies 1999 and 2000 combined.

Total Nitrogen	N application timing				Tons/ Acre	Tons/ Acre % mean	Sugar %	Sugar % mean	LTM[a]	LTM % mean	RST	RST % mean	RSA	RSA % mean
	Pre-plant	6/1	7/1	8/1										
40	40				26.86	104.33	17.33	103.80	1.010	91.44	326.23	104.65	8761.2	100.46
80	40	40			28.28	109.87	16.91	101.30	1.014	91.72	318.00	102.01	8964.8	102.80
120	40	80			27.23	105.79	16.96	101.60	1.012	91.58	318.95	102.31	8693.4	99.68
160	40	120			26.40	102.57	16.66	99.83	1.064	96.30	311.92	100.06	8231.8	94.39
200	40	160			28.44	110.48	16.49	98.80	1.059	95.87	308.59	98.99	8766.0	100.52
120	40	40	40		31.33	121.71	16.72	100.19	1.054	95.36	313.38	100.53	9824.0	112.65
160	40	40	40	40	28.68	111.41	16.48	98.76	1.062	96.12	308.47	98.95	8845.3	101.43
160	40	80	40		27.84	108.17	16.48	98.76	1.058	95.76	308.47	98.95	8575.7	98.33
0	0	0	0	0	24.00	93.23	17.28	103.53	0.995	90.00	325.76	104.50	7826.1	89.74
Mean					27.67		16.81		1.036		315.53		8720.92	
C.V. %					10.16		4.06		6.49		4.65		10.52	
LSD (0.05)					3.58		0.44		0.05		9.40		1225.20	

[a] Abbreviations: LTM, loss to molasses; RST, recoverable sugar per ton; RSA, recoverable sugar per acre.

OBJECTIVE:

Determine the influence if any, of phosphorus placement, phosphorus rate, foliarly applied micro-nutrients, or foliarly applied amino acids on sugar beet growth and yield.

EXPERIMENT PROCEDURE:

The experimental design was a randomized complete block with four replicates. Yield data was collected from each of two locations planted in 2000. Soil applied fertilizer treatments were applied to 11 ft wide by 35 ft long experimental units. The foliar treatments were applied with a bicycle wheel-type sprayer delivering 17.0 gpa at 40 p.s.i. through 8002 flat fan nozzles to the center four rows of 6-row plots. Phosphorus treatments at Bird Island consisted of 20, 40, 60, or 80 pounds P_2O_5 in the form of 0-44-0 knifed in as a band or applied broadcast. P treatments at Raymond included the 20, 40, 60, and 80 pound P_2O_5 band treatments but only the 40 pound broadcast treatment. Both locations included a commercial micro-nutrient plan called the Ele-max program and its individual constituents, a commercial amino acid program called Auxi-gro and a check in addition to the phosphorus placement treatments.

The varieties were Vanderhave H46109 at Raymond and HM Resist at Bird Island. A list of fertilizer application dates, planting dates and harvest dates for each location can be found in table 1. The yield data for each site can be found in tables two and three.

Table 1. Specifications for the phosphorus placement and foliar micro-nutrients with sugar beet experiment.

Exp. #	Location	Olsen P - Soil Test	B'cast / band P applics	Plant Date	Elemax applications			Auxi-gro applic date	Harv Date
					1	2	3		
0007	Bird Island	4	4/10	4/12	6/9	6/22	7/6	8/15	10/6
0008	Raymond	16	4/20	4/26	6/22	7/6	7/19	8/15	10/9

SUMMARY:

- No treatments at either site produced RSA that was significantly greater than the check. However, there were treatments that were significantly lower than the check.
- At the Raymond site 80 pounds of P_2O_5 provided greater RSA than 40 pounds when each were applied broadcast.
- At Raymond the 40 and 60 pound band applications and the 80 pound broadcast application of P_2O_5 tended to produce the greatest RSA and were significantly greater than the micro-nutrient or amino acid foliar feed programs but were not significantly greater than the check.
- At the Bird Island location there was generally no significant difference among treatments.
- At Bird Island the treatments that provided the greatest RSA were the 80 pound broadcast and the 40 pound band applications of P_2O_5, respectively. However, neither treatment was significantly greater than the check. This was somewhat consistent with the data from the Raymond site (see bullet item number 3).

Table 2. Influence of phosphorus placement and foliar applied micronutrients on sugar beet - Bird Island

Abbrv.	Treatment Description	Rate	Tons/ Acre	Tons % mean	Sugar %	Sugar % mean	LTM	LTM % mean	RST	RST % mean	RSA	RSA % mean
ELE-MAX	ELE-MAX Program a) Manganese FL + Super Zinc FL - (4-6 leaf beet stage) b) Maganese FL + Coron Boron - (12-14 days after 4-6 leaf beet stage) c) Phocal - Zn Fl - (24-28 days after 4-6 leaf beet stage)	 1 + 1 pt/Acre 1 pt + 2 qt/Acre 2 qt/Acre	27.42	104.12	16.45	95.61	1.12	104.98	307	94.92	8410	99.09
Mn	Manganese FL - (4-6 leaf beet stage)	1 pt/Acre	26.80	101.77	16.84	97.87	1.09	102.86	315	97.55	8429	99.32
Zn	Super Zinc FL - (4-6 leaf beet stage)	1 pt/Acre	25.46	96.68	16.97	98.64	1.08	101.68	318	98.40	8115	95.62
CB	Coron Boron - (12-14 days after 4-6 leaf beet stage)	2 qt/Acre	27.62	104.87	17.17	99.78	1.07	100.27	322	99.72	8909	104.97
PZn	Phocal - Zn Fl - (24-28 days after 4-6 leaf beet stage)	2 qt/Acre	26.94	102.31	17.24	100.22	1.06	99.33	324	100.26	8717	102.71
Mn-Zn	Manganese FL + Super Zinc FL - (4-6 leaf beet stage)	1+ 1 pt/Acre	21.93	83.27	17.10	99.38	1.07	100.74	321	99.26	7035	82.89
Mn-CB	Maganese FL + Coron Boron - (12-14 days after 4-6 leaf beet stage)	1 pt + 2 qt/Acre	25.76	97.83	17.32	100.66	1.05	98.86	326	100.80	8392	98.88
Auxien	Auxi-gro		26.30	99.88	17.18	99.83	1.06	100.03	322	99.80	8507	100.24
B-20	Banded 20 lbs. P	20 lbs./Acre	27.14	103.05	17.41	101.17	1.05	98.39	328	101.42	8873	104.55
B-40	Banded 40 lbs. P	40 lbs./Acre	27.04	102.66	17.57	102.14	1.04	97.68	331	102.43	8934	105.27
B-60	Banded 60 lbs. P	60 lbs./Acre	26.43	100.36	17.67	102.71	1.03	96.74	333	103.13	8798	103.67
B-80	Banded 80 lbs. P	80 lbs./Acre	27.21	103.32	16.56	96.27	1.11	104.27	309	95.77	8407	99.06
K-40	Broadcast 40 lbs. P	40 lbs./Acre	27.00	102.51	17.35	100.83	1.06	99.33	326	100.96	8472	99.83
K-60	Broadcast 60 lbs. P	60 lbs./Acre	25.89	98.31	17.22	100.08	1.06	99.80	323	100.11	8374	98.67
K-80	Broadcast 80 lbs. P	80 lbs./Acre	27.16	103.14	17.64	102.53	1.03	97.21	333	102.97	9016	106.23
CK-1	Check		25.15	95.52	17.68	102.75	1.03	97.21	333	102.97	8398	98.95
CK-2	Check		25.61	97.23	17.66	102.62	1.03	96.97	333	103.05	8495	100.10
(P) Mn+Zn	Phosyn		26.62	101.08	16.70	97.04	1.10	103.56	312	96.55	8293	97.71
(P) Mn	Phosyn		25.75	97.78	17.35	100.83	1.05	98.86	326	101.04	8405	99.03
(P) Zn	Phosyn		27.45	104.24	16.90	98.23	1.09	102.15	317	98.02	8672	102.18
(P) Mn-Zn	Phosyn		26.35	100.06	17.35	100.83	1.05	99.09	326	100.88	8577	101.06
Mean			26.33		17.20		1.06		322.90		8486.93	
C.V. %			8.33		3.94		4.62		4		10	
LSD (0.05)			3.09		0.96		0.07		20		1185	

Table 3. Influence of phosphorous placement and foliar applied micronutrients on sugar beet yield - Raymond

Treatment Description	Rate	Tons/ Acre	Tons % mean	Sugar %	Sugar % mean	LTM	LTM % mean	RST	RST % mean	RSA	RSA % mean
ELE-MAX Program		24.43	95.20	16.82	100.26	1.088	99.56	315	100.26	7676	95.42
a) Manganese FL + Super Zinc FL - (4-6 leaf beet stage)	1 + 1 pt/Acre										
b) Maganese FL + Coron Boron - (12-14 days after 4-6 leaf beet stage)	1 pt + 2 qt/Acre										
c) Phoscal - Zn Fl - (24-28 days after 4-6 leaf beet stage)	2 qt/Acre										
Manganese FL - (4-6 leaf beet stage)	1 pt/Acre	24.85	96.82	16.90	100.75	1.083	99.10	317	100.90	7842	97.48
Super Zinc FL - (4-6 leaf beet stage)	1 pt/Acre	22.99	89.58	17.08	101.82	1.068	97.73	320	102.09	7365	91.56
Phoscal - Zn Fl - (24-28 days after 4-6 leaf beet stage)	2 qt/Acre	23.59	91.94	16.50	98.32	1.118	102.31	308	98.03	7287	90.59
Manganese FL + Super Zinc FL - (4-6 leaf beet stage)	1 + 1 pt/Acre	26.50	103.26	16.85	100.42	1.088	99.56	315	100.50	8350	103.80
Maganese FL + Coron Boron - (12-14 days after 4-6 leaf beet stage)	1 pt + 2 qt/Acre	23.28	90.70	16.96	101.08	1.078	98.64	318	101.29	7408	92.09
Auxi-gro		24.31	94.73	16.36	97.49	1.125	102.99	305	97.15	7406	92.07
Phosphorous applied in Band 3 -5 inch deep	20 lbs./Acre	26.19	102.07	16.88	100.60	1.085	99.33	316	100.74	8273	102.85
Phosphorous applied in Band 3 -5 inch deep	40 lbs./Acre	29.06	113.25	17.06	101.69	1.075	98.42	320	101.85	9240	114.86
Phosphorous applied in Band 3 -5 inch deep	60 lbs./Acre	28.24	110.04	16.73	99.74	1.090	99.79	313	99.70	8829	109.76
80 lb. Phosphorous applied in Band 3 -5 inch deep	80 lbs./Acre	27.96	108.95	16.75	99.83	1.095	100.25	313	99.86	8754	108.83
Phosphorous applied Broadcast	40 lbs./Acre	25.43	99.08	16.39	97.71	1.125	102.99	305	97.31	7714	95.90
Check		26.79	104.39	16.83	100.29	1.085	99.33	315	100.34	8430	104.79
Mean		25.66		16.78		1.09		314		8044	
C.V. %		9.52		3.48		4.13		4.00		9.03	
LSD (0.05)		3.49		0.83		0.06		18		1038	

VARIETY RESPONSES TO CERCOSPORA LEAFSPOT FUNGICIDES

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OBJECTIVE:

Observe the influence of several cercospora leafspot (CLS) fungicide programs on the yield and quality performance of various sugar beet varieties.

EXPERIMENT PROCEDURE:

The experimental design was a randomized complete block with four replicates. The location, planting date, fungicide treatment dates, evaluation date and harvest date can be found in table 1. The fungicide programs were the fungicide-free check, BAS-500 at two rates, and an Eminent - Supertin alternation at each location. Varieties tested at each site were Hilleshog varieties E17, Supreme, and Agate. At the Renville site Vanderhave H66240 and Beta 3712 were tested in addition to the above varieties. The means from the 1999 coded variety trial CLS nursery KWS evaluation data for each variety were:

Beta 3712 - 5.16 **HME17** -4.10 **HM-Agate** - 5.82 **VDH 66240** - 5.46 **HM-Supreme** - 4.24

Fungicide treatments, rates, and varieties in addition to the KWS leafspot evaluations and yield data can be found in tables 2 and 3. Fungicide applications were made to the center four rows of six row by 30 ft experimental units with a tractor mounted fungicide sprayer. The center two rows were harvested with a two-row small plot lifter. Harvested sugar beets from each experimental unit were sub-sampled and tested for quality parameters.

Table 1. Specifications for the Variety Responses to CLS Fungicides experiment.

Location	Plant Date	Fungicide Treatment Dates				KWS Evaluation Date	Harvest Date
		1	2	3	4		
Gluek	4/28	7/12	7/27	8/10	8/24	9/13	10/9
Renville	5/3	7/12	7/27	8/10	8/24	9/13	10/11

RESULTS AND DISCUSSION:

Data were not combined since there was not enough seed available to plant all varieties at each site. In addition, cercospora pressure as indicated by the average of common varieties was higher at the Renville location (4.06) than at the Gluek site (3.65).

SUMMARY:

- When data were averaged over varieties at either location the BAS-500 and Eminent/Supertin alternation programs did not differ in RSA.
- At Gluek where two of three varieties were relatively tolerant to CLS, there was no difference in KWS readings between BAS-500 or Eminent/Supertin alternation when data were averaged over varieties. However, at Renville where only two of five varieties had relative tolerance to CLS, the Eminent/ Supertin alternation provided a significantly lower (better) KWS reading than the BAS-500 program.
- At Renville, when data were averaged over fungicide programs, Beta 3712 provided greater RSA than HM Agate, HM E17, and VDH 66240 and tended to be greater than HM Supreme. VDH H66240 and HM E17 were equal and provided significantly lower RSA than all other varieties tested.
- When data were averaged over fungicide programs at either location, HM E17 had a lower KWS rating than HM Agate, Beta 3712, or VDH 66240 and tended to be greater than HM Supreme. However, the strong KWS rating of E17 did not correlate to a yield benefit when CLS was controlled.
- Data from these trials indicate that when fungicides are effective for control of CLS, genetic potential can overcome CLS tolerance for yield. However, too much use of susceptible types may increase occurrence of fungicide tolerance. Thus, one can error from choosing a variety that has either extremely high or low KWS leafspot ratings when considering leafspot tolerance for highest RSA.

Table 1. KWS ratings and yield and quality data from fungicide by variety screen, Gluek.

TREATMENT	RATE	VARIETY	KWS- CLS Rating[a]	KWS-CLS % mean	Tons	Tons % mean	Sugar %	Sugar % mean	LTM	LTM % mean	RST LBS	RST % mean	RSA LBS	RSA % mean
Fungicide-free check		Hilleshog E17	4.83	132.32	18.07	76.26	15.55	91.45	1.114	104.31	288.67	90.57	5241.7	68.86
Fungicide-free check		Hilleshog Supreme	6.17	168.82	17.31	73.04	15.61	91.79	1.099	102.92	290.17	91.04	4980.7	65.43
Fungicide-free check		Hilleshog Agate	5.83	159.69	17.15	72.37	15.14	89.04	1.147	107.42	279.83	87.80	4800.8	63.07
BAS 500	12.25 oz.	Hilleshog E17	2.17	59.32	25.82	108.96	17.37	102.16	1.053	98.61	326.5	102.44	8418.8	110.60
BAS 500	12.25 oz.	Hilleshog Supreme	3.67	100.38	26.73	112.79	17.42	102.46	1.060	99.30	327.17	102.65	8763	115.12
BAS 500	12.25 oz.	Hilleshog Agate	3.50	95.82	24.99	105.47	17.09	100.53	1.074	100.63	320.33	100.50	7999.8	105.09
BAS 500	24.5 oz.	Hilleshog E17	2.50	68.44	24.59	103.78	17.9	105.29	1.022	95.69	337.5	105.89	8301.8	109.06
BAS 500	24.5 oz.	Hilleshog Supreme	3.17	86.69	26.6	112.24	17.37	102.14	1.051	98.49	326.5	102.44	8656.7	113.72
BAS 500	24.5 oz.	Hilleshog Agate	3.17	86.69	25.97	109.61	17.5	102.92	1.052	98.55	328.83	103.17	8536.8	112.15
Eminent/Supertin[b]	13 / 5 oz.	Hilleshog E17	2.50	68.44	26.21	110.60	17.63	103.71	1.033	96.79	332.17	104.22	8698.3	114.27
Eminent/Supertin	13 / 5 oz.	Hilleshog Supreme	3.17	86.69	25.9	109.30	17.92	105.38	1.058	99.08	337.17	105.79	8721	114.57
Eminent/Supertin	13 / 5 oz.	Hilleshog Agate	3.17	86.69	25.02	105.57	17.54	103.13	1.048	98.21	329.83	103.49	8225.8	108.06
Mean			3.65		23.7		17		1.067		318.72		7612.1	
C.V. %			18.37		8.84		6.07		6.15		6.85		10.00	
LSD (0.05)			0.7764		2.42		1.19		0.076		25.27		965.96	

Table 2. KWS ratings and yield and quality data from fungicide by variety screen, Renville.

TREATMENT	RATE	VARIETY	KWS- CLS Rating[a]	KWS-CLS % mean	Tons	Tons % mean	Sugar %	Sugar % mean	LTM	LTM % mean	RST LBS	RST % mean	RSA LBS	RSA % mean
Fungicide-free check		Hilleshog E17	4.50	106.51	15.47	106.21	16.56	100.99	1.111	98.38	308.99	101.18	4863	109.40
Fungicide-free check		Hilleshog Supreme	6.50	153.85	15.74	108.03	16.23	98.99	1.135	100.50	301.96	98.88	3459.5	77.82
Fungicide-free check		VDH 66240	6.50	153.85	11.49	78.87	16.99	103.62	1.081	95.79	318.23	104.20	3901.3	87.76
Fungicide-free check		Beta 3712	6.25	147.93	13.72	94.20	15.64	95.39	1.189	105.33	289.07	94.66	4480.5	100.79
Fungicide-free check		Hilleshog Agate	6.50	153.85	12.34	84.70	16.5	100.62	1.121	99.26	307.59	100.72	4204.5	94.58
BAS 500	12.25 oz.	Hilleshog E17	2.50	59.17	17.96	123.24	14.59	88.96	1.248	110.58	266.79	87.36	3586.3	80.68
BAS 500	12.25 oz.	Hilleshog Supreme	3.50	82.84	17.32	118.85	15.74	95.95	1.183	104.82	291.04	95.30	5058	113.78
BAS 500	12.25 oz.	VDH 66240	4.25	100.59	13.28	91.17	15.88	96.85	1.170	103.65	294.25	96.35	3633.3	81.73
BAS 500	12.25 oz.	Beta 3712	4.25	100.59	14.71	100.94	16.93	103.24	1.083	95.92	316.95	103.78	5688	127.95
BAS 500	12.25 oz.	Hilleshog Agate	4.50	106.51	12.35	84.76	17.08	104.13	1.071	94.90	320.08	104.81	4696	105.64
BAS 500	24.5 oz.	Hilleshog E17	2.25	53.25	16.76	115.01	15.59	95.09	1.192	105.55	288.02	94.31	4794	107.84
BAS 500	24.5 oz.	Hilleshog Supreme	2.75	65.09	16.66	114.34	15.68	95.63	1.185	104.93	289.96	94.95	4825.5	108.55
BAS 500	24.5 oz.	VDH 66240	3.25	76.92	12.52	85.90	16.82	102.57	1.100	97.47	314.4	102.95	3925.8	88.31
BAS 500	24.5 oz.	Beta 3712	3.00	71.01	13.81	94.79	16.08	98.07	1.154	102.25	298.57	97.77	4727.3	106.34
BAS 500	24.5 oz.	Hilleshog Agate	3.50	82.84	15.75	108.13	17.03	103.82	1.099	97.31	318.53	104.30	4423	99.50
Eminent/Supertin[b]	13 / 5 oz.	Hilleshog E17	3.50	82.84	14.46	99.25	15.85	96.66	1.171	103.69	293.59	96.14	4250	95.61
Eminent/Supertin	13 / 5 oz.	Hilleshog Supreme	4.25	100.59	15.32	105.12	17.69	107.86	1.027	90.98	333.19	109.10	4668.8	105.03
Eminent/Supertin	13 / 5 oz.	VDH 66240	4.00	94.67	14.05	96.43	16.3	99.38	1.135	100.50	303.26	99.30	3676.3	82.70
Eminent/Supertin	13 / 5 oz.	Beta 3712	4.25	100.59	15.62	107.18	17.85	108.84	1.043	92.40	336.09	110.05	5204.8	117.08
Eminent/Supertin	13 / 5 oz.	Hilleshog Agate	4.50	106.51	12.08	82.88	16.95	103.33	1.081	95.79	317.28	103.89	4840.5	108.89
Mean			4.23		14.57		16.4		1.129		305.39		4445.32	
C.V. %			20.95		10.61		6.81		7.46		7.86		12.86	
LSD (0.05)			1.25		2.19		1.58		0.119		33.99		809.47	

[a] Abbreviations for Tables 1 & 2: KWS-CLS, 2000 cercospora leafspot field rating where 1 = disease free and 9 = complete defoliation; LTM, loss to molasses; RST, recoverable sugar per ton; RSA, recoverable sugar per acre.

[b] The Eminent / Supertin treatment was an alternation of two Eminent application with two Supertin applications beginning with Eminent.

NITRATE SOIL TEST ADJUSTMENT FOR SUGAR BEET GROWN IN HUMID AREAS OF MINNESOTA

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Concerns have been raised about the accuracy of the nitrate-N soil test in prediction of N needs in the Southern Beet Sugar Cooperative growing area. This sugar beet production area is located in a more humid area of Minnesota than the Red River Valley production areas. The extra precipitation changes the soil moisture dynamics and thus increases the chances of N losses to denitrification and also possibly an increase in the contribution of N from soil organic matter. Other logistical problems exist because of the more humid situation. Soil samples from the 2 to 4 foot depths are difficult to collect. Soil can be too wet to stay in the sampling tube when brought to the soil surface or too wet to get a recognizable and representative sample. This work is investigating the importance of deep nitrate soil sampling at different times in the production year in the prediction of the optimum N fertilizer rate for optimum root yield and quality.

Nitrogen management is paramount for optimum sugar production. Nitrogen sources for sugar beet include fertilizer N and organic matter. Factors that influence nitrogen availability are temperature, precipitation, and soil drainage. Of the factors mentioned, the rate of nitrogen fertilizer applied is the easiest input to management. This has been done through the use of a nitrate soil test.

The effect of previous crop on sugar beet yield and quality can be seen in cooperative statistics. There are many different crops in the Southern Minnesota Beet Sugar Cooperative growing area that have been used as previous crop. Little is known about the effect of previous crop on nitrogen fertilizer recommendations for sugar beet grown in this area. One observation has been that a fall nitrate-N soil test when the previous crop is soybean is not very useful because the soybean plant utilizes all the nitrate-N in the soil. The nitrogen in soybean residue mineralizes much quicker than other crops such as corn. This would make a case for the use of a spring or in-season soil test for prediction of N fertilizer needs. Environmental demands may require that no fall N fertilizer application may be made. This leads to the need to know the effect of spring applications of N verses fall application on sugar beet yield and quality.

Objectives:

1. Improve the ability to predict more accurately the nitrogen fertilizer needs for optimum sugar beet yield and quality in humid areas of Minnesota following several different crops.
2. Determine the effect of fall verses spring nitrogen fertilizer applications on sugar beet yield and quality.

Materials and Methods:

This was the third year of a multi-year/multi-site study. In the fall of 1999, six sites were established in the Southern Minnesota Beet Sugar Cooperative production area. Four of the sites were in the eastern growing area near Bird Island and Hector, Minnesota while the other two sites were near Gluek and Murdock, Minnesota in the western growing area. The preceding crop was sweet corn at two of the eastern locations while corn was the previous crop at the remaining four sites. The treatments were four replications of factorial combination of fall and spring application at nitrogen rates of 0, 40, 80, 120, and 160 pounds per acre. Soil samples to a depth of four feet were taken from the 0 N rate plots for nitrate-N during the first week of November 1999 and the last week of April 2000. Sugar beet top samples were taken one or two days before root harvest. These were weighed, subsampled, dried, and analyzed for total nitrogen content. The harvest was done by a plot- sized lifter. Root samples for quality analyses were obtained at harvest and analyzed by the Southern Minnesota Beet Sugar Cooperative Quality Lab. Following harvest, soil samples for nitrate-N were taken from all plots to a depth of four depth.

Results and Discussion:

Growing season 2000 started with a dry planting season. Soil sampling to four feet was not a problem. Substantial rains occurred late May and continued until July. August and September were dry and sugar beet growth was slowed.

Fall and spring soil nitrate-N contents are presented in Table 1. At the Murdock and Gluek locations, soil nitrate-N in the 0 to 2 foot depth increased substantially from the fall to spring soil sampling dates while the nitrate-N contents in the 2 to 4 foot did not change. At Hector and Bird Island locations where the previous crop was, the nitrate-N values did not change much from the fall to spring sampling times. The soil nitrate-N in the 0 to 2 foot depth increased from the fall to sampling dates at the Hector and Bird Island locations which had sweet corn as a previous crop. The nitrate-N increase at Bird Island also occurred in the 2 to 4 foot depth.

Table 1. Soil nitrate-N to 4 foot in early November 1999 and late April 2000 at six locations.

Location	Previous Crop	Soil Nitrate-N			
		Fall		Spring	
		0-2'	2-4'	0-2'	2-4'
		- - - - - - - - - - - - - - lb N/A - - - - - - - - - - - - - - -			
Murdock	corn	35	34	88	32
Gluek	corn	54	29	98	43
Hector	corn	53	50	62	42
Hector	sweet corn	72	69	100	65
Bird Island	corn	64	62	72	61
Bird Island	sweet corn	85	46	104	94

The changes in nitrate-N between the fall and spring soil sampling dates are reflected in the fertilizer N recommendations listed in Table 2. These numbers were calculated using the current recommendations for Southern Minnesota Beet Sugar Cooperative growing area. At all locations, the recommendations were reduced from fall to spring. Large reductions occurred at the Gluek, Murdock, and Bird Island sweet corn locations. Small reductions occurred at Hector corn and Bird Island corn. The Hector sweet corn location was intermediate at 25 pounds N per acre.

Table 2. Soil test N recommendations for six locations using Fall and Spring soil nitrate-N information (150 [(soil test N in 0 to 2 ft depth) + (0.8 X soil nitrate 2-4 ft depth-30)].

Location	Previous Crop	Recommendation	
		Fall	Spring
		- - - - - lb N/A - - - - -	
Murdock	corn	112	60
Gluek	corn	96	42
Hector	corn	81	78
Hector	sweet corn	47	22
Bird Island	corn	60	53
Bird Island	sweet corn	52	0

The root yield and quality information for the Murdock location is listed in Table 3. Root yield was maximized with a fall application of 80 pound N per acre or a spring application of 40 pounds N per acre. Net sucrose, which the sucrose concentration minus the loss to molasses, recoverable sucrose per ton, and recoverable sucrose per acre were the greatest at 80 pounds N per acre. The soil test N recommendation was 112 pounds fertilizer N per acre from the fall soil test and 60 pounds N per acre based on the spring soil test.

Table 3. Sugar beet root yield, net sucrose concentration, recoverable sucrose per ton, and recoverable sucrose per acre for the Murdock location in 2000.

			Root Yield		Net Sucrose		Recoverable Sucrose	
N Rate	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
lb N/A	- - - ton/A - - -		- - - - % - - - -		- - - lb/ton - - -		- - - lb/A - - -	
0	19.7	21.2	15.2	15.0	305	301	6022	6381
40	22.2	22.2	15.1	15.2	303	304	6728	6765
80	22.7	22.2	15.6	15.8	313	316	7081	7030
120	21.9	22.0	14.4	14.9	288	297	6241	6029
160	21.8	20.3	14.3	14.9	287	297	6241	6029

Statistics

Time	NS	NS	NS	NS
N Rate	NS	.008	.008	.19
Linear	NS	.03	.03	NS
Quadratic	.06	.04	.04	.03
Time x N Rate	10.7	NS	NS	NS

The root yield response data for the Gluek location is similar to the Murdock location, Table 4. Root yields were greatest with 80 pounds N per acre as a fall application and 40 pounds of fertilizer N per acre applied in the spring. The greatest net sucrose concentration occurred between the 0 and 40 pounds N per acre application and decreased recoverable sucrose per ton was similar to net sucrose. Recoverable sucrose per acre was greatest with a fall application of 80 pounds N per acre or 40 pounds N per acre from a spring application. The soil test N recommendation was 96 pounds fertilizer N per acre from the fall soil test and 42 pounds fertilizer N per acre from a spring soil test.

Root yield, net sucrose, recoverable sucrose per ton, and recoverable sucrose per acre at the two locations in the eastern growing area, Hector and Bird Island, which had corn as a previous crop either did not respond to N fertilizer application or the response was negative, Tables 5 and 6. The soil tests at these sites did not change significantly from the fall to spring sampling dates. At the Hector corn site the recommendation from the fall soil sample was 81 pounds N per acre and 78 pounds N per acre from the spring soil sample. The Bird Island location N recommendations were 60 pounds N per acre from the fall soil sample and 53 pounds N per acre for the spring soil test.

Table 4. Sugar beet root yield, net sucrose concentration, recoverable sucrose per ton, and recoverable sucrose per acre for the Gluek location in 2000.

	Root Yield		Net Sucrose		Recoverable Sucrose	
N Rate	Fall	Spring	Fall	Spring	Fall	Spring
lb N/A	- - - ton/A - - -		- - - - % - - - -		- - - lb/ton - - -		- - - lb/A - - -	
0	22.4	23.3	16.8	17.1	336	342	7512	7999
40	26.7	27.0	16.8	17.3	335	345	8952	9333
80	27.6	25.1	16.7	17.2	333	344	9184	8624
120	23.8	25.6	16.7	16.8	335	337	7968	8614
160	24.5	20.9	16.4	15.6	327	312	8028	6514

Statistics

Time	NS	NS	NS	NS
N Rate	.003	.03	.04	.0006
Linear	NS	.008	.01	.07
Quadratic	.0002	.06	.06	.0001
Time x N Rate	.12	NS	NS	.08

Table 5. Sugar beet root yield, net sucrose concentration, recoverable sucrose per ton, and recoverable sucrose per acre for the Hector corn location in 2000.

	Root Yield		Net Sucrose		Recoverable Sucrose	
N Rate	Fall	Spring	Fall	Spring	Fall	Spring
lb N/A	- - - ton/A - - -		- - - - % - - - -		- - - lb/ton - - -	
0	22.4	22.9	16.8	16.8	334	336	7481	7673
40	21.2	23.1	16.8	16.7	336	334	7105	7724
80	21.1	21.3	16.6	16.9	332	338	6974	7222
120	20.5	22.0	16.6	16.2	232	325	6800	7153
160	19.4	21.5	16.1	16.2	222	324	6241	6938

Statistics

Time	.11	NS	NS	.13
N Rate	NS	.008	.008	.19
Linear	.07	.03	.03	.03
Quadratic	NS	.04	.04	NS
Time x N Rate	NS	NS	NS	NS

Table 6. Sugar beet root yield, net sucrose concentration, recoverable sucrose per ton, and recoverable sucrose per acre for the Bird Island corn
location in 2000.

	Root Yield		Net Sucrose		Recoverable Sucrose	
N Rate	Fall	Spring	Fall	Spring	Fall	Spring
lb N/A	- - - ton/A - - -		- - - - % - - - -		- - - lb/ton - - -		- - - lb/A - - -	
0	27.5	27.8	16.3	16.7	326	335	8977	9296
40	27.7	30.2	16.7	16.5	334	331	9243	9998
80	27.0	27.8	16.2	16.2	323	325	8733	8994
120	30.1	27.9	15.7	16.3	314	226	9419	9082
160	28.8	28.4	15.8	15.3	317	306	9132	9664

Statistics

Time	NS	NS	NS	NS
N Rate	NS	.04	.03	.08
Linear	NS	.003	.003	.19
Quadratic	NS	.04	NS	NS
Time x N Rate	.16	NS	NS	.19

Root yield and recoverable sucrose per acre were the greatest at the 80 pound fertilizer N per acre application at the Hector sweet corn location, Table 7. Net sucrose and recoverable sucrose per ton were decreased with the application of N fertilizer. The N recommendations were 47 pounds per acre from the fall soil sample and 22 pounds per acre for the spring soil sample.

Table 7. Sugar beet root yield, net sucrose concentration, recoverable sucrose per ton, and recoverable sucrose per acre for the Hector sweet corn location in 2000.

	Root Yield		Net Sucrose		Recoverable Sucrose	
N Rate	Fall	Spring	Fall	Spring	Fall	Spring
lb N/A	- - - ton/A - - -		- - - - % - - - -		- - - lb/ton - - -		- - - lb/A - - -	
0	21.0	20.8	18.1	17.6	312	352	7599	7310
40	24.3	25.2	17.4	17.6	347	352	8429	8866
80	24.9	25.3	17.6	17.5	351	350	8744	8825
120	23.1	22.0	17.9	17.9	351	358	8117	7832
160	24.0	23.9	17.0	17.0	341	341	8143	8156

Statistics

Time	NS	NS	NS	NS
N Rate	.006	.09	.09	.01
Linear	.14	.05	.05	NS
Quadratic	.02	NS	NS	.008
Time x N Rate	NS	NS	NS	NS

At the Bird Island sweet corn site, root yield, net sucrose, recoverable sucrose per ton, and recoverable sucrose per acre were not significantly affected by N application, Table 8. The N recommendation based on the fall soil test was 52 pounds N per acre, while the N recommendation based on the spring soil test was 0 pounds N per acre.

Table 8. Sugar beet root yield, net sucrose concentration, recoverable sucrose per ton, and recoverable sucrose per acre for the Bird Island sweet corn location in 2000.

	Root Yield		Net Sucrose		Recoverable Sucrose	
N Rate	Fall	Spring	Fall	Spring	Fall	Spring
lb N/A	- - - ton/A - - -		- - - - % - - - -		- - - lb/ton - - -		- - - lb/A - - -	
0	28.0	27.4	15.0	15.7	299	314	8291	8602
40	27.0	29.0	15.9	15.9	317	317	8572	9238
80	29.3	28.3	15.3	15.7	305	314	8956	8915
120	29.0	26.3	16.8	15.5	335	310	9715	8193
160	29.2	27.3	15.5	15.6	310	312	9040	8511
Statistics								
Time	NS		NS		NS		NS	
N Rate	NS		NS		NS		NS	
Linear	NS		NS		NS		NS	
Quadratic	NS		NS		NS		NS	
Time x N Rate	NS		NS		NS		.12	

In summary, there were significant positive responses for recoverable sucrose per acre to N fertilization at three of the six locations. The N recommendation based on a fall soil nitrate test over predicted the N needs for optimum recoverable sucrose per acre in five of the six locations (Murdock, Gluek, Hector corn, Bird Island corn, and Bird Island sweet corn) in 2000. The other location (Hector sweet corn) was 30 pounds N per acre short. The N recommendation based on a spring soil nitrate test over predicted the N needs at two locations (Hector corn and Bird Island corn), under predicted at two locations (Murdock, and Hector sweet corn), and was correct at two locations (Gluek and Bird Island sweet corn). The under predictions were approximately 20 pounds N per acre at the Murdock location and 30 pounds N per acre at the Hector sweet corn location.

Management of Turkey and Swine Manure Derived Nitrogen in a Sugar Beet Cropping System

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Justification of Research:

Livestock operations, mainly poultry and swine, are increasing in size and impact in the Southern Minnesota sugar beet growing area. Many sugar beet producers own or have interest in these operations; thus have manure available to use on their fields. Manure research data concludes that manure has a positive effect on crop production from its effects on soil nutrient availability and soil physical properties. A concern has been raised about the effect of late season nitrogen mineralized from the manure on sugar beet quality. Grower observations indicate better growth in manured fields. With the large amount of manure available the question has changed from whether to use manure but when in the sugar beet crop rotation should manure be applied to minimize quality concerns and realize benefits. The answer to this question maybe different depending on the type of manure. Poultry manure has a considerable amount of litter in it compared to swine manure, thus slowing initial release of poultry manure-N.

Little recent information is available on the effect of manure on sugar beet root yield and quality. Halvorson and Hartman (1974) reported that sucrose concentration and recoverable sugar per acre were reduced with the addition of beef manure while root yield was increased. Schmitt et al. (1996) reported that swine manure mineralization occurs several years after application in a legume-corn rotation. Malzer and Graff (1995) reported that leached nitrate-N during second year after an application of turkey manure was greater than in the first year after application. This data suggests that poultry manure has a latter or more extended release of N when compared to liquid swine manure.

The implications of the manure-N release are critical, especially to sugar beet growers. Therefore, recommendations need to be evaluated with sugar beets. This research project has been designed to: 1) measure the effect of manure application effects on sugar beet root yield and quality compared to fertilizer N applications; 2) determine the effect of turkey and swine manure mineralization differences on sugar beet root yield and quality; and 3) develop management strategies for manure application in a sugar beet rotation.

Materials and Methods:

To address the objectives, two experiments were conducted in 1999 and 2000 at locations near Renville and Raymond, Minnesota. Experiment 1 was established after soybean was grown in a soybean-corn-sugar beet rotation at Renville in 1999 while the experiment was established in after corn was grown at the Raymond site in 2000. The treatments listed in Table 1 were designed to evaluate the effect of manure applied one cropping year before sugar beet is grown and compare its nitrogen contribution to fertilizer applied the year of sugar beet production. In the corn year (1999 at Renville and 2000 at Raymond) the plots used for the N rate evaluation in the sugar beet year were fertilized with a recommended rate of fertilizer for optimum corn production. Deep nitrate-N soil samples were taken from the check plots Fall 1998 at Renville and Fall 1999 at Raymond before manure and fertilizer application, April 1999 at Renville and early May 2000 at Raymond before corn planting. Nitrate-N and ammonium-N soil samples were taken monthly to a depth of one foot to characterize the N dynamics during the growing season. Basal stalk samples for nitrate concentration were taken at physiological maturity (black layer). Corn grain was hand harvested from each plot. After corn harvest, soil samples to a 4 foot depth were taken and analyzed for residual nitrate-N from every plot.

Table 1. Treatments for Experiment 1.

Treatment number	Treatment	
	Year 1 (corn)	Year 2 (sugar beet)
1	120 lb N/A	0 lb N/A (check)
2	120 lb N/A	40 lb N/A
3	120 lb N/A	80 lb N/A
4	120 lb N/A	120 lb N/A
5	120 lb N/A	160 lb N/A
6	120 lb N/A	200 lb N/A
7	Swine manure 2500 gal/A (228 lb total N/A)	Residual
8	Swine manure 5000 gal/A (455 lb total N/A)	Residual
9	Turkey manure 5 tons/A (90 lb total N/A)	Residual
10	Turkey manure 10 tons/A (180 lb total N/A)	Residual
11	Check (no fertilizer or manure)	Check (no fertilizer or manure)

The second experiment was established at the same location near Renville, Minnesota in 1999 and Raymond in 2000. The objective of this experiment was to measure the effects of manure application directly before sugar beet production. The treatments include fertilizer nitrogen, turkey manure, and swine manure (Table 2). The treatments were applied early November 1998 at the Renville site and November 1999 at Raymond. Fertilizer nitrogen was applied in a series of rates to determine the equivalent of the N supplied by manure. Soil samples were taken to a depth of four feet for nitrate-N from the check plots Fall 1998, and April 1999 at the Renville site and Fall 1999 and early May 2000 at the Raymond site. This is similar to Experiment 1. Soil samples to one foot for nitrate-N and ammonium-N were taken monthly to estimate the mineralization of N from manure during the growing season. Soil samples were taken to a depth of 4 foot in all plots at both sites after sugar beet harvest.

Table 2. Treatments for Experiment 2.

Treatment number	Treatment
1	0 lb N/A (check)
2	40 lb N/A
3	80 lb N/A
4	120 lb N/A
5	160 lb N/A
6	200 lb N/A
7	Swine manure 2500 gal/A (228 lb total N/A)
8	Swine manure 5000 gal/A (455 lb total N/A)
9	Turkey manure 2.5 tons/A (45 lb total N/A)
10	Turkey manure 5.0 tons/A (90 lb total N/A)

Sugar beet top growth and N content, root yield, and root quality were measured at harvest. Quality samples were taken at harvest and analyzed by the Southern Minnesota Beet Sugar Cooperative Quality Laboratory.

Results and Discussion:

Experiment 1 - The initial soil nitrate-N measured Fall 1998 was 30 pounds per acre for the 0 to 2 foot depth and 11 pounds per acre for the 2 to 4 foot depth. Corn grain yield for the Renville site in 1999 is reported in (Table 3). There was a significant increase in grain yield when compared to the check with the application of fertilizer and manure. There were no significant differences in grain yield between the fertilizer treatment and the manure treatments. The only significant difference was between the grain yields for the two rates of swine manure (155 vs 169 bushels per acre**).**

Soil ammonium-N and nitrate-N were measured each month in 1999, Table 4. Soil ammonium-N concentrations in the surface foot of soil (not shown) were similar for soil from all treatments and at all sampling dates, approximately 40 pounds N per acre. Soil nitrate-N concentrations in the surface foot of soil, did change during the growing season. Nitrate concentrations were greatest at the June sampling date and decrease to a low value in August. The use of fertilizer and manure increase soil nitrate-N concentrations over the check which received no fertilizer or manure. The soil treated with a 120 pounds of fertilizer N per acre had similar nitrate concentrations to the soil treated with 5000 gallons per acre of liquid swine manure. The soil treated with Turkey manure had the greatest nitrate-N concentration in June and the soil treated with 10 tons per acre of turkey manure had elevated nitrate concentration at the November sampling date. The first year of this experiment was the set up year to investigate the effects of manure on sugar beet production two years after application. Sugar beet was grown at this site in 2000.

Table 3. Corn grain yields at 15.5% moisture or Experiment 1 at Renville in 1999.

Treatment	Corn grain yield
	- - - - bu/A - - - -
Check	126
Fertilizer - 120 lb. N/A	158
Swine Manure 2500 gallon/A	155
Swine Manure 5000 gallon/A	169
Turkey Manure 5 tons/A	166
Turkey Manure 10 tons/A	167
LSD 0.05	12

Table 4. Soil nitrate-N for top 1 foot during corn year (Experiment 1) at Renville, MN in 1999.

Treatment	Fall 98	June	July	Aug.	Sept.	Nov.
	- lb N/A -					
Check 0 lb N/A	22	71	45	14	16	15
Fertilizer 120 lb N/A	22	146	72	28	28	32
Swine manure 2500 gal/A	22	109	60	18	20	21
Swine manure 5000 gal/A	22	148	85	33	27	33
Turkey manure 5 ton/A	22	177	93	33	37	36
Turkey manure 10 ton/A	22	288	176	111	87	136

Sugar beet yield, sucrose concentration, loss to molasses, recoverable sucrose per, and recoverable sucrose per acre for 2000 at the Renville site are reported in Table 5. The root yield for the treated plots, manure and 120 pounds fertilizer N per acre applied in 1999, were greater than the check plot which was not treated in 1999 or 2000. This reflects the difference in the soil nitrate-N contents between the check treatment and the 120 pounds N per acre fall 1999, 25 verses 48 pounds N per acre in the 0 to 2 foot depth. The use of fertilizer in 2000 did not affect root yield. Swine manure applied at 5000 gallons per acre and Turkey manure applied at 5 and 10 tons per acre fall 1998 increased root yields over the 2000 fertilize N treatments and the checks. Recoverable sucrose per acre was affected similar to root yield by the treatments. Only the use of 200 pounds of fertilizer N per acre reduced sucrose concentration significantly in 2000. The manure treatments applied fall 1998 did not affect sucrose concentrations. This was unexpected. The lack of reduction in sucrose concentration could have been caused by the lack of N uptake during the last part of the 2000 growing season. There were dry moisture which caused the plant to slow growth during this time. The soil information which is not available at the time of this report may help determine if this occurred.

Table 5. Sugar beet root yield, sucrose, loss to molasses, recoverable sucrose per ton, and recoverable sucrose per acre for Experiment 1 at Renville, MN 2000.

Treatment		Root	Sucrose	Loss to	Recoverable	
1999	2000	Yield	Concentration	Molasses	Sucrose	
		ton/A	- - - - % - - - -	- - % - -	lb/ton	lb/A
Check	Check	15.1	17.4	1.05	328	4948
120 lb N/A	0 lb N/A	18.4	17.2	1.07	322	5921
120 lb N/A	40 lb N/A	17.1	17.0	1.08	318	5429
120 lb N/A	80 lb N/A	18.5	17.1	1.08	320	5927
120 lb N/A	120 lb N/A	17.6	16.6	1.11	311	5476
120 lb N/A	160 lb N/A	17.9	16.5	1.12	309	5524
120 lb N/A	200 lb N/A	18.1	15.7	1.19	290	5276
Swine manure 2500 gal/A	0 lb N/A	17.6	17.2	1.08	321	5643
Swine manure 5000 gal/A	0 lb N/A	24.1	18.3	0.99	345	8314
Turkey manure 5 ton/A	0 lb N/A	22.3	18.0	1.01	344	7608

Turkey manure 10 ton/A	0 lb N/A	21.9	16.4	1.12	366	6727
$LSD_{0.05}$		2.4	1.5	0.11	32	1139

Experiment 2 - Renville 1999 site - The objective of this experiment was to determine the effect of manure application the fall before sugar beet production on sugar beet yield and quality. The soil nitrate-N content was 27 pounds per acre in the 0 to 2 foot depth and 18 pounds per acre in the 2 to 4 foot depth in the fall of 1998 at the Renville site. Root yield was not significantly affected by the nitrogen fertilizer applications (Table 6). Only the root yields of the 5 ton per acre turkey manure and 5000 gallons per acre swine manure applications were significantly greater than the root yield of the check. The loss to molasses for the 5 ton per acre turkey manure application was significantly greater than the check. No significant differences occurred for sucrose concentration, recoverable sucrose per ton, and recoverable sucrose per acre.

Table 6. Root yield, sucrose concentration, loss to molasses, recoverable sucrose per ton, and recoverable sucrose per acre for Experiment 2 at Renville in 1999.

Treatment	Root **Yield**	Sucrose **Concentration**	Loss to **Molasses**	Recoverable **Sucrose**	
	ton/A	%	%	lb/ton	lb/A
Check	23.9	18.3	0.93	348	8301
Fertilizer 40 lb N/A	24.9	18.2	1.01	345	8570
Fertilizer 80 lb N/A	25.3	18.1	0.94	342	8634
Fertilizer 120 lb N/A	25.7	17.5	0.86	332	8546
Fertilizer 160 lb N/A	26.1	17.4	0.98	329	8492
Fertilizer 200 lb N/A	24.2	17.6	1.03	331	8033
Swine Manure 2500 gal/A	25.3	17.5	1.00	329	8353
Swine Manure 5000 gal/A	28.0	17.5	0.94	330	9371
Turkey Manure 2.5 ton/A	26.2	17.8	0.93	337	8849
Turkey Manure 5.0 ton/A	27.3	17.3	1.10	323	8819
LSD 0.05	2.6	NS	0.10	NS	NS

Soil nitrate-N contents in the top 1 foot at Renville in 1999 are reported in Table 7. During the June, and July soil sampling dates soil nitrate-N was greater in the soil's treated with 160 pounds fertilizer N per acre, 200 pounds fertilizer N per acre, 5000 gallons of liquid swine manure per acre, and 5 tons of turkey manure per acre than the check. By August this difference was not measured. This is different than the soil nitrate information reported for corn in Table 4. Sugar beet roots is very efficient at utilizing nitrate-N from the soil and leaves little nitrate-N in soil compared to corn.

Table 7. Soil nitrate-N for top 1 foot during sugar beet year (Experiment 2) at Renville, MN in 1999.

Treatment	Fall 98	June	July	Aug.	Sept.	Nov.
	- lb N/A -					
Check 0 lb N/A	18	61	34	15	17	16
Fertilizer 40 lb N/A	18	76	40	16	16	22
Fertilizer 80 lb N/A	18	90	36	15	19	16
Fertilizer 120 lb N/A	18	101	40	14	18	17
Fertilizer 160 lb N/A	18	122	64	17	20	18
Fertilizer 200 lb N/A	18	126	63	28	19	25
Swine manure 2500 gal/A	18	62	36	13	18	16
Swine manure 5000 gal/A	18	132	54	18	21	18
Turkey manure 2.5 ton/A	18	99	37	17	19	20
Turkey manure 5.0 ton/A	18	160	74	22	20	19

Experiment 2 - Raymond, Minnesota site in 2000. The soil nitrate-N for this site was 50 pounds per acre in the 0 to 2 foot depth and 25 pounds per acre in the 2 to 4 foot depth. The maximum root yield occurred with 120 pounds fertilizer N per acre, 5000 gallons of swine manure per acre, 2.5 tons turkey manure per acre, and 5 tons turkey manure per acre. The sucrose concentration for the manure treatments and the 160 and 200 pounds of fertilizer N per acre treatments were decreased. Recoverable sucrose per acre was the greatest, approximately 10,000 pounds per acre, with the 120 pounds fertilizer N per acre, 5000 gallons of swine manure per acre, 2.5 tons turkey manure per acre, and 5 tons turkey manure per acre.

Table 9. Root yield, sucrose, loss to molasses, recoverable sucrose per ton, and recoverable sucrose per acre for Experiment 2 at Raymond, MN in 2000.

Treatment	Root Yield	Sucrose Concentration	Loss to Molasses		Recoverable Sucrose
	Ton/A	– - - - % - - - -	- - % - -	lb/ton	lb/A
Check 0 lb N/A	18.5	18.8	0.99	356	6593
Fertilizer 40 lb N/A	24.1	18.9	0.98	359	5632
Fertilizer 80 lb N/A	27.5	18.5	1.01	349	9644
Fertilizer 120 lb N/A	28.5	18.9	0.99	358	10206
Fertilizer 160 lb N/A	26.7	18.4	1.00	348	9300
Fertilizer 200 lb N/A	26.0	17.8	1.03	335	8701
Swine manure 2500 gal/A	23.5	18.1	1.02	342	8026
Swine manure 5000 gal/A	29.9	18.0	1.02	339	10135
Turkey manure 2.5 ton/A	31.4	18.2	1.02	344	10819
Turkey manure 5.0 ton/A	26.4	19.3	0.88	366	9643
$LSD_{0.05}$	3.4	1.3	0.06	28	1419

The results from the first two years of this study indicate that the use of manure may not be as detrimental to sugar beet production was original thought. One concern that is raised is what is the effect of long term use of manure in the sugar beet rotation. The above results are from field with not prior manure history. Also the 2000 growing season had a long period during August and September in which the sugar beet plant was under moisture stress and may not have been able to take up the nitrate-N that was mineralized from the manure late in the season.

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CERCOSPORA LEAF SPOT CONTROL IN EASTERN NORTH DAKOTA AND MINNESOTA IN 2000

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Cercospora leaf spot, caused by the fungus *Cercospora beticola* Sacc. is the most serious leaf disease of sugarbeet (*Beta vulgaris* L.) in the production areas of North Dakota and Minnesota. This disease may cause reductions in tonnage and sucrose, and increase impurities. Losses as high as 30 percent in recoverable sucrose are fairly common under moderate disease conditions. Roots of diseased plants do not store in piles 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 tolerance has increased in incidence and severity in the Red River Valley and southern Minnesota. Benzimidazole resistance is present in all production areas of North Dakota and Minnesota.

OBJECTIVES:

The research objectives of these trials were to evaluate the efficacy of labeled and experimental fungicides at controlling Cercospora leaf spot. These fungicides were applied alone, in tank mixes, or alternated at various application intervals not only to evaluate control, but also to evaluate management strategies to prevent or slowdown the buildup of tolerance or resistance to the fungicides. All 2000 test sites had known TPTH tolerance and benzimidazole resistance.

PROCEDURES:

Research was conducted at Crookston, Breckenridge, Maynard, and Renville, Minnesota. The cultural practices and application dates for each location are in **Table 1**. At all locations, plots were 11 feet wide (6-22 inches rows) and 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 Breckenridge and Crookston analysis were completed at the American Crystal Sugar Company Quality Tare Laboratory, East Grand Forks, MN. Southern Minnesota samples were analyzed at the Southern Minnesota Beet Sugar Cooperative Laboratory, Renville, MN. The experiments were all arranged in a randomized complete block design with four replications. At Crookston, three replications were analyzed. Cercospora leaf spot severity was rated on the KWS scale of 1 to 9. One indicates there is no disease, a rating of 3 indicates the early stages of economic loss level, and a rating of 9 indicates that the plants assessed have only new leaf growth, all earlier leaves being dead, and severe economic loss.

All sites were planted in April. All sites were affected by Cercospora leaf spot, with initial symptoms occurring around mid July.

There were 35 identical fungicide treatments at Maynard and Renville in southern Minnesota, and 30 identical fungicide treatments at Breckenridge and Crookston. The fungicides tested in 2000 are listed in **Table 2**. The application interval for each treatment at each site is indicated in the tables for the respective sites.

RESULTS AND DISCUSSION:

The effect of the treatments for Cercospora leaf spot control for the test sites are shown in Tables 3, 4, 5 and 6. **Please note** that some treatments having TPTH exceeded the labeled amounts to be applied for a given season. Only 15 oz/A of TPTH is allowed per season. A Section 18 label was granted for Eminent 125 SL on sugarbeet for the 2000 cropping season. **Another Section 18 label for Eminent 125 SL on sugarbeet in North Dakota and Minnesota was requested for the 2001 cropping season**. Registration status of all other experimental fungicides for the 2001 cropping season is not known at this time.

Crookston:

Cercospora leaf spot progressed slowly after first detection on June 20 until August 28 when a rapid increase occurred and continued until harvest even though climatic conditions for this increase appeared unfavorable. All the fungicide treatments increased recoverable sucrose per acre and reduced the level of Cercospora leaf spot (**Table 3**). Of the labeled fungicides Eminent (with a Section 18 label) gave consistent control and high recoverable sucrose per acre. The experimental compound, BAS 500, also gave good control if applied at the 0.15 lb a.i per acre rate. It should be noted the BAS 500 applied with Agridex at 1% v/v caused leaf necrosis at the first application on July 26 and the addition of Agridex was discontinued on subsequent applications. The amount of leaf necrosis increased with increasing rates of BAS 500.

Breckenridge:

Cercospora leaf spot progressed slowly after it was first detected on July 14. Disease pressure was fairly high during the season with the untreated check plots having a KWS Cercospora leaf spot rating of 7.9 at harvest (**Table 4**).

All treatments, except Quadris, Caramba, TPTH, and AgriTin applied in alternation with Eminent, resulted in significantly higher recoverable sucrose per acre than the untreated check. The most effective treatments were Eminent, Flint alternating with TPTH, and BAS 500 alternating with Eminent. There was some phytotoxicity when BAS 500 was applied with Agridex COC in the first and second applications, resulting in Agridex COC not being used with BAS 500 in later applications. There was also some phytotoxicity with TPTH and Eminent applied on September 7.

Southern Minnesota:

Maynard:

Cercospora leaf spot damage was moderate resulting in untreated check plots having a 7.0 Cercospora leaf spot rating on the KWS scale at harvest (**Table 5**). All treatments resulted in significantly higher recoverable sucrose per acre than the untreated check, and the treatment comprising of only 40 lbs of additional nitrogen. No phytotoxicity was observed.

All fungicide treatments yielded significantly higher recoverable sucrose than the checks. The best treatment of the registered compounds was Topsin M (at the lower rate) + Penncozeb (App 1) / Penncozeb (App 2, 4 6, 8) / TPTH (App 3, 5, 7) which increased recoverable sucrose (lb/A and lb/T), root yield, and sucrose content by 3480 lb/A, 31 lb/T, 11.9 T/A, and 1.5 % respectively, when compared to the untreated check. One of the treatments recommended to farmers, Eminent alternating with TPTH, produced 4,259 lb/A of recoverable sucrose more than the untreated check. The best treatment was the experimental fungicide BAS 500 + Methoil. The application of an additional 40 lb of N_2 at cultivation on plots of one treatment and one check did not improve Cercospora leaf spot control.

Renville:

Cercospora leaf spot damage was moderately high resulting in untreated check plots having a 7.4 Cercospora leaf spot rating on the KWS scale at harvest (**Table 6**). All treatments resulted in significantly higher recoverable sucrose per acre than the untreated check, and the treatment comprising of only 40 lbs of additional nitrogen. No phytotoxicity was observed.

Cercospora leaf spot damage was high resulting in untreated check plots having a 8.4 Cercospora leaf spot rating on the KWS scale at harvest (**Table 6**). All fungicide treatments yielded significantly higher recoverable sucrose than the checks. As at Willmar, the best treatment of the registered compounds was Topsin M (at the lower rate) + Penncozeb (App 1) / Penncozeb (App 2, 4 6, 8) / TPTH (App 3, 5, 7) which increased recoverable sucrose (lb/A and lb/T), root yield, and sucrose content by 2965 lb/A, 4 lb/T, 7.4 T/A, and 2.8 % respectively, when compared to the untreated check. Eminent alternating with TPTH, produced 4,416 lb/A of recoverable sucrose more than the untreated check. The non-registered experimental compounds provided the best Cercospora leaf spot control. The best treatments were BAS 500 / Eminent, BAS 500 + Methoil, and BAS 500 + X-77. The application of an additional 40 lb of N_2 at cultivation on plots of one treatment and one check did not improve Cercospora leaf spot control.

SUMMARY AND CONCLUSIONS

A. Registered Fungicides

1. The 3.75 oz/A TPTH rate should only be used in the northern end of the sugarbeet growing area of North Dakota and Minnesota. For the most effective Cercospora leaf spot control, a 10-day application interval is recommended.

2. The 5.0 oz/A TPTH rate should be used in areas of high TPTH tolerance (Moorhead factory district, Minn-Dak, and Southern Minnesota) with an application interval of 10 days.

3. Using a single benzimidazole (Topsin M) fungicide application in combination with or alternating with a protectant fungicide provided the best Cercospora leaf spot control at Crookston. This treatment was also fairly effective at Gluek and Willmar, and least effective at Foxhome. Only one application of a benzimidazole fungicide in combination with a protectant fungicide should be used at the northern end of the sugarbeet growing region in North Dakota and Minnesota.

B. Experimental Fungicides

1. Some experimental fungicides consistently provided better Cercospora leaf spot control than the best currently registered fungicides. The experimental fungicides that were most effective, alone or in combinations with other experimental or registered fungicides, include BAS 500 (with the addition of an adjuvant), Eminent, and Stratego. Quadris and RH-7592 also showed some promise at some sites.

C. Fungicide with Section 18 Label

1. The availability of Eminent (since a Section 18 has been granted for 2000) will enhance the ability of growers to control Cercospora leaf spot and better manage fungicide resistance. Alternating Eminent with other classes of fungicides provides better disease control and delays the development of fungicide resistance.

D. Other Comments

1. The addition of an extra 40 lb/A of N_2 above the recommended level at cultivation did not improve Cercospora leaf spot control.

2. The first fungicide application should be made when conditions first favor the disease or at disease onset. If the first application is late, control will be difficult all season.

3. Use the recommended rates of fungicides to control Cercospora leaf spot.

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Table 1. Cultural Practices And Application Date Information For Cercospora Leaf Spot Trials In 2000

	Crookston	Breckenridge	Maynard	Renville
Planting Date	April 24	April 27	April 26	April 26
Previous Crop	Wheat	Wheat	Corn	Corn
Variety	HM Valley	HM Valley	Beta 4705	Beta 4705
Weed Control	Betamix –micro-rate	Betamix –micro-rate	Betamix –micro-rate	Betamix –micro-rate
	Betanex – m/rate	Betanex – m/rate	Betanex – m/rate	Betanex – m/rate
	Upbeet – m/rate	Upbeet – m/rate	Upbeet – m/rate	Upbeet – m/rate
	Stinger – m/rate	Stinger – m/rate	Stinger – m/rate	Stinger – m/rate
	Poast – m/rate	Poast – m/rate	Poast – m/rate	Poast – m/rate
	Oil – micro-rate	Oil – micro-rate	Oil – micro-rate	Oil – micro-rate
			Ammonia	Ammonia
	Hand labor	Hand labor	Hand labor	Hand labor
	Cultivation	Cultivation	Cultivation	Cultivation
Insecticide	Counter	Counter	None	None
Plant Population at Thinning	35,000 plant/A	35,000 plant/A	35,000 plant/A	35,000 plant/A
Spray Application				
	Crookston	Foxhome	Willmar	Gluek
1st	July 26	July 25	July 12	July 12
2nd	August 9	August 8	July 19	July 19
3rd	August 16	August 15	August 2	August 2
4th	August 22	August 22	August 5	August 5
5th	August 30	August 29	August 9	August 9
6th	September 7	September 7	August 16	August 16
7th			August 19	August 19
8th			August 23	August 23
9th			August 29	August 29
Spray Volume (gpa)	**20.0**	**20.5**	**20**	**20**
Spray Pressure (psi)	**100**	**110**	**120**	**120**
Rain and/or wet conditions may have occasionally kept application intervals from being exactly correct.				
Harvest Date	**September 29**	**September 26**	**October 9**	**October 11**

Table 2. Fungicides tested in 2000.

Fungicides	Status
Manzate	Registered
Benlate	Registered
Penncozeb	Registered
Topsin M	Registered
Super Tin, Agritin, Triphenyltin hydroxide (TPTH)	Registered
Quadris	Registered
Flint	Registered
Eminent	Section 18 granted for 2000
Caramba	Experimental
Stratego	Experimental
Bas 500	Experimental
RH-7592	Experimental
YF 11393	Experimental

Table 3. Cercospora leaf spot control at Crookston in 2000 with registered and experimental fungicides.

Treatment and rate/A	App. Interval	CLS*	Recoverable Sucrose		Root Yield	Sucrose Content	LTM**
	(d)	22-Sep	(lb/A)	(lb/T)	(T/A)	(%)	(%)
BAS 500 2.09 EC 0.15 lb a.i / Eminent 125 SL 13 fl oz……..	14	1.8	9929	347	28.6	18.4	1.1
Eminent 125 SL 13 fl oz……..	21	2.7	9878	351	28.2	18.6	1.1
BAS 500 2.09 EC 0.15 lb a.i / SuperTin 80 WP 5 oz……	14	2.2	9791	352	27.8	18.7	1.1
Topsin M 70 WSB 0.5 lb + Penncozeb 75DF 2.0 lb (App 1) / Eminent 125 SL 13 fl oz (App 2, 4) / TPTH 80 WP 5 oz (App 3)….	14	3.0	9473	345	27.5	18.4	1.1
BAS 500 2.09 EC 0.15 lb a.i……..	14	1.8	9453	343	27.6	18.3	1.1
Eminent 125 SL 13 fl oz..……..	14	1.8	9319	333	28.0	17.8	1.2
Eminent 125 SL 13 fl oz / BAS 500 2.09 EC 0.15 lb a.i……...	14	2.2	9308	336	27.7	17.9	1.1
BAS 500 2.09 EC 0.15 lb a.i.…….	21	3.0	9257	331	28.0	17.7	1.1
Eminent 125 SL 13 fl oz (App 1) / TPTH 80 WP 5 oz (App 2, 4) / BAS 500 2.09 EC 0.15 lb a.i (App 3)……..	14	2.5	9150	340	27.0	18.1	1.1
BAS 500 2.09 EC 0.20 lb a.i……..	14	2.2	9069	333	27.3	17.8	1.1
Eminent 125 SL 13 fl oz (App 1,4) / Topsin M 70 WSB 0.5 lb + Penncozeb 75DF 2.0 lb (App 2) / TPTH 80 WP 5 oz (App 3)..……	14	2.8	9057	333	27.0	17.8	1.1
Eminent 125 SL 13 fl oz (App 1,4) / Topsin M 70 WSB 0.5 lb + Penncozeb 75DF 2.0 lb (App 2) / BAS 500 2.09 EC 0.15 lb a.i (App 3)……	14	1.8	8978	333	27.0	17.8	1.1
Stratego 2.1 EC 10 fl oz / TPTH 80 WP 5 oz……..	14	2.0	8976	341	26.3	17.2	1.1
RH-7592 2F 8 oz + COC 1 pt ……	14	3.0	8903	339	26.3	18.1	1.2
Eminent 125 SL 13 fl oz (App 1, 4) / BAS 500 2.09 EC 0.15 lb a.i (App 2) / TPTH 80 WP 5 oz (App 3)…..……	14	3.5	8873	332	26.7	17.7	1.1
BAS 500 2.09 EC 0.40 lb a.i……..	14	1.7	8864	331	26.8	17.8	1.2
Eminent 125 SL 13 fl oz (App 1,4) / YF11393 2.08 SC 0.15 lb a.i (App 2) / TPTH 80 WP 5 oz (App 3)……	14	3.3	8336	338	26.2	18.1	1.2
SuperTin 80 WP 5 oz / BAS 500 2.09 EC 0.15 lb a.i……	14	3.3	8698	335	26.0	18.0	1.2
Flint 50 WG 3 oz / TPTH 80 WP 5 oz……...	14	3.2	8686	337	25.8	18.1	1.2
Quadris 2.08 SC 0.15 lb a.i……..	14	3.8	8636	331	26.1	17.8	1.2
Eminent 125 SL 13 fl oz (App 1,4) / Quadris 2.08 SC 0.15 lb a.i (App 2) / TPTH 80 WP 5 oz (App 3)…...……..	14	3.3	8614	333	25.9	17.8	1.1
Eminent 125 SL 13 fl oz / TPTH 80 WP 5 oz……	21/14	3.7	8589	340	25.2	18.1	1.1
Eminent 125 SL 13 fl oz / TPTH 80 WP 5 oz……	14	2.8	8552	337	25.5	18.0	1.1
Caramba 90 SL 0.1 lb a.i……	14	4.7	8497	326	26.1	17.5	1.2
YF 11393 2.08 EC 0.15 a.i…….	14	4.0	8463	329	25.8	17.6	1.1
Eminent 125 SL 13 fl oz (App 1,4) / Benlate 50 WP 0.5 lb + Manzate 75DF 2.0 lb (App 2) / TPTH 80 WP 5 oz (App 3)…….	14	3.0	8347	326	25.6	17.5	1.2
TPTH 80 WP 5 oz……..	14	4.8	8271	333	24.9	17.7	1.1
Agri-Tin 80 WP 5 oz / Eminent 125 SL 13 fl oz……	14	3.7	8269	330	25.1	17.7	1.2
Super Tin 80 WP 5 oz / Eminent 125 SL 13 fl oz……..	14	3.2	8084	325	24.9	17.5	1.2
Check……..		7.5	5974	310	19.4	16.7	1.2
LSD (P=0.05)		0.82	623	15.8	1.4	0.78	NS
CV%		16.32	4.32	2.88	3.35	2.67	9.9

*Cercospora leaf spot measured on KWS scale 1-9 (no leaf spot – dead outer leaves, inner leaves severely damaged, regrowth of new leaves)
**LTM: Sugar loss to molasses

Table 4. Cercospora leaf spot control at Breckenridge in 2000 with registered and experimental fungicides.

Treatment and rate/A	App. Interval	CLS*	Recoverable Sucrose		Root Yield	Sucrose Content	LTM**
	(d)	22-Sep	(lb/A)	(lb/T)	(T/A)	(%)	(%)
Eminent 125 SL 13 fl oz	14	1.6	10210	335	31.3	18.0	1.4
Flint 50 WG 3 oz / TPTH 80 WP 5 oz	14	2.4	10086	350	29.4	18.9	1.4
BAS 500 2.09 EC 0.15 lb a.i / Eminent 125 SL 13 fl oz	14	1.6	10073	338	29.0	19.0	1.3
Eminent 125 SL 13 fl oz (App 1, 4) / BAS 500 2.09 EC 0.15 lb a.i (App 2) / TPTH 80 WP 5 oz (App 3)	14	1.8	10002	353	28.2	19.3	1.4
BAS 500 2.09 EC 0.15 lb a.i	14	2.3	9994	346	29.5	18.7	1.3
BAS 500 2.09 EC 0.15 lb a.i	21	2.6	9922	354	28.6	19.0	1.3
Eminent 125 SL 13 fl oz	21	2.2	9869	332	30.4	18.0	1.4
SuperTin 80 WP 5 oz / BAS 500 2.09 EC 0.15 lb a.i	14	3.9	9836	344	28.4	18.6	1.4
Topsin M 70 WSB 0.5 lb + Penncozeb 75DF 2.0 lb (App 1) / Eminent 125 SL 13 fl oz (App 2, 4) / TPTH 80 WP 5 oz (App 3)	14	2.9	9800	341	29.4	18.4	1.4
Eminent 125 SL 13 fl oz (App 1,4) / YF11393 2.08 SC 0.15 lb a.i (App 2) / TPTH 80 WP 5 oz (App 3)	14	2.9	9775	353	25.2	19.0	1.3
Eminent 125 SL 13 fl oz (App 1,4) / Topsin M 70 WSB 0.5 lb + Penncozeb 75DF 2.0 lb (App 2) / TPTH 80 WP 5 oz (App 3)	14	1.8	9730	351	28.2	19.0	1.3
Eminent 125 SL 13 fl oz (App 1,4) / Quadris 2.08 SC 0.15 lb a.i (App 2) / TPTH 80 WP 5 oz (App 3)	14	2.5	9727	335	29.8	18.3	1.5
Eminent 125 SL 13 fl oz (App 1,4) / Topsin M 70 WSB 0.5 lb + Penncozeb 75DF 2.0 lb (App 2) / BAS 500 2.09 EC 0.15 lb a.i (App 3)	14	2.8	9704	328	28.7	18.7	1.4
Eminent 125 SL 13 fl oz (App 1,4) / Benlate 50 WP 0.5 lb + Manzate 75DF 2.0 lb (App 2) / TPTH 80 WP 5 oz (App 3)	14	2.4	9690	359	27.5	19.2	1.2
YF 11393 2.08 EC 0.15 a.i	14	3.5	9687	338	29.3	18.4	1.5
Super Tin 80 WP 5 oz / Eminent 125 SL 13 fl oz	14	2.9	9681	352	28.0	19.0	1.4
Stratego 2.1 EC 10 fl oz / TPTH 80 WP 5 oz	14	2.7	9654	356	27.6	19.1	1.3
Eminent 125 SL 13 fl oz (App 1) / TPTH 80 WP 5 oz (App 2, 4) / BAS 500 2.09 EC 0.15 lb a.i (App 3)	14	2.3	9651	337	29.3	18.3	1.5
Eminent 125 SL 13 fl oz / TPTH 80 WP 5 oz	21/14	3.0	9632	349	28.1	18.8	1.3
Eminent 125 SL 13 fl oz / TPTH 80 WP 5 oz	14	3.4	9565	335	29.2	18.2	1.4
Eminent 125 SL 13 fl oz / BAS 500 2.09 EC 0.15 lb a.i	14	2.4	9534	338	28.8	18.3	1.4
BAS 500 2.09 EC 0.15 lb a.i / SuperTin 80 WP 5 oz	14	2.3	9468	340	28.4	18.4	1.5
BAS 500 2.09 EC 0.20 lb a.i	14	1.8	9299	322	30.0	17.6	1.5
BAS 500 2.09 EC 0.40 lb a.i	14	1.7	9286	314	30.3	17.3	1.7
RH-7592 2F 8 oz + COC 1 pt	14	3.3	9272	334	28.5	18.1	1.4
Quadris 2.08 SC 0.15 lb a.i	14	4.5	9073	320	29.1	17.6	1.6
Agri-Tin 80 WP 5 oz / Eminent 125 SL 13 fl oz	14	5.1	9008	341	27.1	18.6	1.5
Caramba 90 SL 0.1 lb a.i	14	4.5	8963	329	27.9	17.9	1.4
TPTH 80 WP 5 oz	14	5.5	8862	331	27.2	18.1	1.5
Check		7.9	8288	325	26.1	17.9	1.7
LSD (P=0.05)		1.3	956.2	34.7	2.4	1.5	0.3
CV%		30.8	7.06	7.23	5.8	5.6	15.4

*Cercospora leaf spot measured on KWS scale 1-9 (no leaf spot – dead outer leaves, inner leaves severely damaged, regrowth of new leaves)
**LTM: Sugar loss to molasses

Table 5. Cercospora leaf spot control at Maynard in 2000 with registered and experimental fungicides.

Treatment and rate/A	App. Interval	CLS[1]	Recoverable Sucrose		Root Yield	Sucrose Content	LTM[2]
	(d)	22-Sep	(lb/A)	(lb/T)	(T/A)	(%)	(%)
Eminent 125 SL 13 fl oz + 10 lb N (28%) / TPTH 80 WP 5 oz + 10 lb N (28%)……	14/10	3.8	10007	345	29.0	18.3	1.1
Eminent 125 SL 13 fl oz (App 1, 5) / TPTH 80 WP 5 oz (App 2, 4) / BAS 500 2.09 EC 0.15 lb a.i (App 3)……	14/10/14	3.5	9486	339	28.0	18.1	1.1
Eminent 125 SL 13 fl oz / TPTH 80 WP 5 oz……	14/10	3.0	9441	342	27.6	18.2	1.1
Eminent 125 SL 13 fl oz / BAS 500 2.09 EC 0.15 lb a.i……	14	2.7	9387	344	27.3	18.3	1.1
YF 11393 2.08 EC 0.15 a.i……	14	3.5	9384	337	27.9	18.0	1.1
Eminent 125 SL 13 fl oz / TPTH 80 WP 5 oz……	14	2.8	9369	345	27.2	18.3	1.1
BAS 500 2.09 EC 0.15 lb a.i / Eminent 125 SL 13 fl oz……	14	2.5	9280	346	26.8	18.4	1.1
Super Tin 80 WP 5 oz / Eminent 125 SL 13 fl oz……	14	3.3	9263	335	27.7	17.9	1.2
BAS 500 2.09 EC 0.40 lb a.i……	14	2.8	9230	341	27.0	18.2	1.2
Eminent 125 SL 13 fl oz (App 1, 4) / YF 11393 2.08 EC 0.15 a.i (App 2) / TPTH 80 WP 5 oz (App 3)……	14	3.2	9131	344	26.5	18.3	1.1
Eminent 125 SL 13 fl oz (App 1) / TPTH 80 WP 5 oz (App 2, 4) / BAS 500 2.09 EC 0.15 lb a.i (App 3)……	14	2.7	9121	346	26.4	18.3	1.1
BAS 500 2.09 EC 0.15 lb a.i……	14	3.0	9114	344	26.5	18.3	1.1
BAS 500 2.09 EC 0.15 lb a.i……	21	3.7	9097	338	26.9	18.0	1.1
Eminent 125 SL 13 fl oz (App 1,4) / Topsin M 70 WSB 0.5 lb + Penncozeb 75DF 2.0 lb (App 2) / TPTH 80 WP 5 oz (App 3)……	14	3.8	8980	336	26.7	17.9	1.1
BAS 500 2.09 EC 0.20 lb a.i……	14	3.0	8951	342	26.1	18.2	1.1
Eminent 125 SL 13 fl oz……	14	2.8	8983	343	26.1	18.2	1.1
Eminent 125 SL 13 fl oz (App 1,4) / Topsin M 70 WSB 0.5 lb + Penncozeb 75DF 2.0 lb (App 2) / BAS 500 2.09 EC 0.15 lb a.i (App 3)……	14	3.3	8921	345	25.9	18.4	1.1
Flint 50 WG 3 oz / TPTH 80 WP 5 oz……	14	3.5	8864	338	26.2	18.0	1.1
Eminent 125 SL 13 fl oz (App 1,4) / Benlate 50 WP 0.5 lb + Manzate 75DF 2.0 lb (App 2) / TPTH 80 WP 5 oz (App 3)……	14	4.7	8863	332	26.7	17.7	1.1
Eminent 125 SL 13 fl oz (App 1, 4) / BAS 500 2.09 EC 0.15 lb a.i (App 2) / TPTH 80 WP 5 oz (App 3)……	14	3.0	8783	345	25.5	18.3	1.1
SuperTin 80 WP 5 oz / BAS 500 2.09 EC 0.15 lb a.i……	14	3.0	8747	346	25.3	18.3	1.1
Eminent 125 SL 13 fl oz (App 1,4) / Quadris 2.08 SC 0.15 lb a.i (App 2) / TPTH 80 WP 5 oz (App 3)……	14	3.0	8699	343	25.4	18.2	1.1
Quadris 2.08 SC 0.15 lb a.i……	14	4.0	8645	330	26.2	17.6	1.1
Stratego 2.1 EC 10 fl oz / TPTH 80 WP 5 oz……	14	4.5	8634	335	25.7	17.8	1.1
BAS 500 2.09 EC 0.15 lb a.i / SuperTin 80 WP 5 oz……	14	3.0	8547	345	24.8	18.3	1.1
Caramba 90 SL 0.1 lb a.i……	14	4.0	8462	336	25.2	17.9	1.1
Agri-Tin 80 WP 5 oz / Eminent 125 SL 13 fl oz……	14	2.5	8432	346	24.4	18.5	1.2
Topsin M 70 WSB 0.5 lb + Penncozeb 75DF 2.0 lb (App 1) / Eminent 125 SL 13 fl oz (App 2, 4) / TPTH 80 WP 5 oz (App 3)….	14	4.5	8412	335	25.1	17.8	1.1
Eminent 125 SL 13 fl oz / TPTH 80 WP 5 oz……	21/14	4.7	8135	328	24.8	17.5	1.1
(+ 40 lb N)[3] Eminent 125 SL 13 fl oz / TPTH 80 WP 5 oz……	14/10	3.3	8118	340	23.9	18.1	1.1
RH-7592 2F 8 oz + COC 1 pt ……	14	4.3	7986	331	24.1	17.7	1.1
TPTH 80 WP 5 oz……	14	6.0	7791	309	25.2	16.5	1.1
Eminent 125 SL 13 fl oz……	21	4.2	7739	326	23.7	17.4	1.1
+ 40 lb N[3]……		6.8	6743	271	24.9	14.7	1.2
Untreated Check……		7.0	6109	265	23.2	14.5	1.2
LSD (P=0.05)		0.8	915	11	2.6	NS	0.1
CV%		16.7	9.2	2.9	8.7	2.6	7.94

[1]Cercospora leaf spot measured on KWS scale 1-9 (no leaf spot – dead outer leaves, inner leaves severely damaged, regrowth of new leaves)
[2]LTM: Sugar loss to molasses
[3]Applied on 19 July

Table 6. Cercospora leaf spot control at Renville in 2000 with registered and experimental fungicides.

Treatment and rate/A	App. Interval	CLS[1]	Recoverable Sucrose		Root Yield	Sucrose Content	LTM[2]
	(d)	22-Sep	(lb/A)	(lb/T)	(T/A)	(%)	(%)
Eminent 125 SL 13 fl oz / TPTH 80 WP 5 oz	14	4.2	9000	356	25.3	18.8	0.99
BAS 500 2.09 EC 0.15 lb a.i	14	4.3	8947	366	24.4	19.3	0.98
Eminent 125 SL 13 fl oz / BAS 500 2.09 EC 0.15 lb a.i	14	3.8	8865	355	25.0	18.7	0.99
Agri-Tin 80 WP 5 oz / Eminent 125 SL 13 fl oz	14	3.5	8852	356	24.8	18.8	0.99
Eminent 125 SL 13 fl oz	14	4.7	8753	362	24.2	19.1	0.98
BAS 500 2.09 EC 0.15 lb a.i / Eminent 125 SL 13 fl oz	14	4.2	8561	351	24.4	18.6	0.99
Stratego 2.1 EC 10 fl oz / TPTH 80 WP 5 oz	14	4.0	8480	353	24.0	18.7	0.99
Super Tin 80 WP 5 oz / Eminent 125 SL 13 fl oz	14	4.8	8473	351	24.2	18.5	1.0
Eminent 125 SL 13 fl oz (App 1, 5) / TPTH 80 WP 5 oz (App 2, 4) / BAS 500 2.09 EC 0.15 lb a.i (App 3)	14/10/14	4.7	8457	347	24.4	18.4	1.0
Quadris 2.08 SC 0.15 lb a.i	14	4.8	8361	346	24.1	18.3	1.0
Eminent 125 SL 13 fl oz (App 1, 4) / BAS 500 2.09 EC 0.15 lb a.i (App 2) / TPTH 80 WP 5 oz (App 3)	14	4.2	8335	350	23.8	18.5	1.0
(+ 40 lb N)[3] Eminent 125 SL 13 fl oz / TPTH 80 WP 5 oz	14/10	4.2	8334	346	24.1	18.3	1.0
Flint 50 WG 3 oz / TPTH 80 WP 5 oz	14	4.2	8313	352	23.6	18.6	1.0
BAS 500 2.09 EC 0.15 lb a.i / SuperTin 80 WP 5 oz	14	4.5	8301	347	23.9	18.4	1.0
Eminent 125 SL 13 fl oz / TPTH 80 WP 5 oz	14/10	4.0	8287	356	23.3	18.8	1.0
Eminent 125 SL 13 fl oz + 10 lb N (28%) / TPTH 80 WP 5 oz + 10 lb N (28%)	14/10	4.7	8168	346	23.7	18.3	1.0
Eminent 125 SL 13 fl oz (App 1,4) / Topsin M 70 WSB 0.5 lb + Penncozeb 75DF 2.0 lb (App 2) / BAS 500 2.09 EC 0.15 lb a.i (App 3)	14	4.0	8086	346	23.4	18.3	1.0
BAS 500 2.09 EC 0.15 lb a.i.	21	4.7	8060	359	22.4	18.9	1.0
BAS 500 2.09 EC 0.40 lb a.i	14	3.7	8055	351	22.9	18.5	1.0
SuperTin 80 WP 5 oz / BAS 500 2.09 EC 0.15 lb a.i	14	4.2	7987	346	23.1	18.3	1.0
BAS 500 2.09 EC 0.20 lb a.i	14	4.7	7963	360	22.1	19.0	1.0
Eminent 125 SL 13 fl oz / TPTH 80 WP 5 oz	21/14	5.3	7952	349	22.9	18.4	1.0
RH-7592 2F 8 oz + COC 1 pt	14	4.7	7833	350	22.4	18.5	1.0
Eminent 125 SL 13 fl oz (App 1) / TPTH 80 WP 5 oz (App 2, 4) / BAS 500 2.09 EC 0.15 lb a.i (App 3)	14	4.0	7758	350	22.2	18.5	1.0
YF 11393 2.08 EC 0.15 a.i	14	4.7	7653	347	22.1	18.3	1.0
Caramba 90 SL 0.1 lb a.i	14	4.5	7629	362	21.1	19.1	1.0
Topsin M 70 WSB 0.5 lb + Penncozeb 75DF 2.0 lb (App 1) / Eminent 125 SL 13 fl oz (App 2, 4) / TPTH 80 WP 5 oz (App 3)	14	4.7	7585	345	22.0	18.2	1.0
Eminent 125 SL 13 fl oz	21	5.3	7498	360	20.8	19.0	1.0
Eminent 125 SL 13 fl oz (App 1,4) / Quadris 2.08 SC 0.15 lb a.i (App 2) / TPTH 80 WP 5 oz (App 3)	14	4.7	7392	340	21.8	18.0	1.0
Eminent 125 SL 13 fl oz (App 1,4) / Topsin M 70 WSB 0.5 lb + Penncozeb 75DF 2.0 lb (App 2) / TPTH 80 WP 5 oz (App 3).	14	4.8	7328	340	21.6	18.0	1.0
Eminent 125 SL 13 fl oz (App 1,4) / Benlate 50 WP 0.5 lb + Manzate 75DF 2.0 lb (App 2) / TPTH 80 WP 5 oz (App 3)	14	5.5	7232	336	21.6	17.8	1.0
Eminent 125 SL 13 fl oz (App 1, 4) / YF 11393 2.08 EC 0.15 a.i (App 2) / TPTH 80 WP 5 oz (App 3)	14	5.2	6904	332	20.7	17.7	1.0
TPTH 80 WP 5 oz	14	6.3	6675	342	19.5	18.1	1.0
+ 40 lb N[3]		7.0	5152	307	16.8	16.5	1.12
Untreated Check		7.5	4998	308	16.3	16.5	1.1
LSD (P=0.05)		0.9	872	13	2.3	0.6	0.02
CV%		16.4	9.7	3.3	8.9	3.0	2.08

[1]Cercospora leaf spot measured on KWS scale 1-9 (no leaf spot – dead outer leaves, inner leaves severely damaged, regrowth of new leaves)
[2]LTM: Sugar loss to molasses
[3]Applied on 19 July

2000 LEAF SPOT SUMMARY

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DATE	CLARA CITY	2 DAY TOTAL	# OF HRS	AVG TMP @ > 87% RH	OLIVIA	2 DAY TOTAL	# OF HRS	AVG TMP @ > 87% RH	SACRD HEART	2 DAY TOTAL	# OF HRS	AVG TMP @ > 87% RH	BIRD ISLAND	2 DAY TOTAL	# OF HRS	AVG TMP @ > 87% RH
7/1/00	2	2	7	65	0	0	2	65	Not available				1	1	5	64
7/2/00	2	4	7	65	3	3	13	68	Not available				3	4	12	68
7/3/00	6	8	22	66	4	7	18	66	Not available				5	8	19	66
7/4/00	6	12	20	71	6	10	22	72	Not available				4	9	16	71
7/5/00	3	9			3	9			Not available				3	7		
7/6/00	3	6			5	8	17	72	Not available				3	6		
7/7/00	7	10	22	77	7	12	24	76	Not available				Not available			
7/8/00	6	13	14	78	4	11	10	77	Not available				Not available			
7/9/00	6	12	19	75	5	9	16	75	Not available				5	5	18	75
7/10/00	3	9	12	70	3	8	12	70	Not available				3	8	13	69
7/11/00	6	9	21	70	4	7	18	69	Not available				5	8	19	69
7/12/00	4	10	16	67	4	8	15	68	Not available				4	9	15	67
7/13/00	3	7	12	68	3	7	12	68	Not available				3	7	12	67
7/14/00	2	5	8	65	3	6	12	65	Not available				3	6	12	65
7/15/00	2	4	8	65	3	6	13	66	Not available				3	6	13	66
7/16/00	2	4	8	65	3	6	14	69	Not available				3	6	14	69
7/17/00	0	2	13	59	0	3	12	59	Not available				0	3		
7/18/00	0	0	24	54	0	0	24	55	Not available				0	0	24	54
7/19/00	0	0	13	56	0	0	14	57	Not available				0	0	15	56
7/20/00	0	0	13	59	0	0	13	59	0	0	4	60	0	0	12	58
7/21/00	0	0	13	54	0	0	12	52	Not available				0	0	10	51
7/22/00	0	0	12	54	0	0	11	53	Not available				0	0	10	51
7/23/00	0	0	13	60	0	0	11	57	Not available				0	0	10	51
7/24/00	5	5	21	67	4	4	17	66	5	5	21	67	Not available			
7/25/00	4	9	17	68	4	8	16	67	4	9	16	67	Not available			
7/26/00	4	8	15	64	4	8	15	65	4	8	16	65	Not available			
7/27/00	3	7	12	64	3	7	13	65	3	7	14	65	Not available			
7/28/00	Not available				3	6	13	65	3	6	13	64	Not available			
7/29/00	Not available				4	7	14	65	4	7	15	64	Not available			
7/30/00	Not available				3	7	14	64	3	7	14	63	Not available			
7/31/00	Not available				3	6	11	64	Not available				3	3	13	64
8/1/00	Not available				3	6			Not available				3	6		
8/2/00	Not available				0	3	11	60	Not available				0	3	14	61
8/3/00	Not available				0	0	13	60	Not available				0	0	13	58

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DATE	CLARA CITY	2 DAY TOTAL	# OF HRS	AVG TMP @ > 87% RH	OLIVIA	2 DAY TOTAL	# OF HRS	AVG TMP @ > 87% RH	SACRD HEART	2 DAY TOTAL	# OF HRS	AVG TMP @ > 87% RH	BIRD ISLAND	2 DAY TOTAL	# OF HRS	AVG TMP @ > 87% RH
8/4/00	Not available				3	3	14	67	Not available				4	4	15	67
8/5/00	Not available				4	7	17	70	Not available				4	8	17	69
8/6/00	Not available				4	8	15	65	Not available				4	8	15	64
8/7/00	Not available				3	7	14	64	Not available				0	4	10	60
8/8/00	Not available				5	8	19	69	Not available				Not available			
8/9/00	0		12	62	3	8	13	63	Not available				Not available			
8/10/00	4	4	15	66	3	6	14	65	Not available				Not available			
8/11/00	3	7	12	69	3	6	13	68	3	3	13	69	Not available			
8/12/00	6	9	19	76	4	7	15	75	5	8	17	75	Not available			
8/13/00	3	9	14	65	3	7	14	67	3	8	14	65	Not available			
8/14/00	3	6	14	69	3	6	14	69	4	7	16	70	Not available			
8/15/00	3	6	13	65	3	6	13	65	3	7	12	66		0		
8/16/00	0	3	17	55	0	3	17	57	0	3	19	56		0		
8/17/00	5	5	24	62	4	4	21	61	4	4	21	61		0		
8/18/00	0	5	14	56	0	4	14	56	0	4	14	55	0	0	15	57
8/19/00	0	0	16	59	0	0	16	59	0	0	16	58	0	0	17	57
8/20/00	4	4	17	64	4	4	15	64	4	4	18	65	3	3	16	63
8/21/00	4	8	17	65	5	9	20	67	4	8	15	65	6	9	24	67
8/22/00	3	7	19	62	3	8	18	63	2	6	18	62	6	12	22	65
8/23/00	1	4	14	62	3	6	15	63	0	2	14	60	0	6	15	60
8/24/00	1	2	15	62	1	4	14	62	0	0	8	55	0	0	16	60
8/25/00	6	7	23	71	6	7	22	71	6	6	22	71	6	6	23	70
8/26/00	3	9	13	68	3	9	11	70	3	9	14	68	4	10	15	68
8/27/00	4	7	15	65	3	6	14	65	2	5	16	62	3	7	16	63
8/28/00	6	10	23	69	6	9	22	69	5	7	19	68	6	9	24	69
8/29/00	0	6	13	54	0	6	13	55	0	5	10	51	0	6	14	54
8/30/00	3	3	14	63	4	4	18	68	3	3	14	64	4	4	18	67
8/31/00	4	7	18	65	6	10	23	69	4	7	15	65	6	10	24	69
9/1/00	2	6	24	60	4	10	24	61	4	8	24	61	4	10	24	61
9/2/00	5	7	24	62	6	10	24	65	6	10	24	64	6	10	23	64
9/3/00	6	11	24	65	5	11	20	65	6	12	22	66	5	11	19	64
9/4/00	0	6	17	57	0	5	15	57	0	6	15	57	0	5	16	57

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9/5/00	0	0	10	52	0	0	11	52	0	0	11	52	0	0	13	51
9/6/00	0	0	4	57	0	0	1	59	0	0	0	0	0	0	7	55
9/7/00	0	0	8	61	0	0	7	60	0	0			0	0	9	58
9/8/00	0	0	10	50	0	0	10	49	0	0	10	46	0	0	10	43
9/9/00	0	0	1	69	0	0	0	0	0	0	2	70	1	1	4	68
9/10/00	0	0	6	47	0	0	6	48	0	0	7	46	0	1	7	48
9/11/00	0	0	9	55	0	0	6	59	0	0	11	52	0	0	10	54
9/12/00	0	0	9	42	0	0	9	42	0	0	10	43	0	0	9	38