2001
Southern Minnesota
Beet Sugar Cooperative
Research Report

2001 SMBSC Research Report Index

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2002 Beet Seed Orders

Seed Company	%of our market
Betaseed	75.1
Crystal	9.1
Hilleshog	8.3
Holly / VDH	7.5

Seed Size	%of our market
Non-pelleted	0.5
Mini pellets	5.5
Regular pellets	39
Jumbo pellets	26.5
Pro 200	28.5

Tachigaren	%of our order
45 gram	72.5
75 gram	0.5
Total	73

Top Ten Varieties

Beta 4811R
Beta 3945
Beta 4930R
Beta 4600R
Crystal 999
Beta 3820
Beta 6904
Beta 4818R
Crystal 952
VDH 46109

Rhizomania Resistant Seed

62% of the seed ordered was rhizomania resistant varieties.

*The above numbers are based on 114,000 acre order placed by the shareholders.

Table 1. Mean of Three Year Performance of 2002 SMBSC Approved Varieties, 1999-2001.

NON-DISEASED TRIAL DATA

Entry		Rec/T (lbs)		Rec/A (lbs)		Loss to Mol.		Yield (T/A)		Sugar %		CLS*		Emergence (%)		Aphanomyces RRI *	
		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*
Beta 3820		295.48	100.17	7372.87	102.52	1.17	101.20	24.85	102.14	15.90	100.02	4.49	105.15	49.57	89.48	5.65	100.24
Beta 3945		304.74	103.31	7265.09	101.02	1.14	98.60	23.77	97.68	16.40	103.15	4.29	100.39	52.84	95.38	5.95	105.56
Beta 4818 (M813)		294.21	99.74	7418.25	103.15	1.15	100.13	25.13	103.29	15.91	100.04	4.81	112.64	59.47	107.34	5.45	96.69
Beta 5815		293.39	99.46	7088.17	98.56	1.15	99.56	24.17	99.33	15.79	99.32	3.76	87.91			5.69	100.95
Beta 6904		300.58	101.90	6983.24	97.10	1.14	98.60	23.16	95.20	16.17	101.70	4.73	110.76	55.14	99.53	5.78	102.60
Crystal 952		299.01	101.36	7532.43	104.73	1.16	100.69	25.15	103.36	16.07	101.05	4.59	107.41	52.58	94.91	5.40	95.80
Crystal 999		293.97	99.66	7625.22	106.02	1.17	101.27	25.88	106.38	15.88	99.85	4.66	109.13	54.63	98.61	5.61	99.47
HM 7057		290.21	98.38	6743.15	93.76	1.16	100.62	23.17	95.23	15.67	98.53	3.89	90.95	58.00	104.70	6.02	106.86
Holly Hybrid LM1000		289.21	98.04	7008.65	97.45	1.17	101.20	24.14	99.20	15.64	98.37	3.84	89.78			5.80	102.96
Van der Have H46109		288.24	97.71	7115.04	98.93	1.17	101.78	24.75	101.72	15.60	98.12	3.75	87.83	56.19	101.42	5.41	95.98
Van der Have H46140		295.51	100.18	6995.25	97.26	1.12	97.44	23.58	96.92	15.90	99.98	4.13	96.65	57.35	103.52	5.48	97.22
Van der Have H46177		295.26	100.09	7156.39	99.51	1.14	98.89	24.22	99.55	15.88	99.88	4.33	101.40	58.22	105.10	5.39	95.68
Mean		**294.99**	**100.00**	**7191.98**	**100.00**	**1.15**	**100.00**	**24.33**	**100.00**	**15.90**	**100.00**	**4.27**	**100.00**	**55.40**	**100.00**	**5.64**	**100.00**

SPECIALTY VARIETIES

Beta 4811R	RZM & APH	272.44	92.36	6521.94	90.68	1.23	106.41	23.89	98.20	14.85	93.42	4.60	107.64	55.55	100.27	4.96	87.94
Beta 4930	RZM & APH	281.20	95.33	6650.93	92.48	1.20	104.09	23.67	97.29	15.28	96.08	4.38	102.42	49.91	90.09	5.35	94.91
Hilleshog 7083 Rz	RZM Specialty	280.77	95.18	6806.03	94.63	1.21	105.04	24.31	99.90	15.25	95.89	4.62	108.19	56.80	102.53	6.16	109.23
Hilleshog 7073 Rz	RZM Specialty	280.70	95.16	6490.50	90.25	1.22	106.12	23.04	94.71	15.29	96.17	4.59	107.33	57.23	103.31	6.00	106.45
Hilleshog RH5	Rzc. Specialty	289.61	98.18	6539.83	90.93	1.15	100.09	22.48	92.40	15.64	98.35	3.66	85.57	57.47	103.74	5.78	102.60
Van der Have H68108	APH Specialty	267.13	90.56	6629.81	92.18	1.28	110.75	24.78	101.85	14.68	92.31	3.65	85.49	54.60	98.56	5.42	96.10

* Lower numbers indicate better Cercospora and Aphanomyces resistance.

Table 2. Mean of Two Year Performance Summary of 2002 SMBSC Approved Varieties, 2000 - 2001. ***NON-DISEASED TRIAL DATA***

Entry		Rec/T (lbs)		Rec/A (lbs)		Loss to Mol.		Yield (T/A)		Sugar %		CLS*		Emergence (%)		Aphanomyces RRI*	
		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
Beta 3820		*296.18*	*100.30*	*7541.07*	*102.63*	*1.17*	*100.03*	*25.32*	*102.02*	*15.92*	*99.97*	*4.46*	*104.18*	*53.27*	*91.11*	*5.10*	*103.14*
Beta 3945		*303.08*	*102.63*	*7540.89*	*102.63*	*1.14*	*97.88*	*24.77*	*99.78*	*16.34*	*102.57*	*4.49*	*104.76*	*55.87*	*95.56*	*5.30*	*107.19*
Beta 4818 (M813)		*293.98*	*99.56*	*7545.43*	*102.69*	*1.16*	*99.63*	*25.57*	*103.02*	*15.92*	*99.96*	*4.76*	*111.07*	*59.47*	*101.71*	*4.72*	*95.36*
Beta 5815		*292.39*	*99.02*	*7356.65*	*100.12*	*1.17*	*100.52*	*25.14*	*101.31*	*15.75*	*98.92*	*3.76*	*87.82*	*55.47*	*94.88*	*5.04*	*101.83*
Beta 6904		*301.17*	*101.99*	*7229.17*	*98.38*	*1.15*	*98.31*	*23.91*	*96.32*	*16.21*	*101.79*	*4.75*	*110.95*	*58.30*	*99.71*	*5.05*	*102.13*
Crystal 952		*297.29*	*100.68*	*7620.22*	*103.71*	*1.16*	*99.60*	*25.56*	*102.97*	*15.96*	*100.18*	*4.49*	*104.76*	*52.58*	*89.93*	*4.85*	*98.09*
Crystal 999		*293.61*	*99.43*	*7656.68*	*104.20*	*1.17*	*100.46*	*26.04*	*104.92*	*15.87*	*99.62*	*4.57*	*106.74*	*54.63*	*93.44*	*4.79*	*96.77*
HM 7057		*292.16*	*98.94*	*7034.84*	*95.74*	*1.18*	*101.32*	*24.01*	*96.74*	*15.78*	*99.09*	*3.90*	*91.09*	*62.11*	*106.23*	*5.45*	*110.22*
Holly Hybrid LM1000		*289.92*	*98.18*	*6972.86*	*94.90*	*1.19*	*102.17*	*23.92*	*96.36*	*15.71*	*98.61*	*3.82*	*89.11*	*62.09*	*106.19*	*5.17*	*104.46*
Van der Have H46109		*287.37*	*97.31*	*7130.97*	*97.05*	*1.20*	*102.60*	*24.91*	*100.37*	*15.59*	*97.86*	*3.78*	*88.29*	*60.66*	*103.74*	*4.70*	*95.05*
Van der Have H46140		*298.81*	*101.19*	*7215.85*	*98.20*	*1.15*	*98.31*	*24.04*	*96.86*	*16.08*	*100.97*	*4.17*	*97.28*	*62.54*	*106.97*	*4.64*	*93.74*
Van der Have H46177		*297.61*	*100.78*	*7330.91*	*99.77*	*1.16*	*99.17*	*24.66*	*99.34*	*16.00*	*100.47*	*4.45*	*103.94*	*64.63*	*110.54*	*4.55*	*92.02*
Mean		**295.30**	**100.00**	**7347.96**	**100.00**	**1.16**	**100.00**	**24.82**	**100.00**	**15.93**	**100.00**	**4.28**	**100.00**	**58.47**	**100.00**	**4.94**	**100.00**
SPECIALTY VARIETIES																	
	Specialty																
Beta 4600	RZM & APH	*295.26*	*99.99*	*7511.99*	*102.23*	*1.17*	*100.46*	*25.32*	*102.02*	*15.97*	*100.25*	*4.86*	*113.52*	*54.59*	*93.36*	*4.60*	*93.03*
Beta 4811R	RZM & APH	*268.64*	*90.97*	*6601.06*	*89.84*	*1.27*	*108.61*	*24.48*	*98.61*	*14.70*	*92.30*	*4.54*	*105.93*	*54.82*	*93.76*	*4.10*	*82.92*
Beta 4930	RZM & APH	*280.60*	*95.02*	*6765.43*	*92.07*	*1.22*	*104.75*	*24.14*	*97.24*	*15.28*	*95.91*	*4.36*	*101.84*	*48.48*	*82.92*	*4.65*	*94.04*
Crystal R932	RZM & APH	*287.75*	*97.45*	*7348.01*	*100.00*	*1.19*	*102.26*	*25.47*	*102.61*	*15.59*	*97.87*	*4.49*	*104.76*	*56.45*	*96.55*	*4.82*	*97.38*
Hilleshog 7073 Rz	RZM Specialty	*282.89*	*95.80*	*6835.66*	*93.03*	*1.21*	*103.89*	*24.07*	*96.98*	*15.41*	*96.73*	*4.47*	*104.29*	*59.36*	*101.52*	*5.25*	*106.18*
Hilleshog 7083 Rz	RZM Specialty	*280.99*	*95.16*	*7045.18*	*95.88*	*1.22*	*104.32*	*25.14*	*101.29*	*15.26*	*95.82*	*4.68*	*109.20*	*56.80*	*97.15*	*5.49*	*110.93*
Hilleshog RH5	Rzc Specialty	*290.59*	*98.40*	*6659.90*	*90.64*	*1.19*	*101.74*	*22.75*	*91.64*	*15.72*	*98.68*	*3.58*	*83.50*	*57.47*	*98.30*	*5.14*	*103.85*
Van der Have H68108	APH Specialty	*265.99*	*90.08*	*6633.62*	*90.28*	*1.27*	*108.61*	*24.90*	*100.33*	*14.63*	*91.86*	*3.61*	*84.32*	*56.27*	*96.25*	*4.84*	*97.78*

* Lower numbers indicate better Cercospora and Aphanomyces resistance.

Table 3. Mean of One Year Performance Summary of 2002 SMBSC Approved Varieties, 2001. ***NON-DISEASED TRIAL DATA***

Entry		Rec/T (lbs)		Rec/A (lbs)		Loss to Mol.		Yield (T/A)		Sugar %		CLS *		Emergence (%)		Aphanomyces RRI *	
		2001	% of Mean	2001	% of Mean	2001	% of Mean	2001	% of Mean	2001	% of Mean	2001	% of Mean	2001	% of Mean	2001	% of Mean
Beta 3820		293.73	99.17	7538.39	100.90	1.17	100.93	25.76	102.00	15.75	98.67	4.52	104.53	60.30	100.23	5.60	103.54
Beta 3945		301.98	101.95	7678.47	102.77	1.14	98.35	25.40	100.58	16.32	102.24	4.50	104.07	60.07	99.84	6.10	112.79
Beta 5815		295.60	99.80	7350.90	98.39	1.16	100.07	24.90	98.60	15.86	99.36	3.73	86.26	57.79	96.05	5.40	99.85
Beta 6904		303.27	102.39	7365.13	98.58	1.13	97.48	24.32	96.30	16.31	102.18	4.82	111.47	61.33	101.94	5.60	103.54
Beta 4818 (M813)		291.37	98.37	7441.00	99.59	1.17	100.93	25.44	100.74	15.85	99.30	4.82	111.47		0.00	5.10	94.30
Crystal 952		298.59	100.81	7908.60	105.85	1.15	99.21	26.55	105.13	15.94	99.86	4.60	106.38	59.90	99.56	5.20	96.15
Crystal 999		302.27	102.05	7770.21	104.00	1.14	98.35	25.77	102.04	16.28	101.99	4.55	105.22	56.15	93.33	5.40	99.85
Holly Hybrid LM1000		289.16	97.62	7127.87	95.40	1.19	102.66	24.72	97.88	15.69	98.30	3.85	89.03	59.01	98.08	5.50	101.69
Hilleshog 7057		291.17	98.30	7173.71	96.02	1.18	101.80	24.70	97.81	15.73	98.55	3.91	90.42	61.17	101.67	5.90	109.09
Van der Have H46109		293.25	99.00	7412.94	99.22	1.17	100.93	25.30	100.18	15.88	99.49	3.89	89.96	60.60	100.73	4.90	90.60
Van der Have H46140		299.82	101.22	7463.71	99.90	1.14	98.35	24.94	98.76	16.12	100.99	4.06	93.89	64.02	106.41	5.10	94.30
Van der Have H46177		294.21	99.33	7424.77	99.38	1.17	100.93	25.25	99.98	15.81	99.05	4.64	107.30	61.46	102.15	5.10	94.30
Mean		**296.20**	**100.00**	**7471.31**	**100.00**	**1.16**	**100.00**	**25.25**	**100.00**	**15.96**	**100.00**	**4.32**	**100.00**	**60.16**	**100.00**	**5.41**	**100.00**

SPECIALTY VARIETIES

	Specialty																
Beta 4600	RZM & APH	288.95	97.55	7640.84	102.27	1.19	102.66	26.34	104.30	15.71	98.42	4.93	114.01	56.58	94.04	5.20	96.15
Beta 4811R	RZM & APH	258.83	87.38	6344.56	84.92	1.30	112.15	24.56	97.25	14.25	89.28	5.11	118.17	53.34	88.66	4.70	86.90
Beta 4930	RZM & APH	271.00	91.49	6612.32	88.50	1.26	108.70	24.64	97.57	14.86	93.10	4.86	112.39	47.07	78.24	5.30	98.00
Crystal R932	RZM & APH	290.47	98.06	7816.36	104.62	1.18	101.80	26.96	106.75	15.72	98.49	4.67	108.00			4.80	88.75
Hilleshog 7083 Rz	RZM Specialty	286.87	96.85	7127.62	95.40	1.20	103.52	24.96	98.84	15.53	97.30	4.66	107.77	53.69	89.24	5.80	107.24
Hilleshog RH5	Rzc Specialty	290.17	97.96	6568.24	87.91	1.18	101.80	22.63	89.61	15.69	98.30	3.92	90.65	54.61	90.77	5.60	103.54
Hilleshog 7073 Rz	RZM Specialty	279.80	94.46	7257.64	97.14	1.22	105.25	26.00	102.95	15.31	95.92	4.43	102.45	63.60	105.71	5.50	101.69
Van der Have H68108	APH Specialty	266.98	90.13	6832.43	91.45	1.27	109.56	25.70	101.77	14.75	92.41	3.88	89.73	55.56	92.35	5.00	92.45

* Lower numbers indicate better Cercospora and Aphanomyces resistance.

Table 4. Mean of Two Year Performance of 2002 SMBSC Approved Varieties on Diseased Ground, 2000 - 2001. ***DISEASED TRIAL DATA***

Entry	Specialty	Rec/T (lbs)		Rec/A (lbs)		Loss to Mol.		Yield (T/A)		Sugar %		CLS*		Emergence (%)		Aphanomyces RRI*	
		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*
Beta 3820		*282.44*	*99.31*	*6203.66*	*101.15*	*1.21*	*100.35*	*21.88*	*101.02*	*15.33*	*99.38*	*4.46*	*104.18*	*50.55*	*89.10*	*5.10*	*103.14*
Beta 3945		*288.90*	*101.59*	*6063.91*	*98.87*	*1.19*	*98.69*	*21.04*	*97.12*	*15.64*	*101.39*	*4.49*	*104.76*	*57.79*	*101.86*	*5.30*	*107.19*
Beta 4818 (M813)		*296.40*	*104.22*	*7214.08*	*117.62*	*1.17*	*97.03*	*24.33*	*112.31*	*15.99*	*103.65*	*4.76*	*111.07*	*50.69*	*89.35*	*4.72*	*95.36*
Beta 5815		*277.25*	*97.49*	*5667.98*	*92.41*	*1.23*	*102.00*	*20.72*	*95.64*	*15.10*	*97.85*	*3.76*	*87.82*	*60.45*	*106.54*	*5.04*	*101.83*
Beta 6904		*285.01*	*100.22*	*5405.16*	*88.13*	*1.21*	*99.93*	*19.07*	*88.04*	*15.45*	*100.15*	*4.75*	*110.95*	*58.17*	*102.53*	*5.05*	*102.13*
Crystal 952		*280.61*	*98.67*	*6225.10*	*101.50*	*1.22*	*100.76*	*22.36*	*103.21*	*15.25*	*98.86*	*4.49*	*104.76*	*56.28*	*99.20*	*4.85*	*98.09*
Crystal 999		*276.99*	*97.40*	*6555.18*	*106.88*	*1.24*	*102.42*	*23.69*	*109.35*	*15.08*	*97.76*	*4.57*	*106.74*	*55.02*	*96.98*	*4.79*	*96.77*
HM 7057		*273.93*	*96.32*	*4792.45*	*78.14*	*1.24*	*102.83*	*17.68*	*81.63*	*14.94*	*96.85*	*3.90*	*91.09*	*56.46*	*99.51*	*5.45*	*110.22*
Holly Hybrid LM1000		*282.31*	*99.27*	*6170.77*	*100.61*	*1.21*	*100.35*	*22.09*	*101.99*	*15.33*	*99.34*	*3.82*	*89.11*	*60.29*	*106.27*	*5.17*	*104.46*
Van der Have H46109		*275.29*	*96.80*	*5795.61*	*94.49*	*1.24*	*102.42*	*21.36*	*98.59*	*15.01*	*97.27*	*3.78*	*88.29*	*57.62*	*101.55*	*4.70*	*95.05*
Van der Have H46140		*294.84*	*103.68*	*6514.52*	*106.22*	*1.17*	*97.03*	*22.28*	*102.86*	*15.92*	*103.17*	*4.17*	*97.28*	*59.97*	*105.70*	*4.64*	*93.74*
Van der Have H46177		*298.72*	*105.04*	*6991.02*	*113.98*	*1.16*	*96.20*	*23.45*	*108.24*	*16.10*	*104.34*	*4.45*	*103.94*	*57.53*	*101.40*	*4.55*	*92.02*
Mean		***284.39***	***100.00***	***6133.28***	***100.00***	***1.21***	***100.00***	***21.66***	***100.00***	***15.43***	***100.00***	***4.28***	***100.00***	***56.73***	***100.00***	***4.94***	***100.00***

SPECIALTY VARIETIES

	Specialty																
Beta 4600	RZM & APH	*285.85*	*100.51*	*7139.60*	*116.41*	*1.20*	*99.52*	*24.92*	*115.03*	*15.50*	*100.45*	*4.86*	*113.52*	*57.39*	*101.16*	*4.60*	*93.03*
Beta 4811R	RZM & APH	*284.06*	*99.88*	*8169.66*	*133.20*	*1.21*	*99.93*	*28.65*	*132.25*	*15.41*	*99.86*	*4.54*	*105.93*	*54.97*	*96.90*	*4.10*	*82.92*
Beta 4930	RZM & APH	*285.85*	*100.51*	*7794.04*	*127.08*	*1.20*	*99.52*	*27.25*	*125.79*	*15.50*	*100.45*	*4.36*	*101.84*	*53.26*	*93.87*	*4.65*	*94.04*
Crystal R932	RZM & APH	*286.48*	*100.73*	*7270.59*	*118.54*	*1.20*	*99.52*	*25.41*	*117.32*	*15.51*	*100.54*	*4.49*	*104.76*	*45.62*	*80.41*	*4.82*	*97.38*
Hilleshog 7083 Rz	RZM specialty	*285.63*	*100.44*	*7120.17*	*116.09*	*1.20*	*99.52*	*25.02*	*115.49*	*15.48*	*100.35*	*4.68*	*109.20*	*56.88*	*100.26*	*5.49*	*110.93*
Hilleshog RH5	Rzc specialty	*265.43*	*93.33*	*5269.57*	*85.92*	*1.27*	*105.32*	*20.04*	*92.52*	*14.55*	*94.29*	*3.58*	*83.50*	*58.98*	*103.96*	*5.14*	*103.85*
HM 7073 Rz	RZM specialty	*278.40*	*97.89*	*6753.96*	*110.12*	*1.23*	*101.59*	*24.33*	*112.31*	*15.15*	*98.18*	*4.47*	*104.29*	*58.11*	*102.43*	*5.25*	*106.18*
Van der Have H68108	APH specialty	*269.55*	*94.78*	*6246.81*	*101.85*	*1.26*	*104.08*	*23.37*	*107.87*	*14.73*	*95.49*	*3.61*	*84.32*	*52.03*	*91.70*	*4.84*	*97.78*

* Lower numbers indicate better Cercospora and Aphanomyces resistance.

Table 5. Mean of One Year Performance of 2002 SMBSC Approved Varieties on Diseased Ground, 2001. ***DISEASED TRIAL DATA***

Entry		Rec/T (lbs)		Rec/A (lbs)		Loss to Mol.		Yield (T/A)		Sugar %		CLS		Emergence (%)		Aphanomyces RRI	
		2001	% of Mean	2001	% of Mean	2001	% of Mean	2001	% of Mean	2001	% of Mean	2001	% of Mean	2001	% of Mean	2001	% of Mean
Beta 3820		260.44	98.15	5509.28	96.21	1.29	101.24	20.94	97.31	14.31	98.40	4.52	104.53	59.36	85.45	5.60	103.54
Beta 3945		266.29	100.35	5477.90	95.67	1.27	99.67	20.50	95.26	14.59	100.33	4.50	104.07	71.70	103.22	6.10	112.79
Beta 5815		261.10	98.39	5607.37	97.93	1.29	101.24	21.39	99.40	14.34	98.61	3.73	86.26	70.01	100.79	5.40	99.85
Beta 6904		264.30	99.60	5166.43	90.23	1.28	100.46	19.49	90.57	14.49	99.64	4.82	111.47	71.30	102.64	5.60	103.54
Beta 4818 (M813)		268.79	101.29	6285.94	109.78	1.27	99.67	23.30	108.28	14.71	101.15	4.82	111.47			5.10	94.30
Crystal 952		265.24	99.95	5988.16	104.58	1.27	99.67	22.55	104.79	14.54	99.98	4.60	106.38	70.89	102.05	5.20	96.15
Crystal 999		264.77	99.78	6170.21	107.76	1.28	100.46	23.24	108.00	14.51	99.78	4.55	105.22	66.28	95.42	5.40	99.85
HM 7057		265.95	100.22	5149.08	89.92	1.27	99.67	19.35	89.92	14.57	100.19	3.91	90.42	70.20	101.06	5.90	109.09
Holly Hybrid LM1000		265.98	100.23	5762.31	100.63	1.27	99.67	21.69	100.79	14.57	100.19	3.85	89.03	72.43	104.27	5.50	101.69
Van der Have H46109		259.88	97.93	5398.25	94.27	1.29	101.24	20.76	96.47	14.29	98.26	3.89	89.96	69.79	100.47	4.90	90.60
Van der Have H46140		268.99	101.37	5711.53	99.75	1.26	98.89	21.34	99.17	14.71	101.15	4.06	93.89	72.30	104.08	5.10	94.30
Van der Have H46177		272.60	102.73	6486.70	113.28	1.25	98.10	23.68	110.04	14.88	102.32	4.64	107.30	69.85	100.55	5.10	94.30
Mean		**265.36**	**100.00**	**5726.10**	**100.00**	**1.27**	**100.00**	**21.52**	**100.00**	**14.54**	**100.00**	**4.32**	**100.00**	**69.46**	**100.00**	**5.41**	**100.00**

SPECIALTY VARIETIES

	Specialty																
Beta 4600	RZM/APH	261.02	*98.36*	6108.02	*106.67*	1.29	*101.24*	23.44	*108.93*	14.34	*98.61*	4.93	*114.01*	68.53	*98.65*	5.20	*96.15*
Beta 4811R	RZM/APH	257.16	*96.91*	6682.54	*116.70*	1.30	*102.03*	26.05	*121.05*	14.16	*97.37*	5.11	*118.17*	66.59	*95.86*	4.70	*86.90*
Beta 4930	RZM/APH	263.40	*99.26*	6697.96	*116.97*	1.28	*100.46*	25.40	*118.03*	14.45	*99.36*	4.86	*112.39*	60.38	*86.92*	5.30	*98.00*
Crystal R932	RZM/APH	258.13	*97.28*	6381.57	*111.45*	1.30	*102.03*	24.75	*115.01*	14.18	*97.51*	4.67	*108.00*			4.80	*88.75*
Hilleshog 7083 Rz	RZM specialty	267.50	*100.81*	6415.26	*112.04*	1.27	*99.67*	23.96	*111.34*	14.64	*100.67*	4.66	*107.77*	67.37	*96.98*	5.80	*107.24*
Hilleshog RH5	Rzc. Specialty	256.92	*96.82*	5421.43	*94.68*	1.30	*102.03*	21.20	*98.52*	14.15	*97.30*	3.92	*90.65*	67.83	*97.65*	5.60	*103.54*
HM 7073 Rz	RZM specialty	259.14	*97.66*	5910.87	*103.23*	1.30	*102.03*	22.81	*106.00*	14.25	*97.99*	4.43	*102.45*	67.13	*96.64*	5.50	*101.69*
Van der Have H68108	APH specialty	251.90	*94.93*	5780.71	*100.95*	1.32	*103.60*	23.03	*107.02*	13.91	*95.65*	3.88	*89.73*	61.68	*88.79*	5.00	*92.45*

2001 Cercospora Readings for Coded Test Entries
Betaseed Nursery - Shakopee, MN

All Data Adjusted to 5.5 Equivalent*

CLS Code	Code	Description	Average Rating at Each Date* 7/24	7/31+8/3**	8/7	8/10	8/14	2001 Avg.	2 Yr Mean	3 Yr Mean	2000 Mean	1999 Mean
329	901	Beta 2012LL(Aph)	2.1	3.8	4.3	6.5	7.4	4.81	5.08	5.14	5.34	5.27
339	110	Beta 3820(M701 Aph Spec)	2.3	3.6	4.2	6.1	6.5	4.52	4.46	4.49	4.40	4.56
315	104	Beta 3945(Aph Spec)	2.1	3.5	4.3	6	6.7	4.5	4.49	4.29	4.47	3.90
323	107	Beta 4811R(M811 Aph & Rzm Spec)	2.3	4.1	4.9	6.6	7.7	5.11	4.54	4.60	3.96	4.73
320	113	Beta 6904(Aph Spec)	2.1	4	4.7	6.2	7.1	4.82	4.75	4.73	4.68	4.70
346	905	Beta 991 RR(Aph)	2.1	3.9	4.8	6.7	7.4	4.98	5.18		5.38	
350	910	Beta 993RR(Rzm)	2.6	4.1	5.1	7.2	8.5	5.49	5.32		5.16	
302	204	Beta BM0901(Rzm)	2.1	3.7	4.4	6.3	7.1	4.71	4.75		4.78	
314	229	Beta BM1031	2.3	4	5	6.4	7.2	4.93	4.93			
304	218	Beta BM1032	2.4	3.6	4.4	6	6.8	4.63	4.63			
347	233	Beta BX0934(Rzm Spec)	2.1	3.5	4.9	6.6	7.5	4.93	4.90		4.88	
327	101	Beta 4600(Rzm & Aph Spec) - BX0960	2.1	3.6	4.8	6.7	7.3	4.93	4.86		4.79	
354	201	Beta 4818 (Aph & Rzm Spec) M813	2.1	3.8	4.4	6.3	7.4	4.82	4.75	4.81	4.69	4.93
305	119	Beta 5815 (Aph) M815	1.7	3.3	3.6	4.5	5.7	3.73	3.76	3.76	3.79	3.75
338	112	Beta 4930 (Rzm & Aph Spec) M930	2.4	3.8	4.6	6.5	7	4.86	4.36	4.38	3.86	4.41
335	109	Crystal 952(Aph)	2.1	3.6	4.3	6	7	4.6	4.48	4.59	4.37	4.80
318	206	Crystal 956(Aph)	2.1	3.5	4.4	6.1	6.6	4.51	4.51	4.45	4.51	4.34
353	120	Crystal 999(Aph Spec)	1.9	3.4	4.2	6.3	7	4.55	4.57	4.66	4.59	4.85
308	227	Crystal R826(Rzm Spec)	2.3	3.9	4.7	6.5	7.3	4.93	4.71		4.48	
341	212	Crystal R932(Rzm & Aph Spec)	1.9	3.5	4.8	6.1	7	4.67	4.48		4.30	
303	908	Hilleshog 129RzRR(Rzm)	2.3	3.8	5.2	7.3	8.2	5.35	5.19		5.03	
313	117	Hilleshog 7057(Aph Spec)	1.9	3.2	3.8	4.9	5.8	3.91	3.90	3.89	3.89	3.86
324	909	Hilleshog 7057RR	1.6	3.2	4.2	5.2	6.3	4.09	3.85	3.94	3.61	4.13
331	103	Hilleshog 7073Rz(Rzm Spec)	1.9	3.5	4.1	6	6.6	4.43	4.47	4.59	4.50	4.83
352	108	Hilleshog 7083Rz(Rzm Spec)	2.1	3.6	4.4	6	7.1	4.66	4.67	4.62	4.69	4.52
312	228	Hilleshog 7108Rz(Rzm Spec)	1.9	4	4.7	6.2	7	4.78	4.57		4.37	
342	220	Hilleshog 7111Rz(Rzm Spec)	2.1	3.8	4.4	6.2	7.1	4.71	4.54		4.37	
336	217	Hilleshog 7114	1.9	3.9	4.4	6.4	7.2	4.74	4.83		4.92	
325	232	Hilleshog 7121Rz(Rzm Spec)	2.1	3.7	4.5	6	6.9	4.64	4.78		4.93	
334	225	HM 7135	1.9	3.1	3.9	5.5	5.9	4.07	4.07			
326	219	HM 7136	1.7	3.7	4	5.7	6.5	4.34	4.34			
311	231	HM 7143	2.1	3.7	4.4	5.9	6.8	4.58	4.58			
340	210	HM 7145Rz	1.6	3.4	3.7	5.4	6	4	4.00			
330	216	HM 7146Rz	2.8	4.5	5.7	7.6	8.6	5.84	5.84			
356	203	HM 7147Rz	2.3	3.8	5.1	6.8	7.8	5.16	5.16			
310	215	HM 7148Rz	2.1	3.2	3.4	4.3	5.7	3.72	3.72			
317	221	HM 7149Rz	2.1	3.5	4.1	5.3	5.9	4.17	4.17			
322	904	Hilleshog Resist RR(Aph Spec)	1.9	3.6	4.5	6.3	7.1	4.66	4.58	4.60	4.50	4.64
345	115	Hilleshog Resist(Aph Spec)	2.1	3.7	4.1	6.2	6.4	4.5	4.31	4.21	4.13	4.01
348	118	Hilleshog RH5(Rhizoc Spec)	1.7	3.3	3.5	5	6	3.92	3.57	3.66	3.23	3.82
306	102	Holly 00HX019(Rzm Spec)	2.1	3.8	4.3	6.3	7	4.68	4.51		4.35	
328	224	Holly 01HX045	2.1	3.2	4.2	5.7	6.5	4.34	4.34			
344	234	Holly 01HX046	1.7	3	3.7	5.4	5.9	3.95	3.95			
349	116	Holly LM1000(98HX829 Aph & Rzm Spec)	2.1	3.2	3.4	5	5.6	3.85	3.81	3.84	3.78	3.88
343	202	Sx 1021	2.3	3.8	4.5	6.2	7.2	4.8	4.80			
332	208	Sx 1022	2.1	3.3	4.1	6	6.5	4.41	4.41			
351	222	Sx 1023	2.1	3.5	4.1	5.5	6.5	4.34	4.34			
307	236	Sx 1024	1.7	3.1	3.2	4.5	5.2	3.56	3.56			
301	211	Sx 1025	1.9	3.2	4	5.4	6.8	4.29	4.29			
333	111	Van der Have H46109	2.1	3.2	3.8	4.9	5.5	3.89	3.78	3.75	3.67	3.70
355	106	Van der Have H46140(Aph Spec)	1.7	3.3	3.9	5.2	6.1	4.06	4.17	4.13	4.27	4.06
319	114	Van der Have H46177(Aph-Rzm Spec)	2.1	3.5	4.5	6	7.1	4.64	4.45	4.33	4.26	4.10

2001 Aphanomyces Readings for Coded Test Entries

APH Code	Code	Description	2001 Ratings: Foliar 1* Rating	Foliar 1* ½ App+	Foliar 1* % App+	Root Index** Rating	Root Index** ½ App+	Root Index** % App+	2 Yr Mean: Foliar1*	2 Yr Mean: %App+	2 Yr Mean: Rt.Indx**	2 Yr Mean: %App+	3 Yr Mean: Foliar1*	3 Yr Mean: %App+	3 Yr Mean: Rt.Indx**	3 Yr Mean: %App+	2000 Foliar1*	2000 Rt.Indx**	1999 Foliar1*	1999 Rt.Indx**
841	901	Beta 2012LL(Aph)	3.10	95	94	4.90	91	92	2.72	90	5.10	100	2.39	88	5.76	92	2.33	4.67	1.75	7.08
810	110	Beta 3820(M701 Aph Spec)	4.00	122	122	5.60	104	105	3.42	113	5.10	100	2.92	108	5.65	90	2.83	4.60	1.92	6.75
801	104	Beta 3945 (Aph Spec)	3.80	116	116	6.10	114	113	3.07	102	5.30	104	2.85	105	5.95	95	2.33	4.50	2.42	7.25
815	101	Beta 4600Rzm&Aph Spec)	3.50	107	107	5.20	97	96	2.92	97	4.60	91					2.33	4.00		
832	107	Beta 4811R(M811 Aph&Rzm Spec)	3.50	107	107	4.70	88	88	2.92	97	4.10	81	2.53	93	4.96	79	2.33	3.50	1.75	6.67
820	112	Beta 4930 (Rzm & Aph Spec)	3.60	110	109	5.30	99	98	3.30	109	4.65	92	2.92	108	5.35	85	3.00	4.00	2.17	6.75
833	119	Beta 5815(Aph)	3.40	104	104	5.40	101	100	3.29	109	5.04	99	3.00	111	5.69	90	3.17	4.67	2.42	7.00
850	113	Beta 6904(Aph Spec)	3.30	101	102	5.60	104	104	3.24	107	5.05	99	2.96	110	5.78	92	3.17	4.50	2.42	7.25
828	905	Beta 991RR(Aph)	3.90	119	120	6.10	114	113												
802	910	Beta 993RR(Rzm)	3.80	116	116	5.50	102	102												
842	204	Beta BM0901	3.50	107	107	5.80	108	108												
852	229	Beta BM1031	3.30	101	102	4.70	88	87												
817	218	Beta BM1032	4.80	146	147	6.70	125	124												
836	233	Beta BX0934	3.70	113	113	5.90	110	111												
827	201	Beta M813(Aph&Rzm Spec)	3.20	98	98	5.10	95	96	2.94	97	4.72	93	2.57	95	5.45	87	2.67	4.33	1.83	6.92
853	109	Crystal 952(Aph Spec)	3.60	110	110	5.20	97	96	3.05	101	4.85	95	2.64	98	5.40	86	2.50	4.50	1.83	6.50
851	206	Crystal 956(Aph)	3.40	104	102	5.40	101	101	3.12	103	4.79	94	2.74	101	5.53	88	2.83	4.17	2.00	7.00
804	120	Crystal 999(Aph Spec)	3.30	101	99	5.40	101	101	3.07	102	4.79	94	2.79	103	5.61	89	2.83	4.17	2.25	7.25
806	227	Crystal R826	3.40	104	102	4.70	88	88												
839	212	Crystal R932 (Rzm & Aph)	3.40	104	103	4.80	89	89	3.29	109	4.82	95					3.17	4.83		
819	908	Hilleshog 129RzRR	4.10	125	125	6.80	127	126												
825	117	Hilleshog 7057 (Aph Spec)	3.90	119	118	5.90	110	110	3.70	123	5.45	107	3.30	122	6.02	96	3.50	5.00	2.50	7.17
844	909	Hilleshog 7057RR	3.80	116	117	6.00	112	112									4.33	5.17		
843	103	Hilleshog 7073Rz (Rzm)	3.40	104	105	5.50	102	103	3.37	111	5.25	103	3.19	118	6.00	95	3.33	5.00	2.83	7.50
818	108	Hilleshog 7083Rz (Rzm)	4.00	122	121	5.80	108	108	3.67	121	5.49	108	3.50	129	6.16	98	3.33	5.17	3.17	7.50
813	228	Hilleshog 7108Rz (Rzm)	4.40	134	134	6.60	123	123	4.54	150	6.3	124					4.67	6.00		
811	220	Hilleshog 7111Rz(Rzm Spec)	4.60	140	141	6.10	114	113	4.30	142	5.64	111					4.00	5.17		
829	217	Hilleshog 7114	4.30	131	131	6.40	119	120	3.90	129	5.87	116					3.50	5.33		
848	232	Hilleshog 7121Rz (Rzm)	3.90	119	119	5.90	110	109	4.70	156	6.12	120					5.50	6.33		
824	225	Hilleshog 7135	3.90	119	120	5.60	104	105												
823	219	Hilleshog 7136	3.60	110	111	5.10	95	95												
847	231	Hilleshog 7143	4.50	137	136	6.20	115	115												
807	210	Hilleshog 7145 Rz	5.00	152	151	6.30	117	117												
805	216	Hilleshog 7146 Rz	4.20	128	128	6.30	117	116												
826	203	Hilleshog 7147 Rz	3.70	113	112	6.10	114	114												
856	215	Hilleshog 7148 Rz	3.90	119	118	5.60	104	104												
814	221	Hilleshog 7149 Rz	5.00	152	152	6.80	127	127												
846	115	Hilleshog Resist(Aph Spec)	3.40	104	105	5.10	95	95	2.79	92	4.8	94	2.41	89	5.59	89	2.17	4.50	1.67	7.17
854	904	Hilleshog ResistRR(Aph Spec)	4.00	122	123	6.00	112	112									3.50	5.17		
855	118	Hilleshog RH5 (Rhizoc Spec)	3.70	113	113	5.60	104	105	3.44	114	5.14	101	3.07	113	5.79	92	3.17	4.67	2.33	7.08
816	224	Holly 01HX045	3.70	113	112	4.40	82	104												
831	234	Holly 01HX046	2.60	79	78	4.90	91	83												
837	102	Holly Hybrid 00HX019	3.30	101	102	5.60	104	91												
808	116	Holly LM1000 (98HX829 Aph & Rzm Spe	3.50	107	107	5.50	102	102	3.09	102	5.17	102	2.72	101	5.81	92	2.67	4.83	2.00	7.08
845	202	Seedex 1021	3.70	113	112	5.80	108	109												
812	208	Seedex 1022	3.30	101	102	5.20	97	97												
838	222	Seedex 1023	3.40	104	104	5.60	104	105												
830	236	Seedex 1024	3.90	119	120	5.00	93	94												
840	211	Seedex 1025	3.30	101	101	5.20	97	98												
822	111	Van der Have H46109	2.90	88	89	4.90	91	91	2.87	95	4.7	93	2.58	95	5.41	86	2.83	4.50	2.00	6.83
849	106	Van der Have H46140(Aph Spec)	3.60	110	111	5.10	95	95	3.05	101	4.64	91	2.73	101	5.48	87	2.50	4.17	2.08	7.17
835	114	Van der Have H46177(Rzm-Aph Spec)	3.20	98	97	5.10	95	95	2.60	86	4.55	90	2.40	89	5.39	86	2.00	4.00	2.00	7.08
834	105	Van der Have H68108(Aph Spec)	4.30	131	130	5.00	93	102	3.65	121	4.84	95	2.91	107	5.42	86	3.00	4.67	1.42	6.58
821	230	Vanderhave H46333	3.40	104	105	5.50	102	94												
809	213	Vanderhave H68242	4.10	125	124	5.70	106	106												
803	226	Vanderhave H68243	4.20	128	129	5.70	106	106												
		Betaseed Check Varieties																		
	639	Aph Res Check	3.30	101	99	5.10	95	96												
	643	Aph Res Check	3.10	95	93	4.50	84	84												
	642	RRV Mod Susc Check	4.60	140	141	6.40	119	119												
	646	RRV Mod Susc Check	4.80	146	148	6.80	127	126												
	640	USDA Res Check	3.80	116	116	5.80	108	108												
	644	USDA Res Check	4.20	128	129	5.50	102	102												
	641	Very Susc Check	5.70	174	173	7.30	136	136												
	645	Very Susc Check	5.40	165	166	7.30	136	136												
Betaseed check variety averages in % approval limit:			4.36		133	6.09		113												
		American Crystal Check Mean	2.85		87	4.67		87	2.63	87	4.42	87					2.40	4.17		
		Coeff. of Var. (%)	19.89																	
ican Crystal Check Mean * 115% (Approval Criteria) :			3.28			5.37			3.02		5.08		2.71		6.29		2.76	4.79	2.08	7.79

+ Approval is based upon the two year foliar rating and other comparisons are for general information.

Check varieties are Beta 3800, Crystal 960, Crystal 999, Hilleshog Resist & van der Have H46140.

* 2001 Foliar rating is the Aph Foliar 2 rating (7/18 & 8/13 mean) from the unidentified data.

** 2001 Root rating of Aph symptoms was done on 9/19 (1=healthy, 9=severe damage).

Bird Island/Rudeen

2001 BIRD ISLAND COMMERCIAL TRIAL ANALYSIS

ENTRY			% SUGAR MEAN	% SUGAR % Test Mean	LTM MEAN	LTM % Test Mean	RECOV. SUG/TON MEAN	RECOV. SUG/TON % Test Mean	TONS/ACRE MEAN	TONS/ACRE % Test Mean	RSA MEAN	RSA % Test Mean	% TARE MEAN	% TARE % Test Mean	% EMERGE MEAN	% EMERGE % Test Mean
1	Betaseed	4600	14.1	97.8	1.31	102.0	255.1	97.4	22.1	109.0	5616.3	105.8	3.39	49.6	67.7	99.0
2	Holly	00HX19	13.8	95.9	1.33	103.3	249.4	95.2	21.9	108.1	5443.1	102.6	3.26	47.8	67.7	99.1
3	Hilleshog	7073Rz	14.1	98.2	1.31	101.8	256.3	97.9	18.4	91.0	4700.7	88.6	60.07	881.0	64.6	94.5
4	Betaseed	3945	14.6	101.8	1.27	98.7	267.40	102.1	19.3	95.5	5186.5	97.7	4.38	64.2	76.8	112.4
5	Vanderhave	H68108	13.6	94.3	1.34	103.9	244.6	93.4	20.8	102.7	5069.5	95.5	3.64	53.3	60.7	88.7
6	Vanderhave	H46140	15.1	104.8	1.24	96.0	276.8	105.7	17.8	87.9	4902.2	92.4	5.16	75.7	67.5	98.6
7	Betaseed	4811R	14.3	99.3	1.30	101.1	259.7	99.1	24.2	119.5	6271.9	118.2	3.14	46.1	65.6	96.0
8	Hilleshog	7083Rz	14.5	100.5	1.28	99.4	263.5	100.6	20.3	100.5	5385.6	101.5	5.17	75.9	66.1	96.7
9	Crystal	952	14.6	101.6	1.27	98.5	267.0	101.9	22.0	108.8	5914.8	111.4	3.36	49.3	74.5	108.9
10	Betaseed	3820	14.2	98.7	1.30	100.9	257.9	98.4	19.9	98.1	5158.9	97.2	3.22	47.2	56.8	83.1
11	Vanderhave	H46109	14.4	99.9	1.28	99.7	261.7	99.9	20.9	103.1	5485.8	103.4	5.92	86.8	67.2	98.3
12	Betaseed	4930	14.7	102.4	1.27	98.4	269.3	102.8	23.2	114.5	6255.1	117.9	3.81	55.9	58.1	85.0
13	Betaseed	6904	14.4	100.1	1.29	100.2	262.1	100.1	18.7	92.4	4943.2	93.1	3.28	48.2	71.1	104.0
14	Vanderhave	H46177	14.7	101.9	1.27	98.6	267.9	102.3	19.8	97.9	5329.1	100.4	4.02	58.9	70.3	102.9
15	Hilleshog	Resist	14.3	99.3	1.29	100.3	260.0	99.3	17.7	87.3	4643.9	87.5	3.91	57.3	76.6	112.0
16	Holly	LM1000	14.6	101.2	1.27	98.8	265.7	101.4	20.2	100.0	5402.6	101.8	5.26	77.1	70.1	102.4
17	Hilleshog	7057	14.6	101.2	1.27	99.0	265.6	101.4	18.2	89.9	4774.4	90.0	4.51	66.1	71.9	105.1
18	Hilleshog	RH5	14.3	99.3	1.30	100.8	259.7	99.1	19.8	97.8	5126.9	96.6	4.17	61.2	68.2	99.8
19	Betaseed	5815	14.6	101.2	1.28	99.2	265.6	101.4	19.0	93.9	5060.3	95.3	3.20	46.9	77.6	113.5
20	Crystal	999	14.5	100.6	1.28	99.3	263.8	100.7	20.7	102.1	5474.0	103.1	3.53	51.7	68.5	100.2
		Trial Mean	14.4		1.29		262.0		20.2		5307.2		6.82		68.4	
		Coeff. Of Var. (%)	4.4		3.61		5.2		10.3		11.6		432.88		13.0	
		LSD (0.05)	0.6		0.05		13.3		2.1		624.8		28.31		8.5	
		ALPHA	0.1		0.05 *		0.1		0.1		0.1		0.05 *		0.1	

Buffalo Lake/Fischer

2001 BUFFALO LAKE COMMERCIAL TRIAL ANALYSIS

ENTRY			% SUGAR MEAN	% SUGAR % Test Mean	LTM MEAN	LTM % Test Mean	RECOV. SUG/TON MEAN	RECOV. SUG/TON % Test Mean	TONS/ACRE MEAN	TONS/ACRE % Test Mean	RSA MEAN	RSA % Test Mean	% TARE MEAN	% TARE % Test Mean	% EMERGE MEAN	% EMERGE % Test Mean
1	Betaseed	4600	14.5	103.6	1.28	97.4	264.8	104.2	25.6	115.0	6829.3	120.1	4.95	95.7	60.9	106.8
2	Holly	00HX19	13.7	97.6	1.33	101.7	246.9	97.2	22.4	100.4	5535.6	97.4	4.18	80.8	51.8	91.0
3	Hilleshog	7073Rz	14.3	101.8	1.30	99.4	259.2	102.0	27.4	123.1	7040.6	123.9	5.02	97.0	61.3	107.5
4	Betaseed	3945	14.3	102.0	1.29	98.6	260.1	102.4	20.0	89.9	5263.9	92.6	6.06	117.0	57.8	101.5
5	Vanderhave	H68108	13.6	96.9	1.34	102.3	244.9	96.4	24.1	108.2	5879.4	103.4	3.93	76.0	47.3	82.9
6	Vanderhave	H46140	13.8	98.2	1.33	101.2	248.8	97.9	20.4	91.7	5073.4	89.3	5.67	109.5	62.2	109.1
7	Betaseed	4811R	14.2	101.5	1.30	99.1	258.6	101.8	28.2	126.7	7321.7	128.8	4.49	86.7	53.7	94.3
8	Hilleshog	7083Rz	14.6	104.0	1.28	97.5	265.9	104.6	27.7	124.4	7397.0	130.1	4.54	87.7	54.1	94.9
9	Crystal	952	14.2	101.1	1.31	99.7	257.3	101.2	21.7	97.6	5599.8	98.5	5.03	97.3	58.8	103.1
10	Betaseed	3820	13.9	99.1	1.32	100.8	251.4	99.0	20.3	90.9	5082.9	89.4	4.83	93.4	48.2	84.5
11	Vanderhave	H46109	13.6	97.0	1.33	101.8	245.3	96.5	20.3	91.1	4989.5	87.8	5.20	100.5	61.5	108.0
12	Betaseed	4930	14.1	100.6	1.31	100.0	255.8	100.7	25.8	115.6	6638.5	116.8	4.66	90.0	47.3	83.0
13	Betaseed	6904	13.9	99.4	1.31	99.9	252.5	99.4	20.2	90.7	5071.8	89.2	5.53	106.9	55.1	96.7
14	Vanderhave	H46177	15.0	107.2	1.24	94.9	275.5	108.4	25.7	115.6	7077.4	124.5	5.10	98.5	58.2	102.2
15	Hilleshog	Resist	13.5	96.2	1.34	101.9	242.9	95.6	16.7	74.9	4175.8	73.5	5.76	111.3	62.0	108.8
16	Holly	LM1000	14.1	100.3	1.30	99.3	255.2	100.4	19.7	88.5	4957.0	87.2	5.65	109.1	63.7	111.7
17	Hilleshog	7057	14.0	99.8	1.31	100.0	253.6	99.8	16.0	71.6	4052.5	71.3	6.11	118.1	58.3	102.3
18	Hilleshog	RH5	13.4	95.8	1.34	102.4	241.8	95.2	19.5	87.5	4729.5	83.2	5.64	109.0	58.5	102.6
19	Betaseed	5815	13.7	97.5	1.33	101.6	246.7	97.1	21.4	96.1	5302.4	93.3	5.41	104.6	60.6	106.4
20	Crystal	999	14.0	100.2	1.32	100.5	254.5	100.2	22.4	100.5	5665.2	99.7	5.75	111.0	58.6	102.8
		Trial Mean	14.0		1.3		254.1		22.3		5684.2		5.2		57.0	
		Coeff. Of Var. (%)	4.0		2.45		4.7		15.3		16.8		30.23		18.2	
		LSD (0.05)	0.6		0.03		12.6		3.4		963.1		1.50		10.5	
		ALPHA	0.1		0.05	*	0.1		0.1		0.1		0.05	*	0.1	

Clara City East/Schwitters **2001 CLARA CITY EAST COMMERCIAL TRIAL ANALYSIS**

ENTRY			% SUGAR		LTM		RECOV. SUG/TON		TONS/ACRE		RSA		% TARE		% EMERGE	
			MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean
1	Betaseed	4600	14.4	96.6	1.28	102.8	261.6	96.0	22.4	99.2	5773.1	94.0	3.07	105.5	66.3	100.3
2	Holly	00HX19	14.1	94.9	1.31	105.0	255.8	93.9	23.8	105.4	6078.3	98.9	2.75	94.7	61.7	93.4
3	Hilleshog	7073Rz	14.3	96.0	1.30	103.6	259.5	95.3	22.3	98.6	5834.4	95.0	2.96	102.0	60.4	91.3
4	Betaseed	3945	14.9	100.5	1.24	99.3	273.9	100.6	20.3	89.9	5567.3	90.6	2.83	97.3	64.9	98.2
5	Vanderhave	H68108	14.6	98.5	1.27	101.6	267.5	98.2	21.7	95.9	5754.8	93.7	2.80	96.2	62.0	93.7
6	Vanderhave	H46140	15.4	103.4	1.21	97.0	283.3	104.0	25.1	111.1	7016.2	114.2	3.07	105.7	74.1	112.2
7	Betaseed	4811R	14.4	97.1	1.28	102.8	263.2	96.6	23.8	105.5	6217.0	101.2	2.81	96.8	60.8	92.0
8	Hilleshog	7083Rz	14.9	100.1	1.25	99.9	272.8	100.1	23.7	105.0	6457.3	105.1	3.44	118.3	70.1	106.0
9	Crystal	952	14.8	99.3	1.25	100.2	270.1	99.2	22.9	101.6	6177.0	100.5	2.57	88.3	70.3	106.4
10	Betaseed	3820	15.0	100.9	1.24	99.3	275.2	101.0	21.8	96.4	6088.1	99.1	2.42	83.3	57.7	87.3
11	Vanderhave	H46109	14.8	99.2	1.26	100.8	269.9	99.1	19.9	88.1	5369.9	87.4	3.39	116.6	61.1	92.4
12	Betaseed	4930	14.9	100.0	1.25	100.2	272.4	100.0	26.6	117.6	7194.8	117.1	2.61	89.8	66.3	100.3
13	Betaseed	6904	15.1	101.4	1.24	99.0	276.6	101.6	19.5	86.4	5430.0	88.4	2.56	88.1	73.6	111.3
14	Vanderhave	H46177	15.0	100.8	1.24	99.4	274.9	101.0	24.4	108.3	6807.6	110.8	2.87	98.6	67.8	102.5
15	Hilleshog	Resist	15.6	105.0	1.19	95.5	288.4	105.9	20.6	91.2	6025.5	98.1	2.39	82.4	65.9	99.6
16	Holly	LM1000	15.1	101.7	1.24	98.8	277.6	101.9	22.2	98.3	6180.4	100.6	3.60	123.8	74.8	113.1
17	Hilleshog	7057	15.4	103.5	1.20	96.4	283.7	104.2	21.0	93.1	5936.7	96.6	3.07	105.7	68.3	103.4
18	Hilleshog	RH5	14.9	100.5	1.25	99.7	273.9	100.6	22.5	99.8	6042.5	98.3	2.89	99.6	67.0	101.4
19	Betaseed	5815	14.8	99.8	1.25	99.8	271.9	99.8	21.8	96.6	5966.7	97.1	3.44	118.3	63.9	96.7
20	Crystal	999	15.0	100.8	1.24	98.9	274.9	100.9	25.3	111.8	6961.2	113.3	2.58	88.9	65.1	98.5
		Trial Mean	14.9		1.25		272.4		22.6		6143.9		2.9		66.1	
		Coeff. Of Var. (%)	4.8		4.45		5.6		9.9		12.2		36.70		14.1	
		LSD (0.05)	0.7		0.06		15.5		2.3		751.9		1.03		9.4	
		ALPHA	0.1		0.05	*	0.1		0.1		0.1		0.05	*	0.1	

Clara City West/Condon

2001 CLARA CITY WEST COMMERCIAL TRIAL ANALYSIS

ENTRY			% SUGAR		LTM		RECOV. SUG/TON		TONS/ACRE		RSA		% TARE		% EMERGE	
			MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean
1	Betaseed	4600	16.11	101.37	1.15	98.49	299.25	101.60	27.67	108.08	8291.11	109.81	2.49	111.09	50.83	100.72
2	Holly	00HX19	15.12	95.11	1.23	105.75	277.65	94.26	26.73	104.42	7645.97	101.27	2.10	93.69	48.79	96.68
3	Hilleshog	7073Rz	15.64	98.37	1.19	101.67	288.99	98.11	25.97	101.46	7512.57	99.50	2.07	92.42	57.27	113.48
4	Betaseed	3945	16.45	103.49	1.12	96.28	306.51	104.06	25.33	98.93	7767.61	102.88	2.36	105.53	50.74	100.53
5	Vanderhave	H68108	15.04	94.60	1.24	106.25	275.94	93.68	25.51	99.64	7058.11	93.48	2.03	90.66	45.60	90.35
6	Vanderhave	H46140	16.43	103.40	1.12	95.89	306.31	103.99	25.12	98.12	7673.52	101.63	1.95	87.31	57.96	114.84
7	Betaseed	4811R	14.32	90.10	1.30	111.16	260.49	88.44	25.24	98.58	6565.76	86.96	2.46	110.11	45.49	90.13
8	Hilleshog	7083Rz	15.40	96.88	1.21	103.84	283.74	96.33	26.69	104.25	7565.35	100.20	3.18	142.22	48.76	96.62
9	Crystal	952	16.51	103.89	1.12	95.62	307.95	104.55	26.21	102.39	8089.87	107.15	1.95	87.05	53.18	105.37
10	Betaseed	3820	16.46	103.54	1.12	96.05	306.72	104.13	26.14	102.11	8013.38	106.13	1.31	58.48	50.65	100.35
11	Vanderhave	H46109	15.95	100.34	1.16	99.68	295.71	100.39	25.56	99.84	7549.92	100.00	2.73	121.80	57.86	114.65
12	Betaseed	4930	14.86	93.50	1.25	107.30	272.20	92.41	24.76	96.73	6646.46	88.03	1.99	88.98	40.94	81.12
13	Betaseed	6904	16.92	106.49	1.08	92.64	316.89	107.58	24.16	94.36	7670.26	101.59	2.09	93.50	53.06	105.13
14	Vanderhave	H46177	16.24	102.20	1.14	97.52	302.11	102.57	25.66	100.23	7747.08	102.61	2.41	107.60	47.74	94.58
15	Hilleshog	Resist	16.18	101.80	1.14	97.97	300.73	102.10	25.36	99.06	7635.20	101.12	1.31	58.49	50.93	100.91
16	Holly	LM1000	15.57	97.97	1.19	102.23	287.59	97.64	25.52	99.68	7332.09	97.11	3.32	148.13	54.55	108.09
17	Hilleshog	7057	15.99	100.59	1.16	99.07	296.65	100.71	25.72	100.47	7637.79	101.16	3.03	135.16	49.47	98.01
18	Hilleshog	RH5	16.00	100.67	1.16	99.09	296.89	100.80	24.43	95.44	7270.75	96.30	2.10	93.75	49.82	98.70
19	Betaseed	5815	16.26	102.30	1.14	97.39	302.47	102.69	24.75	96.66	7496.08	99.28	1.93	86.35	48.87	96.82
20	Crystal	999	16.43	103.37	1.12	96.13	306.16	103.94	25.49	99.55	7836.50	103.79	1.96	87.68	46.88	92.90
		Trial Mean	15.89		1.17		294.55		25.60		7550.27		2.24		50.47	
		Coeff. Of Var. (%)	4.06		4.51		4.74		8.57		9.60		44.63		18.20	
		LSD (0.05)	0.64		0.05		13.79		2.26		753.17		0.97		9.13	
		ALPHA	0.05	*	0.05	*	0.05	*	0.05	*	0.05	*	0.05	*	0.05	*

Gluek/L&N

2001 GLUEK COMMERCIAL TRIAL ANALYSIS

ENTRY			% SUGAR		LTM		RECOV. SUG/TON		TONS/ACRE		RSA		% TARE		% EMERGE	
			MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean
1	Betaseed	4600	16.7	103.2	1.10	96.1	312.0	103.7	22.9	102.2	7124.3	105.7	1.66	87.3	52.2	106.5
2	Holly	00HX19	15.0	92.6	1.24	108.3	274.9	91.4	22.0	98.0	6063.5	89.9	2.09	109.8	46.4	94.5
3	Hilleshog	7073Rz	16.2	100.2	1.14	99.7	301.5	100.2	23.9	106.5	7216.3	107.0	1.60	83.9	60.0	122.2
4	Betaseed	3945	16.7	103.5	1.10	96.6	312.8	104.0	22.4	100.0	7019.9	104.1	1.68	88.1	58.7	119.7
5	Vanderhave	H68108	15.2	94.2	1.22	106.9	280.5	93.2	22.5	100.4	6299.9	93.4	2.11	110.8	41.5	84.5
6	Vanderhave	H46140	15.6	96.6	1.18	103.4	288.9	96.0	22.1	98.6	6419.8	95.2	1.97	103.7	50.0	102.0
7	Betaseed	4811R	15.3	94.4	1.22	106.7	281.1	93.5	24.8	110.6	7005.2	103.9	1.92	100.9	46.3	94.3
8	Hilleshog	7083Rz	16.4	101.1	1.12	98.2	304.8	101.3	24.1	107.5	7284.0	108.0	2.00	105.1	52.7	107.3
9	Crystal	952	16.6	102.7	1.11	96.8	310.2	103.1	20.9	93.2	6438.8	95.5	2.06	108.2	43.8	89.3
10	Betaseed	3820	17.1	105.5	1.07	93.5	320.1	106.4	22.3	99.3	7107.4	105.4	2.39	125.7	43.7	89.1
11	Vanderhave	H46109	16.4	101.3	1.13	98.4	305.4	101.5	22.4	99.8	6839.1	101.4	2.14	112.4	42.8	87.3
12	Betaseed	4930	15.8	97.7	1.17	102.4	292.9	97.4	21.7	96.8	6361.3	94.4	2.00	105.2	40.5	82.5
13	Betaseed	6904	16.5	101.7	1.14	99.3	306.5	101.9	21.5	96.1	6625.8	98.3	1.82	95.9	56.4	115.0
14	Vanderhave	H46177	16.6	102.5	1.11	97.1	309.6	102.9	23.1	103.3	7120.8	105.6	1.56	81.8	48.8	99.5
15	Hilleshog	Resist	16.2	100.3	1.14	99.4	302.0	100.4	21.0	93.7	6293.2	93.3	1.80	94.8	52.1	106.2
16	Holly	LM1000	16.4	101.2	1.13	98.9	305.1	101.4	22.6	100.9	6932.8	102.8	2.00	105.3	47.2	96.2
17	Hilleshog	7057	16.1	99.6	1.15	100.3	299.5	99.6	21.2	94.8	6564.3	97.4	1.91	100.2	45.8	93.3
18	Hilleshog	RH5	15.9	98.4	1.16	101.7	295.1	98.1	22.9	102.2	6663.5	98.8	1.84	96.6	49.2	100.3
19	Betaseed	5815	16.6	102.3	1.11	97.4	308.8	102.6	21.6	96.6	6741.5	100.0	1.88	99.0	57.5	117.1
20	Crystal	999	16.4	101.1	1.13	98.8	304.5	101.2	22.3	99.4	6710.0	99.5	1.62	85.3	45.8	93.3
		Trial Mean	16.2		1.1		300.8		22.4		6741.6		1.9		49.1	
		Coeff. Of Var. (%)	5.3		5.82		6.1		11.6		12.8		34.55		17.7	
		LSD (0.05)	0.9		0.07		18.9		2.5		826.5		0.63		8.5	
		ALPHA	0.1		0.05	*	0.1		0.1		0.1		0.05	*	0.1	

Hector/Wehking

2001 HECTOR COMMERCIAL TRIAL ANALYSIS

ENTRY			% SUGAR MEAN	% SUGAR % Test Mean	LTM MEAN	LTM % Test Mean	RECOV. SUG/TON MEAN	RECOV. SUG/TON % Test Mean	TONS/ACRE MEAN	TONS/ACRE % Test Mean	RSA MEAN	RSA % Test Mean	% TARE MEAN	% TARE % Test Mean	% EMERGE MEAN	% EMERGE % Test Mean
1	Betaseed	4600	15.31	99.63	1.23	101.57	278.65	98.53	25.01	101.33	6990.57	100.62	4.03	85.98	62.33	94.81
2	Holly	00HX19	14.82	96.44	1.25	102.94	270.52	95.65	24.51	99.30	6555.77	94.36	4.21	89.85	66.50	101.15
3	Hilleshog	7073Rz	14.99	97.55	1.26	103.76	270.61	95.69	26.02	105.43	7002.70	100.79	5.95	127.14	69.92	106.35
4	Betaseed	3945	16.19	105.36	1.16	95.52	297.46	105.18	25.48	103.24	7589.32	109.24	5.59	119.48	69.41	105.57
5	Vanderhave	H68108	14.47	94.16	1.30	107.59	258.02	91.23	25.88	104.86	6606.75	95.09	5.05	107.92	65.53	99.67
6	Vanderhave	H46140	15.81	102.88	1.17	96.49	293.33	103.72	24.75	100.28	7253.91	104.41	4.57	97.60	70.08	106.59
7	Betaseed	4811R	14.17	92.21	1.30	107.66	257.17	90.94	23.88	96.75	6123.35	88.14	5.68	121.38	61.20	93.09
8	Hilleshog	7083Rz	15.66	101.91	1.18	97.76	289.99	102.54	23.23	94.10	6689.89	96.29	5.49	117.21	58.62	89.16
9	Crystal	952	15.37	100.02	1.19	98.12	289.24	102.27	26.89	108.93	7727.33	111.22	3.97	84.86	66.62	101.34
10	Betaseed	3820	15.04	97.87	1.22	100.79	280.73	99.27	25.39	102.86	7063.40	101.67	4.06	86.67	69.95	106.39
11	Vanderhave	H46109	15.82	102.95	1.18	97.48	290.79	102.82	25.05	101.47	7275.97	104.73	4.84	103.43	63.35	96.35
12	Betaseed	4930	14.85	96.64	1.26	104.07	269.81	95.40	24.52	99.33	6578.18	94.68	4.23	90.29	53.19	80.90
13	Betaseed	6904	15.69	102.10	1.19	97.88	289.65	102.42	24.48	99.19	7060.00	101.62	4.13	88.19	69.60	105.87
14	Vanderhave	H46177	15.37	100.02	1.20	99.05	286.30	101.24	24.85	100.66	7102.47	102.23	3.88	82.89	75.18	114.36
15	Hilleshog	Resist	15.53	101.06	1.20	98.92	286.90	101.45	24.19	98.02	6923.14	99.65	5.15	110.10	65.51	99.64
16	Holly	LM1000	15.80	102.82	1.18	97.54	290.73	102.80	23.92	96.91	6923.65	99.66	5.61	119.73	63.47	96.55
17	Hilleshog	7057	15.47	100.67	1.20	99.26	285.70	101.02	23.67	95.90	6709.63	96.58	5.38	114.83	72.88	110.86
18	Hilleshog	RH5	15.37	100.02	1.21	100.13	283.44	100.22	20.83	84.39	5865.73	84.43	4.83	103.13	59.41	90.37
19	Betaseed	5815	15.47	100.67	1.19	98.24	288.73	102.09	25.05	101.48	7205.71	103.72	3.16	67.55	66.71	101.47
20	Crystal	999	16.14	105.03	1.15	95.24	298.37	105.50	26.05	105.56	7703.93	110.89	3.83	81.76	65.42	99.51
		Trial Mean	15.37		1.21		282.81		24.68		6947.57		4.68		65.74	
		Coeff. Of Var. (%)	4.56		4.06		4.56		9.41		9.17		34.65		16.18	
		LSD (0.05)	0.70		0.05		13.21		2.38		666.06		1.59		10.30	
		ALPHA	0.05	*	0.05	*	0.05	*	0.05	*	0.05	*	0.05	*	0.05	*

Lake Lillian/Schmoll

2001 LAKE LILLIAN COMMERCIAL TRIAL ANALYSIS

ENTRY			% SUGAR MEAN	% SUGAR % Test Mean	LTM MEAN	LTM % Test Mean	RECOV. SUG/TON MEAN	RECOV. SUG/TON % Test Mean	TONS/ACRE MEAN	TONS/ACRE % Test Mean	RSA MEAN	RSA % Test Mean	% TARE MEAN	% TARE % Test Mean	% EMERGE MEAN	% EMERGE % Test Mean
1	Betaseed	4600	14.4	100.6	1.28	99.5	262.6	100.7	23.7	100.4	6213.4	101.0	4.17	95.7	79.2	97.7
2	Holly	00HX19	14.1	98.5	1.30	101.0	256.4	98.3	26.5	112.4	6760.0	109.8	3.65	83.7	83.1	102.5
3	Hilleshog	7073Rz	14.4	100.2	1.29	99.6	261.5	100.2	23.1	98.1	6067.8	98.6	4.57	104.9	82.3	101.6
4	Betaseed	3945	14.5	101.0	1.28	99.5	263.8	101.1	22.4	94.8	5893.9	95.8	4.73	108.5	87.2	107.7
5	Vanderhave	H68108	13.9	96.7	1.32	102.5	250.7	96.1	25.6	108.6	6419.2	104.3	3.53	81.1	76.8	94.8
6	Vanderhave	H46140	14.6	102.0	1.27	98.6	267.0	102.4	22.0	93.5	5854.4	95.1	5.56	127.6	85.4	105.4
7	Betaseed	4811R	13.7	95.5	1.33	103.0	247.2	94.8	28.0	118.6	6919.6	112.4	4.73	108.6	86.2	106.4
8	Hilleshog	7083Rz	14.7	102.3	1.27	98.4	267.8	102.7	24.1	102.0	6421.2	104.3	4.02	92.2	79.2	97.7
9	Crystal	952	14.6	101.9	1.27	98.8	266.6	102.2	23.5	99.7	6261.1	101.7	3.73	85.6	80.0	98.7
10	Betaseed	3820	14.2	98.8	1.30	100.9	257.3	98.6	21.9	92.8	5707.3	92.7	3.56	81.8	74.7	92.3
11	Vanderhave	H46109	14.4	100.6	1.29	99.7	262.6	100.7	22.0	93.1	5747.8	93.4	4.96	114.0	89.3	110.3
12	Betaseed	4930	14.1	98.5	1.31	101.1	256.2	98.2	26.1	110.7	6703.4	108.9	4.48	102.9	69.8	86.1
13	Betaseed	6904	14.6	101.7	1.28	99.1	265.9	101.9	19.5	82.9	5220.7	84.8	4.33	99.3	85.4	105.4
14	Vanderhave	H46177	14.9	103.6	1.25	97.2	272.0	104.3	24.7	104.8	6732.7	109.4	3.48	79.8	83.1	102.5
15	Hilleshog	Resist	14.1	98.0	1.30	100.7	255.1	97.8	20.7	88.0	5358.6	87.1	4.23	97.2	86.7	107.0
16	Holly	LM1000	14.5	101.5	1.28	99.0	265.4	101.8	24.6	104.3	6509.3	105.8	6.55	150.3	81.3	100.3
17	Hilleshog	7057	14.3	100.0	1.29	100.3	260.8	100.0	22.2	94.3	5832.8	94.8	4.06	93.2	82.3	101.6
18	Hilleshog	RH5	13.9	97.2	1.32	102.1	252.3	96.7	23.0	97.4	5786.8	94.0	5.43	124.7	77.6	95.8
19	Betaseed	5815	14.3	99.8	1.30	100.6	260.2	99.8	23.3	98.9	6100.1	99.1	3.94	90.4	77.9	96.1
20	Crystal	999	14.6	101.6	1.27	98.7	265.9	101.9	24.6	104.5	6580.5	106.9	3.42	78.4	72.9	90.0
		Trial Mean	14.3		1.3		260.9		23.6		6154.5		4.4		81.0	
		Coeff. Of Var. (%)	4.2		3.13		4.9		10.6		12.3		29.10		8.6	
		LSD (0.05)	0.6		0.04		12.7		2.6		785.7		1.22		6.7	
		ALPHA	0.1		0.05		0.1		0.1		0.1		0.05		0.1	

Bird Island/Rudeen Bros.

2001 BIRD ISLAND SEMI-COMMERCIAL TRIAL ANALYSIS

ENTRY			% SUGAR		LTM		RECOV. SUG/TON		TONS/ACRE		RSA		% TARE	
			MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean
1	Betaseed	M813	14.35	103.43	1.30	98.14	261.14	103.98	19.78	92.30	5191.61	96.43	2.55	73.13
2	Seedex	1021	13.72	98.85	1.32	100.16	247.90	98.71	22.12	103.23	5575.61	103.56	3.52	100.96
3	Hilleshog	7147Rz	13.40	96.54	1.35	102.02	240.99	95.96	22.13	103.26	5365.21	99.65	3.49	100.00
4	Betaseed	BM0901	14.02	101.04	1.31	99.53	254.14	101.20	26.01	121.41	6598.46	122.56	2.55	73.06
5	Hilleshog	7083	13.90	100.17	1.32	99.84	251.65	100.20	17.62	82.25	4448.27	82.62	3.34	95.71
6	Crystal	956	14.49	104.43	1.28	97.03	264.21	105.21	20.31	94.80	5414.46	100.57	2.24	64.15
7	Beta	4600	14.00	100.88	1.31	99.57	253.68	101.01	20.56	95.96	5230.67	97.15	3.22	92.49
8	Seedex	1022	13.47	97.08	1.34	101.61	242.62	96.61	20.97	97.85	5142.00	95.51	4.82	138.28
9	Hilleshog	7073	13.89	100.12	1.32	100.06	251.47	100.13	21.46	100.15	5388.82	100.09	3.90	111.87
10	Hilleshog	7145Rz	14.00	100.86	1.31	99.38	253.69	101.01	23.12	107.88	5852.74	108.71	4.01	115.06
11	Seedex	1025	14.06	101.30	1.31	99.42	254.88	101.49	19.51	91.04	4962.23	92.17	3.70	106.15
12	Crystal	R932	13.40	96.57	1.34	101.86	241.14	96.02	24.36	113.70	5897.82	109.54	3.37	96.67
13	Vanderhave	H68242	13.65	98.33	1.34	101.33	246.17	98.02	21.80	101.75	5392.83	100.17	3.64	104.38
14	Beta	3945	13.95	100.52	1.32	100.08	252.55	100.56	20.35	94.95	5156.24	95.77	3.93	112.85
15	Hilleshog	7148Rz	13.93	100.38	1.32	99.90	252.23	100.44	20.73	96.73	5214.28	96.85	4.05	116.29
16	Hilleshog	7146Rz	13.90	100.18	1.32	99.95	251.66	100.21	24.35	113.66	6137.63	114.00	3.37	96.74
17	Hilleshog	7114	13.83	99.66	1.33	100.85	249.98	99.54	19.51	91.03	4887.46	90.78	4.19	120.14
18	Betaseed	BM1032	13.50	97.26	1.34	101.57	243.14	96.81	23.95	111.75	5785.95	107.47	3.75	107.43
19	Hilleshog	7136	13.72	98.87	1.33	101.11	247.70	98.63	17.86	83.34	4425.49	82.20	4.05	116.08
20	Hilleshog	7111Rz	14.42	103.95	1.29	97.70	262.70	104.61	20.69	96.57	5393.62	100.18	3.40	97.40
21	Hilleshog	7149Rz	13.06	94.12	1.36	102.84	234.08	93.21	20.95	97.75	4903.33	91.07	3.13	89.66
22	Seedex	1023	13.24	95.38	1.35	102.28	237.72	94.66	21.55	100.57	5101.29	94.75	3.91	112.18
23	Beta	4811	13.98	100.73	1.31	99.59	253.28	100.85	24.54	114.52	6204.08	115.23	2.66	76.18
24	Holly	01HX045	14.37	103.53	1.29	97.99	261.45	104.11	18.88	88.10	4966.66	92.25	3.81	109.34
25	Hilleshog	7135	13.99	100.80	1.32	99.83	253.39	100.90	19.81	92.44	5007.91	93.02	2.97	85.22
26	Vanderhave	H68243	14.11	101.67	1.30	98.89	256.08	101.97	23.36	109.02	5987.46	111.21	3.46	99.28
27	Crystal	R826	13.95	100.54	1.31	99.19	252.84	100.68	20.24	94.46	5149.23	95.64	2.72	78.04
28	Hilleshog	7108Rz	13.79	99.40	1.33	100.63	249.31	99.27	24.84	115.95	6183.74	114.86	3.65	104.83
29	Betaseed	BM1031	13.60	98.04	1.34	101.20	245.37	97.70	26.58	124.04	6540.13	121.47	3.57	102.46
30	Vanderhave	H46333	13.80	99.47	1.33	100.60	249.49	99.35	20.64	96.33	5130.66	95.30	3.18	91.29
31	Hilleshog	7143	14.63	105.40	1.27	96.31	267.11	106.36	20.99	97.96	5599.73	104.01	3.72	106.70
32	Hilleshog	7121Rz	14.05	101.24	1.31	99.29	254.77	101.45	20.52	95.79	5238.91	97.31	3.37	96.67
33	Betaseed	BX0934	13.82	99.62	1.32	100.27	250.02	99.55	21.40	99.88	5350.35	99.38	3.14	90.06
34	Holly	01HX046	14.03	101.08	1.31	99.46	254.27	101.25	20.88	97.47	5221.20	96.98	4.12	118.30
35	VanderHave	46109	14.26	102.77	1.30	98.44	259.22	103.22	20.79	97.01	5376.50	99.86	3.66	105.01
36	Seedex	1024	13.29	95.79	1.35	102.04	238.93	95.14	18.23	85.09	4399.26	81.71	3.34	95.95
		Trial Mean	13.88		1.32		251.14		21.43		5383.94		3.49	
		Coeff. Of Var. (%)	3.53		2.13		4.11		9.91		10.52		32.06	
		LSD (0.05)	0.49		0.03		10.30		2.14		571.75		1.08	
		ALPHA	0.05	*	0.05	*	0.05	*	0.05	*	0.05	*	0.05	*

Buffalo Lake/Fischer

2001 BUFFALO LAKE SEMI-COMMERCIAL TRIAL ANALYSIS

ENTRY			% SUGAR MEAN	% SUGAR % Test Mean	LTM MEAN	LTM % Test Mean	RECOV. SUG/TON MEAN	RECOV. SUG/TON % Test Mean	TONS/ACRE MEAN	TONS/ACRE % Test Mean	RSA MEAN	RSA % Test Mean	% TARE MEAN	% TARE % Test Mean
1	Betaseed	M813	15.19	101.73	1.24	99.48	279.07	101.96	25.06	112.51	6966.35	114.03	3.33	90.31
2	Seedex	1021	14.58	97.61	1.27	102.37	266.23	97.27	15.35	68.90	4067.49	66.58	4.18	113.25
3	Hilleshog	7147Rz	15.53	104.02	1.21	97.15	286.51	104.68	26.33	118.20	7550.80	123.60	3.44	93.18
4	Betaseed	BM0901	15.46	103.55	1.18	95.14	285.03	104.14	26.72	119.96	7592.99	124.29	4.33	117.42
5	Hilleshog	7083	14.93	99.99	1.25	100.52	273.55	99.94	22.40	100.57	6119.83	100.17	4.90	132.71
6	Crystal	956	14.91	99.86	1.23	99.16	273.58	99.96	20.04	89.97	5519.50	90.35	2.67	72.31
7	Beta	4600	15.00	100.47	1.24	99.80	275.33	100.59	23.88	107.23	6586.88	107.82	3.15	85.35
8	Seedex	1022	14.76	98.84	1.26	101.41	269.95	98.63	22.74	102.12	6135.22	100.43	6.13	166.20
9	Hilleshog	7073	15.01	100.49	1.24	99.88	275.83	100.78	23.02	103.37	6367.45	104.23	3.39	91.96
10	Hilleshog	7145Rz	15.36	102.88	1.20	96.42	282.44	103.19	24.02	107.85	6792.64	111.19	5.17	140.28
11	Seedex	1025	15.89	106.41	1.16	93.45	294.09	107.45	22.60	101.46	6612.66	108.24	4.63	125.61
12	Crystal	R932	14.73	98.61	1.26	101.41	269.07	98.31	25.81	115.89	6943.90	113.66	3.43	93.08
13	Vanderhave	H68242	14.78	99.00	1.26	101.17	270.40	98.79	23.75	106.63	6417.72	105.05	2.49	67.54
14	Beta	3945	15.51	103.84	1.21	96.99	285.96	104.48	20.61	92.54	5906.87	96.69	3.71	100.48
15	Hilleshog	7148Rz	15.46	103.54	1.22	97.71	284.75	104.04	23.09	103.66	6556.79	107.33	3.58	97.12
16	Hilleshog	7146Rz	15.28	102.33	1.22	97.87	281.32	102.78	26.98	121.16	7642.52	125.10	2.99	81.07
17	Hilleshog	7114	14.44	96.72	1.27	101.73	263.19	96.16	18.15	81.50	4778.88	78.22	3.85	104.25
18	Betaseed	BM1032	14.13	94.65	1.30	104.63	256.85	93.85	23.20	104.18	6008.13	98.35	3.21	87.11
19	Hilleshog	7136	14.65	98.12	1.27	102.37	267.42	97.71	14.24	63.92	3792.63	62.08	3.22	87.33
20	Hilleshog	7111Rz	15.12	101.28	1.23	98.92	277.53	101.40	21.10	94.75	5930.50	97.07	2.76	74.72
21	Hilleshog	7149Rz	14.16	94.85	1.32	105.75	257.13	93.95	25.35	113.82	6576.16	107.64	3.42	92.64
22	Seedex	1023	14.74	98.70	1.27	102.37	269.47	98.46	20.32	91.24	5461.14	89.39	4.69	127.10
23	Beta	4811	14.61	97.86	1.26	101.49	266.85	97.50	25.75	115.62	6862.89	112.34	3.02	81.96
24	Holly	01HX045	16.26	108.87	1.15	92.24	302.15	110.40	24.15	108.43	7288.77	119.31	3.52	95.35
25	Hilleshog	7135	14.12	94.58	1.31	105.27	256.52	93.72	12.58	56.50	3247.50	53.16	3.38	91.61
26	Vanderhave	H68243	14.72	98.57	1.25	100.52	269.11	98.32	21.49	96.51	5815.48	95.19	2.86	77.62
27	Crystal	R826	15.19	101.71	1.23	98.76	278.93	101.91	24.90	111.80	6859.47	112.28	3.94	106.79
28	Hilleshog	7108Rz	14.89	99.72	1.25	100.36	272.51	99.57	21.03	94.41	5757.04	94.24	3.12	84.62
29	Betaseed	BM1031	14.90	99.81	1.25	100.69	273.46	99.91	28.19	126.58	7676.62	125.66	4.64	125.88
30	Vanderhave	H46333	14.65	98.11	1.25	100.12	267.63	97.78	25.29	113.53	6770.76	110.83	2.67	72.25
31	Hilleshog	7143	15.12	101.24	1.23	98.76	277.66	101.45	15.58	69.95	4305.85	70.48	4.42	119.94
32	Hilleshog	7121Rz	14.96	100.16	1.27	101.89	274.11	100.15	23.95	107.52	6578.94	107.69	2.99	80.93
33	Betaseed	BX0934	14.39	96.35	1.28	102.62	262.29	95.83	27.39	122.97	7220.11	118.18	3.82	103.43
34	Holly	01HX046	14.88	99.62	1.23	98.59	272.35	99.51	19.12	85.84	5151.04	84.32	3.55	96.11
35	VanderHave	46109	14.61	97.82	1.26	101.17	266.98	97.55	19.22	86.31	5143.68	84.20	4.17	113.08
36	Seedex	1024	14.65	98.08	1.27	101.81	267.92	97.89	18.40	82.61	4926.95	80.65	4.04	109.40
		Trial Mean	14.93		1.24		273.70		22.27		6109.23		3.69	
		Coeff. Of Var. (%)	4.06		3.79		4.76		15.93		16.49		41.02	
		LSD (0.05)	0.60		0.05		12.89		3.47		982.89		1.49	
		ALPHA	0.05 *		0.05 *		0.05 *		0.05 *		0.05 *		0.05 *	

Clara City East/Schwitters

2001 CLARA CITY EAST SEMI-COMMERCIAL TRIAL ANALYSIS

ENTRY			% SUGAR		LTM		RECOV. SUG/TON		TONS/ACRE		RSA		% TARE	
			MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean
1	Betaseed	M813	15.41	101.70	1.20	97.95	284.69	102.35	21.35	99.23	6161.03	102.91	2.72	81.72
2	Seedex	1021	14.89	98.27	1.24	100.73	276.44	99.38	22.03	102.41	6094.44	101.80	3.05	91.72
3	Hilleshog	7147Rz	15.37	101.43	1.21	98.41	284.16	102.16	26.99	125.43	7672.96	128.17	3.68	110.52
4	Betaseed	BM0901	15.42	101.76	1.20	97.78	286.00	102.82	26.18	121.70	7496.58	125.22	2.96	89.00
5	Hilleshog	7083	15.23	100.51	1.23	99.70	279.33	100.42	21.23	98.67	5939.33	99.21	2.93	87.99
6	Crystal	956	15.85	104.60	1.17	95.18	294.07	105.72	22.53	104.72	6607.35	110.37	3.09	92.80
7	Beta	4600	15.73	103.81	1.18	96.04	291.05	104.64	23.87	110.97	6994.58	116.84	3.52	105.72
8	Seedex	1022	15.23	100.51	1.23	100.10	276.58	99.44	19.12	88.85	5238.28	87.50	4.12	124.03
9	Hilleshog	7073	14.97	98.79	1.25	101.57	274.27	98.61	21.26	98.83	5817.50	97.18	3.24	97.48
10	Hilleshog	7145Rz	15.69	103.55	1.20	97.43	285.22	102.54	21.60	100.38	6140.05	102.56	3.53	106.11
11	Seedex	1025	15.88	104.80	1.19	96.84	288.78	103.82	20.78	96.58	6036.69	100.84	3.64	109.47
12	Crystal	R932	14.92	98.46	1.24	100.50	275.86	99.18	20.71	96.25	5699.81	95.21	3.33	100.03
13	Vanderhave	H68242	14.42	95.16	1.30	105.56	257.98	92.75	23.76	110.45	6173.57	103.12	3.24	97.56
14	Beta	3945	15.50	102.29	1.21	98.65	282.76	101.66	18.14	84.33	5114.37	85.43	2.56	77.04
15	Hilleshog	7148Rz	15.56	102.69	1.20	97.52	286.73	103.09	21.05	97.83	6018.50	100.53	3.14	94.39
16	Hilleshog	7146Rz	15.66	103.35	1.19	96.44	290.28	104.36	25.45	118.28	7331.35	122.46	2.50	75.15
17	Hilleshog	7114	15.54	102.56	1.19	96.86	288.20	103.61	20.61	95.78	5918.14	98.86	3.64	109.51
18	Betaseed	BM1032	14.43	95.23	1.28	104.02	265.27	95.37	21.03	97.74	5574.27	93.11	3.51	105.47
19	Hilleshog	7136	14.60	96.35	1.28	104.42	263.92	94.89	19.38	90.09	5148.73	86.00	3.44	103.52
20	Hilleshog	7111Rz	14.97	98.79	1.24	101.06	275.78	99.15	20.04	93.16	5471.92	91.40	2.25	67.58
21	Hilleshog	7149Rz	14.13	93.25	1.30	105.82	256.70	92.29	22.77	105.83	5882.97	98.27	4.02	120.83
22	Seedex	1023	14.92	98.46	1.26	102.30	270.82	97.36	20.46	95.09	5532.41	92.41	3.94	118.63
23	Beta	4811	14.64	96.62	1.27	103.05	268.59	96.56	20.53	95.44	5482.39	91.58	2.81	84.40
24	Holly	01HX045	15.65	103.28	1.19	96.46	289.32	104.02	20.44	95.00	5911.05	98.74	3.41	102.44
25	Hilleshog	7135	15.41	101.70	1.21	98.24	284.53	102.29	19.33	89.85	5498.17	91.84	3.79	113.85
26	Vanderhave	H68243	14.58	96.22	1.28	103.90	265.72	95.53	23.14	107.53	6102.44	101.94	4.38	131.79
27	Crystal	R826	15.16	100.05	1.22	99.09	280.85	100.97	20.87	96.99	5888.51	98.36	3.85	115.87
28	Hilleshog	7108Rz	14.94	98.60	1.25	101.76	272.55	97.99	24.29	112.90	6639.97	110.91	2.12	63.72
29	Betaseed	BM1031	14.31	94.44	1.29	104.87	261.88	94.15	25.82	120.00	6788.19	113.39	3.40	102.38
30	Vanderhave	H46333	15.03	99.19	1.24	101.20	274.73	98.77	20.22	93.97	5572.64	93.09	2.73	82.23
31	Hilleshog	7143	16.06	105.99	1.16	94.14	296.91	106.75	21.52	100.02	6391.85	106.77	2.90	87.25
32	Hilleshog	7121Rz	14.72	97.14	1.27	102.96	269.40	96.85	18.85	87.62	5083.34	84.91	4.27	128.31
33	Betaseed	BX0934	14.88	98.20	1.27	103.63	265.35	95.40	17.66	82.10	4692.80	78.39	3.20	96.10
34	Holly	01HX046	15.58	102.82	1.18	96.23	290.86	104.57	19.12	88.86	5553.11	92.76	2.99	89.85
35	VanderHave	46109	15.76	104.01	1.17	94.83	295.77	106.34	22.31	103.69	6636.22	110.85	4.88	146.88
36	Seedex	1024	14.46	95.43	1.29	104.78	262.03	94.20	20.10	93.43	5211.22	87.05	2.95	88.66
		Trial Mean	15.15		1.23		278.15		21.52		5986.58		3.33	
		Coeff. Of Var. (%)	4.16		3.59		4.34		13.08		12.95		35.16	
		LSD (0.05)	0.63		0.04		12.09		2.77		771.47		1.15	
		ALPHA	0.05	*	0.05	*	0.05	*	0.05	*	0.05	*	0.05	*

Clara City West/Condon

2001 CLARA CITY WEST SEMI-COMMERCIAL TRIAL ANALYSIS

ENTRY			% SUGAR MEAN	% SUGAR % Test Mean	LTM MEAN	LTM % Test Mean	RECOV. SUG/TON MEAN	RECOV. SUG/TON % Test Mean	TONS/ACRE MEAN	TONS/ACRE % Test Mean	RSA MEAN	RSA % Test Mean	% TARE MEAN	% TARE % Test Mean
1	Betaseed	M813	16.40	102.53	1.14	98.14	302.51	101.90	26.23	101.59	7947.19	103.89	1.82	85.15
2	Seedex	1021	16.23	101.47	1.13	97.51	304.58	102.60	23.99	92.92	7367.67	96.32	1.90	88.58
3	Hilleshog	7147Rz	16.30	101.91	1.15	99.21	299.79	100.99	29.78	115.32	8886.39	116.17	2.38	111.23
4	Betaseed	BM0901	15.81	98.84	1.17	100.99	293.56	98.89	24.81	96.08	7209.42	94.25	1.79	83.75
5	Hilleshog	7083	15.83	98.97	1.18	102.13	290.21	97.76	26.56	102.87	7724.41	100.98	2.17	101.42
6	Crystal	956	16.22	101.40	1.15	99.55	300.26	101.15	26.88	104.10	8000.80	104.59	2.01	93.87
7	Beta	4600	16.46	102.91	1.13	97.42	304.17	102.46	25.33	98.08	7695.84	100.61	2.28	106.48
8	Seedex	1022	15.31	95.72	1.22	104.96	282.12	95.03	24.22	93.78	6838.04	89.39	4.12	192.18
9	Hilleshog	7073	16.15	100.97	1.15	98.86	300.29	101.16	24.80	96.04	7379.99	96.48	1.72	80.48
10	Hilleshog	7145Rz	16.16	101.03	1.15	99.31	298.75	100.64	26.65	103.20	8029.04	104.96	2.13	99.47
11	Seedex	1025	16.88	105.53	1.08	93.35	316.78	106.71	26.16	101.30	8262.25	108.01	2.49	116.05
12	Crystal	R932	16.61	103.84	1.11	95.41	310.78	104.69	26.88	104.11	8304.06	108.56	1.85	86.16
13	Vanderhave	H68242	14.98	93.65	1.24	106.83	276.90	93.28	25.48	98.67	7065.13	92.36	1.98	92.39
14	Beta	3945	15.99	99.97	1.17	100.68	294.60	99.24	25.38	98.27	7493.44	97.96	2.10	98.07
15	Hilleshog	7148Rz	16.08	100.53	1.16	100.05	296.48	99.87	24.00	92.93	6999.80	91.51	2.06	96.28
16	Hilleshog	7146Rz	15.76	98.53	1.18	102.25	290.05	97.70	28.78	111.44	8304.06	108.56	1.93	90.21
17	Hilleshog	7114	15.91	99.47	1.15	99.63	297.39	100.18	27.36	105.94	8098.95	105.88	2.74	127.81
18	Betaseed	BM1032	15.37	96.09	1.21	104.76	282.54	95.17	28.02	108.51	7866.60	102.84	1.79	83.75
19	Hilleshog	7136	15.84	99.03	1.16	100.35	295.49	99.54	24.86	96.27	7348.92	96.07	1.83	85.23
20	Hilleshog	7111Rz	16.33	102.09	1.12	96.92	305.99	103.08	23.79	92.12	7275.99	95.12	2.06	96.36
21	Hilleshog	7149Rz	15.47	96.72	1.19	102.73	288.61	97.22	26.14	101.24	7415.02	96.93	2.02	94.34
22	Seedex	1023	15.56	97.28	1.19	102.69	288.15	97.06	24.39	94.46	7006.86	91.60	2.06	96.21
23	Beta	4811	15.22	95.15	1.21	104.65	282.81	95.27	25.88	100.22	7309.00	95.55	1.80	83.83
24	Holly	01HX045	16.56	103.53	1.11	95.71	309.39	104.22	25.97	100.58	8049.06	105.22	1.91	89.20
25	Hilleshog	7135	16.98	106.16	1.09	93.93	314.96	106.10	22.73	88.02	7131.91	93.23	1.44	67.33
26	Vanderhave	H68243	15.69	98.09	1.17	101.15	292.87	98.65	28.62	110.84	8354.95	109.22	2.38	110.92
27	Crystal	R826	16.53	103.34	1.11	95.69	308.84	104.03	27.19	105.29	8424.02	110.12	1.64	76.67
28	Hilleshog	7108Rz	15.76	98.53	1.18	102.01	290.76	97.95	27.34	105.87	7985.58	104.39	2.03	94.88
29	Betaseed	BM1031	15.64	97.78	1.18	101.98	290.24	97.77	26.49	102.57	7713.14	100.83	1.59	74.02
30	Vanderhave	H46333	14.76	92.28	1.25	107.49	273.92	92.27	27.29	105.69	7516.62	98.26	2.49	116.05
31	Hilleshog	7143	17.50	109.41	1.06	91.58	324.39	109.27	24.84	96.21	8095.77	105.83	2.17	101.34
32	Hilleshog	7121Rz	15.43	96.47	1.19	102.82	288.16	97.07	23.11	89.49	6652.53	86.97	2.03	94.65
33	Betaseed	BX0934	15.59	97.47	1.20	103.18	286.51	96.51	28.06	108.66	8132.90	106.32	3.27	152.87
34	Holly	01HX046	15.68	98.03	1.18	101.68	291.96	98.35	24.74	95.81	7160.99	93.61	2.45	114.34
35	VanderHave	46109	16.45	102.84	1.13	97.24	305.07	102.76	24.25	93.91	7376.39	96.43	2.74	127.88
36	Seedex	1024	16.39	102.47	1.13	97.13	307.12	103.46	22.61	87.57	6960.45	90.99	1.94	90.52
		Trial Mean	16.00		1.16		296.86		25.82		7649.53		2.14	
		Coeff. Of Var. (%)	4.49		4.76		4.87		9.73		11.08		55.01	
		LSD (0.05)	0.72		0.06		14.45		2.48		822.82		1.12	
		ALPHA	0.05	*	0.05	*	0.05	*	0.05	*	0.05	*	0.05	*

Gluek/L&N

2001 GLUEK SEMI-COMMERCIAL TRIAL ANALYSIS

ENTRY			% SUGAR		LTM		RECOV. SUG/TON		TONS/ACRE		RSA		% TARE	
			MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean
1	Betaseed	M813	16.53	101.09	1.12	98.70	308.28	101.27	24.58	107.49	7578.49	109.09	4.11	212.81
2	Seedex	1021	16.17	98.92	1.14	100.99	300.66	98.77	22.03	96.36	6615.24	95.22	2.52	130.35
3	Hilleshog	7147Rz	17.41	106.50	1.05	92.54	327.36	107.54	24.12	105.52	7886.26	113.52	1.42	73.28
4	Betaseed	BM0901	17.03	104.17	1.08	95.66	319.03	104.80	23.76	103.93	7549.81	108.68	1.59	82.04
5	Hilleshog	7083	16.36	100.07	1.13	99.71	304.70	100.09	22.06	96.49	6707.32	96.55	2.28	117.83
6	Crystal	956	16.56	101.29	1.11	98.52	308.97	101.49	22.21	97.16	6852.15	98.63	1.57	81.12
7	Beta	4600	16.97	103.81	1.08	95.51	317.90	104.43	23.62	103.31	7517.80	108.22	1.74	89.78
8	Seedex	1022	16.12	98.57	1.15	101.69	299.36	98.34	19.75	86.38	5888.42	84.76	2.61	135.17
9	Hilleshog	7073	16.45	100.58	1.12	99.07	306.51	100.69	21.79	95.33	6686.13	96.24	1.65	85.56
10	Hilleshog	7145Rz	16.37	100.11	1.13	99.64	304.86	100.15	21.98	96.14	6696.93	96.40	1.85	95.44
11	Seedex	1025	16.77	102.54	1.09	96.87	313.42	102.96	23.78	104.03	7448.78	107.22	2.19	113.20
12	Crystal	R932	16.98	103.83	1.08	95.52	317.95	104.45	24.04	105.13	7632.01	109.86	1.74	90.08
13	Vanderhave	H68242	15.49	94.74	1.20	106.27	285.79	93.88	21.44	93.76	6125.05	88.17	1.51	78.36
14	Beta	3945	16.56	101.29	1.12	99.41	308.77	101.43	19.78	86.51	6104.26	87.87	1.54	79.88
15	Hilleshog	7148Rz	16.48	100.79	1.12	98.80	307.28	100.94	19.89	87.02	6109.86	87.95	2.21	114.21
16	Hilleshog	7146Rz	16.27	99.53	1.13	100.37	302.80	99.47	25.37	110.96	7661.05	110.28	1.65	85.55
17	Hilleshog	7114	16.43	100.47	1.12	99.24	306.12	100.56	25.92	113.39	7941.38	114.31	1.54	79.68
18	Betaseed	BM1032	15.41	94.26	1.21	106.73	284.13	93.34	25.70	112.43	7283.04	104.84	1.97	101.80
19	Hilleshog	7136	16.08	98.31	1.15	101.77	298.50	98.06	23.37	102.21	6982.45	100.51	1.55	80.39
20	Hilleshog	7111Rz	16.90	103.33	1.08	95.90	316.24	103.89	20.45	89.45	6443.55	92.75	2.00	103.54
21	Hilleshog	7149Rz	15.50	94.77	1.20	106.43	285.85	93.90	25.43	111.23	7265.73	104.59	1.70	88.00
22	Seedex	1023	15.94	97.49	1.16	102.47	295.65	97.12	20.26	88.60	5963.45	85.84	2.15	111.28
23	Beta	4811	15.47	94.61	1.20	106.24	285.38	93.75	24.54	107.34	6986.28	100.56	1.85	95.89
24	Holly	01HX045	16.88	103.24	1.09	96.19	315.89	103.77	21.23	92.84	6720.96	96.75	2.33	120.49
25	Hilleshog	7135	16.29	99.65	1.13	100.25	303.23	99.61	21.45	93.83	6492.57	93.46	2.15	111.33
26	Vanderhave	H68243	16.14	98.71	1.15	101.49	299.87	98.51	23.10	101.02	6962.14	100.22	1.44	74.57
27	Crystal	R826	17.25	105.49	1.06	93.71	323.79	106.36	23.85	104.33	7717.66	111.09	1.79	92.39
28	Hilleshog	7108Rz	16.83	102.94	1.10	97.50	314.61	103.35	23.87	104.40	7486.42	107.76	1.60	82.52
29	Betaseed	BM1031	15.30	93.56	1.22	107.60	281.65	92.52	25.64	112.16	7196.02	103.58	1.88	97.32
30	Vanderhave	H46333	15.77	96.44	1.18	104.27	291.79	95.85	23.70	103.68	6898.34	99.30	1.66	85.64
31	Hilleshog	7143	16.99	103.93	1.08	95.25	318.35	104.58	22.00	96.21	7018.64	101.03	1.60	82.76
32	Hilleshog	7121Rz	16.10	98.47	1.15	101.84	299.00	98.22	25.35	110.90	7575.97	109.05	1.62	83.64
33	Betaseed	BX0934	16.23	99.26	1.14	100.84	301.80	99.14	24.46	106.98	7396.05	106.46	1.94	100.10
34	Holly	01HX046	16.52	101.02	1.12	98.68	308.05	101.19	21.37	93.48	6574.32	94.63	1.99	102.72
35	VanderHave	46109	15.97	97.66	1.16	102.45	296.20	97.30	22.16	96.92	6496.87	93.52	2.76	142.75
36	Seedex	1024	16.11	98.54	1.15	101.87	299.21	98.29	19.00	83.08	5632.10	81.07	1.90	98.52
		Trial Mean	16.35		1.13		304.42		22.86		6947.04		1.93	
		Coeff. Of Var. (%)	4.64		5.35		5.38		10.20		11.05		58.50	
		LSD (0.05)	0.74		0.06		16.05		2.30		753.52		1.12	
		ALPHA	0.05	*	0.05	*	0.05	*	0.05	*	0.05	*	0.05	*

Hector/Wehking

2001 HECTOR SEMI-COMMERCIAL TRIAL ANALYSIS

ENTRY			% SUGAR MEAN	% SUGAR % Test Mean	LTM MEAN	LTM % Test Mean	RECOV. SUG/TON MEAN	RECOV. SUG/TON % Test Mean	TONS/ACRE MEAN	TONS/ACRE % Test Mean	RSA MEAN	RSA % Test Mean	% TARE MEAN	% TARE % Test Mean
1	Betaseed	M813	15.37	102.56	1.21	97.61	283.29	103.00	24.02	98.17	6797.99	101.38	3.19	84.45
2	Seedex	1021	14.65	97.74	1.25	101.07	267.99	97.44	22.84	93.34	6037.50	90.03	4.08	108.19
3	Hilleshog	7147Rz	14.95	99.74	1.24	100.45	274.14	99.67	25.86	105.67	7016.95	104.64	3.18	84.19
4	Betaseed	BM0901	15.08	100.59	1.23	99.57	276.91	100.68	25.91	105.87	7191.02	107.24	3.69	97.76
5	Hilleshog	7083	15.09	100.64	1.23	99.30	277.12	100.76	24.15	98.70	6612.43	98.61	4.17	110.42
6	Crystal	956	15.15	101.05	1.22	98.70	278.49	101.26	22.94	93.76	6426.16	95.83	3.26	86.41
7	Beta	4600	15.49	103.30	1.20	96.71	285.75	103.89	26.16	106.91	7462.68	111.29	3.56	94.28
8	Seedex	1022	14.95	99.69	1.25	100.70	273.94	99.60	22.83	93.31	6162.57	91.90	5.09	134.95
9	Hilleshog	7073	14.78	98.56	1.26	101.80	270.27	98.27	23.05	94.20	6261.75	93.38	4.05	107.31
10	Hilleshog	7145Rz	15.25	101.74	1.22	98.53	280.61	102.03	26.15	106.87	7340.48	109.47	4.27	113.18
11	Seedex	1025	15.84	105.64	1.17	94.43	293.31	106.65	24.94	101.91	7312.66	109.05	3.83	101.37
12	Crystal	R932	14.91	99.45	1.25	100.73	273.21	99.34	26.29	107.44	7176.92	107.03	4.35	115.35
13	Vanderhave	H68242	14.76	98.48	1.26	101.95	269.99	98.17	23.19	94.78	6231.21	92.92	3.35	88.79
14	Beta	3945	15.43	102.92	1.20	97.20	284.50	103.44	26.13	106.77	7423.15	110.70	3.89	103.02
15	Hilleshog	7148Rz	14.97	99.88	1.24	100.45	274.57	99.83	25.62	104.69	6986.94	104.19	2.98	78.88
16	Hilleshog	7146Rz	15.40	102.72	1.21	97.71	283.75	103.17	26.32	107.55	7185.51	107.15	3.45	91.50
17	Hilleshog	7114	15.57	103.83	1.20	96.45	287.41	104.50	23.16	94.65	6655.75	99.25	4.48	118.61
18	Betaseed	BM1032	14.35	95.71	1.28	103.40	261.36	95.03	26.13	106.78	6815.60	101.64	4.02	106.65
19	Hilleshog	7136	15.04	100.35	1.23	99.48	276.22	100.43	23.65	96.64	6544.27	97.59	4.08	108.14
20	Hilleshog	7111Rz	14.74	98.36	1.26	101.73	269.70	98.06	21.07	86.09	5619.69	83.80	3.63	96.26
21	Hilleshog	7149Rz	14.34	95.65	1.29	103.81	261.05	94.91	26.55	108.50	6948.31	103.62	3.84	101.88
22	Seedex	1023	13.99	93.32	1.31	105.67	253.59	92.20	22.68	92.68	5782.00	86.22	4.49	118.99
23	Beta	4811	14.44	96.31	1.28	103.39	263.13	95.67	26.10	106.65	6833.65	101.91	3.69	97.69
24	Holly	01HX045	15.48	103.27	1.20	96.88	285.59	103.84	23.12	94.46	6566.27	97.92	3.25	86.12
25	Hilleshog	7135	15.16	101.14	1.23	99.16	278.65	101.32	22.69	92.73	6346.54	94.64	3.66	97.07
26	Vanderhave	H68243	14.05	93.74	1.31	105.89	254.81	92.65	25.38	103.73	6518.80	97.21	3.60	95.43
27	Crystal	R826	15.66	104.46	1.19	96.02	289.39	105.22	26.85	109.74	7732.77	115.32	4.11	108.85
28	Hilleshog	7108Rz	14.70	98.07	1.26	101.60	268.85	97.75	24.29	99.27	6550.17	97.68	4.10	108.78
29	Betaseed	BM1031	14.25	95.06	1.29	104.47	259.12	94.22	25.45	104.02	6550.70	97.69	3.37	89.30
30	Vanderhave	H46333	14.92	99.54	1.25	100.91	273.43	99.42	24.86	101.57	7145.41	106.56	3.05	80.71
31	Hilleshog	7143	15.88	105.91	1.17	94.17	294.21	106.97	23.87	97.54	7026.54	104.78	4.22	111.96
32	Hilleshog	7121Rz	14.75	98.40	1.26	102.00	269.74	98.07	26.01	106.29	6922.36	103.23	2.92	77.45
33	Betaseed	BX0934	14.76	98.46	1.26	101.34	270.07	98.20	25.25	103.17	6598.47	98.40	3.34	88.43
34	Holly	01HX046	15.44	103.00	1.20	97.14	284.73	103.53	22.75	92.96	6410.28	95.59	3.97	105.11
35	VanderHave	46109	15.20	101.36	1.22	98.77	279.43	101.60	23.77	97.12	6593.66	98.33	4.49	119.06
36	Seedex	1024	14.90	99.36	1.25	100.81	272.92	99.23	20.92	85.48	5619.70	83.80	3.15	83.49
		Trial Mean	14.99		1.24		275.03		24.47		6705.75		3.77	
		Coeff. Of Var. (%)	3.50		3.22		4.10		12.29		13.76		29.83	
		LSD (0.05)	0.52		0.04		11.27		3.01		912.39		1.09	
		ALPHA	0.05	*	0.05	*	0.05	*	0.05	*	0.05	*	0.05	*

Lake Lillian/Schmoll

2001 LAKE LILLIAN SEMI-COMMERCIAL TRIAL ANALYSIS

ENTRY			% SUGAR		LTM		RECOV. SUG/TON		TONS/ACRE		RSA		% TARE	
			MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean	MEAN	% Test Mean
1	Betaseed	M813	14.70	103.59	1.27	97.51	268.58	104.20	26.32	100.57	7053.80	104.69	2.69	65.30
2	Seedex	1021	14.52	102.33	1.28	98.43	264.77	102.72	23.08	88.20	6097.82	90.50	3.91	94.91
3	Hilleshog	7147Rz	14.31	100.86	1.30	99.65	260.31	100.99	31.92	121.96	8323.56	123.54	4.12	99.89
4	Betaseed	BM0901	14.20	100.10	1.30	100.06	258.04	100.11	29.98	114.55	7726.21	114.67	3.46	83.98
5	Hilleshog	7083	14.09	99.27	1.31	100.64	255.53	99.14	24.53	93.75	6279.13	93.19	4.78	115.93
6	Crystal	956	14.46	101.95	1.29	98.97	263.55	102.25	26.74	102.18	7029.65	104.33	2.90	70.40
7	Beta	4600	14.47	101.97	1.28	98.79	263.66	102.29	27.11	103.61	7129.86	105.82	4.52	109.67
8	Seedex	1022	13.85	97.60	1.33	102.19	250.38	97.14	25.58	97.76	6170.43	91.58	5.75	139.45
9	Hilleshog	7073	14.11	99.44	1.31	100.55	256.01	99.32	25.97	99.23	6676.97	99.10	5.11	123.92
10	Hilleshog	7145Rz	14.52	102.36	1.28	98.28	264.90	102.77	24.54	93.79	6512.12	96.65	3.74	90.80
11	Seedex	1025	14.87	104.81	1.25	96.18	272.40	105.68	26.17	100.01	7116.49	105.62	3.76	91.13
12	Crystal	R932	14.49	102.11	1.28	98.79	264.04	102.44	27.21	103.98	7176.65	106.51	4.10	99.58
13	Vanderhave	H68242	13.40	94.46	1.34	103.41	241.16	93.56	27.69	105.80	6686.38	99.24	2.85	69.20
14	Beta	3945	14.60	102.92	1.27	97.89	266.59	103.43	26.37	100.75	7024.20	104.25	3.82	92.64
15	Hilleshog	7148Rz	14.31	100.84	1.29	99.41	260.29	100.98	24.97	95.43	6496.52	96.42	3.76	91.22
16	Hilleshog	7146Rz	14.28	100.67	1.30	99.99	259.66	100.74	30.97	118.35	8050.84	119.49	3.93	95.43
17	Hilleshog	7114	14.37	101.28	1.29	99.31	261.58	101.48	26.36	100.71	6909.45	102.55	3.99	96.74
18	Betaseed	BM1032	13.19	92.99	1.36	104.66	236.66	91.81	23.02	87.97	5446.42	80.83	4.19	101.76
19	Hilleshog	7136	14.57	102.70	1.28	98.18	265.91	103.16	26.76	102.27	7100.56	105.38	4.07	98.87
20	Hilleshog	7111Rz	14.26	100.51	1.29	99.38	259.36	100.62	24.44	93.39	6363.31	94.44	2.83	68.58
21	Hilleshog	7149Rz	13.04	91.88	1.37	105.02	233.41	90.55	25.63	97.95	5985.30	88.83	6.05	146.95
22	Seedex	1023	13.56	95.54	1.34	102.71	244.40	94.82	24.06	91.94	5841.20	86.69	6.03	146.45
23	Beta	4811	13.36	94.15	1.35	103.66	240.21	93.19	27.79	106.19	6673.82	99.05	3.36	81.45
24	Holly	01HX045	14.97	105.51	1.25	95.86	274.45	106.48	25.51	97.50	6983.98	103.65	5.92	143.59
25	Hilleshog	7135	14.41	101.55	1.29	99.14	262.37	101.79	21.96	83.92	5795.98	86.02	3.26	79.19
26	Vanderhave	H68243	14.37	101.27	1.29	99.44	261.51	101.46	27.54	105.24	7216.30	107.10	3.60	87.48
27	Crystal	R826	14.72	103.72	1.26	97.20	269.04	104.38	25.87	98.87	6963.05	103.34	4.52	109.75
28	Hilleshog	7108Rz	14.03	98.89	1.31	100.75	254.42	98.70	25.96	99.22	6599.92	97.95	3.84	93.16
29	Betaseed	BM1031	13.38	94.32	1.34	103.39	240.77	93.41	28.79	110.00	6932.89	102.90	3.82	92.63
30	Vanderhave	H46333	13.86	97.70	1.33	101.94	250.72	97.27	27.23	104.06	6826.01	101.31	2.74	66.48
31	Hilleshog	7143	14.99	105.63	1.25	95.94	274.79	106.61	23.94	91.47	6585.75	97.74	3.53	85.62
32	Hilleshog	7121Rz	13.75	96.93	1.33	102.56	248.40	96.37	27.01	103.23	6704.91	99.51	4.31	104.63
33	Betaseed	BX0934	14.53	102.40	1.28	98.32	265.02	102.82	27.40	104.70	7266.83	107.85	4.67	113.34
34	Holly	01HX046	14.50	102.22	1.28	98.43	264.46	102.60	24.40	93.22	6433.47	95.48	4.63	112.33
35	VanderHave	46109	13.86	97.72	1.32	101.58	250.88	97.33	25.91	99.00	6525.56	96.85	5.62	136.50
36	Seedex	1024	13.88	97.81	1.32	101.77	251.08	97.41	23.35	89.22	5854.84	86.90	4.16	101.03
		Trial Mean	14.19		1.30		257.76		26.17		6737.78		4.12	
		Coeff. Of Var. (%)	3.84		2.70		4.49		9.32		10.36		31.85	
		LSD (0.05)	0.53		0.03		11.35		2.40		687.56		1.28	
		ALPHA	0.05	*	0.05	*	0.05	*	0.05	*	0.05	*	0.05	*

CERCOSPORA LEAF SPOT CONTROL IN EASTERN NORTH DAKOTA AND MINNESOTA IN 2001

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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 2001 test sites had known TPTH tolerance and benzimidazole resistance.

PROCEDURES:

Research was conducted at Crookston, Breckenridge, and Gluek, 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. 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 May because of wet field condition in April. All sites were affected by Cercospora leaf spot, but disease severity was low to moderate depending on location.

The fungicides tested in 2001 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, and 5.

Crookston:

Cercospora leaf spot severity was low during July and August, but increased rapidly in September. All the fungicide treatments, except Messenger applied alone, increased recoverable sucrose per acre, and all treatments significantly reduced the level of Cercospora leaf spot (**Table 3**). Of the labeled fungicides, Eminent (with a Section 18 label) in alternation with TPTH, Topsin M plus Penncozeb, and other registered fungicides and experimentals gave consistent control and high recoverable sucrose per acre. The experimental compound, BAS 500, also gave consistent control when applied alone or with the adjuvant AG 01005; and in a rotation program with Eminent, TPTH, and a tank-mix of Topsin and Penncozeb.

Breckenridge:

Cercospora leaf spot severity was low during the season with the untreated check plots having a KWS Cercospora leaf spot rating of 4.6 ten days before harvest (**Table 4**).

Of the labeled fungicides, Eminent alternating with TPTH, and Eminent alternating with TPTH and a tank-mix of Topsin and Penncozeb resulted in high recoverable sucrose per acre. The experimental compound, BAS 500, gave good control when applied with the adjuvant AG 01005; and in alternation with Eminent; and in a rotation program with Eminent, TPTH, and a tank-mix of Topsin and TPTH. There was some phytotoxicity with Stratego alternating with TPTH.

Southern Minnesota:

Gluek:

Cercospora leaf spot severity was low with the untreated check plots having a KWS Cercospora leaf spot rating of 4.3 at harvest (**Table 5**)

Of the labeled fungicides, Eminent alternating with TPTH, resulted in high recoverable sucrose per acre. The experimental compound, BAS 500, gave good control and resulted in high recoverable sugar per acre when applied in alternation with Eminent; in alternation with TPTH; and in a rotation program with Eminent and TPTH.
No phytotoxicity was observed.

SUMMARY AND CONCLUSIONS

The increase in recoverable sucrose yield and sucrose percent in the three trials listed cannot be explained solely on the basis of Cercospora leaf spot. At the Crookston location, consecutive days of wind (86 and 108 mph) caused severe leaf damage. The damage was the greatest on plots that received application on August 8, the day of the highest wind, as compared to the untreated check. At harvest, a visual vigor rating of the trial using a scale of 1 (least vigor) – 10 (most vigor) had the highest correlation with recoverable sucrose per acre ($r^2 = 0.92$). There was a significant correlation of this scale with the KWS scale. The difference observed in vigor cannot be explained at this time.

D. Other Comments [Please note that Eminent, and Bas 500 – to be called Headline – can only be used for the 2002 crop if they are granted registration by the EPA

1. 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.

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

3. Use Headline or Eminent as your first fungicide application.

4. The 5.0 oz/A TPTH rate should be used with an application interval of 14 days in all factory districts in Minnesota and North Dakota.

5. In the southern Minnesota, Minn-Dak, and Moorhead factory districts, the use of Headline, Eminent, and TPTH in an alternation program will effectively control Cercospora leaf spot.

6. In Hillsboro, East Grand Forks, Crookston, and Drayton factory districts, the use of Headline, Eminent, TPTH, or a tank-mix of Topsin and Penncozeb, in an alternation program will effectively control Cercospora leaf spot.

7. Only one application of a benzimidazole fungicide (Topsin M) in combination with a protectant fungicide (Penncozeb or TPTH) should be used in the Hillsboro, East Grand Forks, Crookston, and Drayton factory districts.

8. Never use the same fungicide or fungicides from the same class of chemistry or same mode of action ‘back-to-back’.

9. Alternate, alternate, alternate! Alternate different chemistry fungicides.

The following shows the experimental and registered fungicides and their class of chemistry:

Strobilurins	**Sterol Inhibitors**	**Ethylenebisdithiocarbamates (EBDC)**
Quadris	Eminent	Maneb
Gem (USF 2004)	RH-7592	Mancozeb
BAS 500	Stratego (**Tilt** + Flint)	Manzate
Stratego (**Flint** +Tilt)		Penncozeb

Benzimidazole	**Triphenyltin Hydroxide (TPTH)**
Topsin M	SuperTin
	AgriTin

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Table 1. Cultural Practices And Application Date Information For Cercospora Leaf Spot Trials In 2001

	Crookston	**Breckenridge**	**Gluek**
Planting Date	May 4	May 11	May 4
Previous Crop	Wheat	Wheat	Corn
Variety	HM Agate	HM Agate	Beta 4705
Weed Control	Betamix –micro-rate	Betamix –micro-rate	Betamix –micro-rate
	Betanex – m/rate	Betanex – m/rate	Betanex – m/rate
	Upbeet – m/rate	Upbeet – m/rate	Upbeet – m/rate
	Stinger – m/rate	Stinger – m/rate	Stinger – m/rate
	Poast – m/rate	Poast – m/rate	Poast – m/rate
	MSO – micro-rate	MSO – micro-rate	Oil – micro-rate
			Ammonia
	Hand labor	Hand labor	Hand labor
	Cultivation	Cultivation	Cultivation
Insecticide	Counter, Asana XL	Counter	None
Plant Population at Thinning	35,000 plant/A	35,000 plant/A	35,000 plant/A
Spray Application	**Crookston**	**Breckenridge**	**Gluek**
1st	July 26	July 25	July 18
2nd	August 8	August 6	August 2
3rd	August 16	August 14	August 8
4th	August 22	August 20	August 15
5th	August 30	August 28	
6th	September 7	September 4	
Spray Volume (gpa)	20	20	20
Spray Pressure (psi)	100	100	120
Harvest Date	October 2	September 24	October 4

Table 2. Fungicides tested in 2001.

Fungicides	**Status**
Penncozeb	Registered
Topsin M	Registered
Super Tin, Agritin, Triphenyltin hydroxide (TPTH)	Registered
Quadris	Registered
USF 2004	Experimental
Eminent	Section 18 granted for 2001
Stratego	Experimental
Messenger	Experimental
Armicarb 100	Experimental
Bas 500	Experimental
RH-7592	Experimental
DG 14161	Experimental

Table 3. Cercospora leaf spot control at Crookston in 2001 with registered and experimental fungicides.

Treatment and rate/A	App. Interval	CLS*	Recoverable Sucrose		Root Yield	Sucrose Content	LTM**
	(d)	1-Oct	(lb/A)	(lb/T)	(T/A)	(%)	(%)
BAS 500 2.09 EC 0.15 lb a.i + AG 01005 1% v/v……..	14	1.9	9529	359.5	26.5	19.2	1.2
BAS 500 2.09 EC 0.15 lb a.i / TPTH 80 WP 5 oz / Eminent 125 SL 13 fl oz……	14	2.4	9514	343	27.8	18.5	1.4
Topsin M 70 WSB 0.5 lb + Pennocozeb 75DF 2.0 lb / Eminent 125 SL 13 fl oz / TPTH 80 WP 5 oz / BAS 500 2.09 EC 0.15 lb a.i……..	14	2.5	9319	346	26.9	18.5	1.2
Eminent 125 SL 13 fl oz / BAS 500 2.09 EC 0.15 lb a.i..……	21	1.8	9219	342	27.0	18.4	1.3
Topsin M 70 WSB 0.375 lb + TPTH 80 WP 3.75 oz / Eminent 125 SL 13 fl oz / BAS 500 2.09 EC 0.15 lb a.i…..…….	14	2.5	9196	338	27.2	18.2	1.3
Eminent 125 SL 13 fl oz / TPTH 80 WP 3.75 oz / BAS 500 2.09 EC 0.15 lb a.i..……	14	2.3	9158	334	26.6	18.4	1.4
Eminent 125 SL 13 fl oz / Stratego 2.1 EC 10 fl oz……	14	2.6	9136	341	26.8	18.4	1.4
Eminent 125 SL 13 fl oz / BAS 500 2.09 EC 0.15 lb a.i..……..	14	2.1	9135	345	26.5	18.5	1.3
BAS 500 2.09 EC 0.15 lb a.i……..	14	2.1	9099	345	26.4	18.5	1.3
BAS 500 2.09 EC 0.15 lb a.i + Agridex COC 1% v/v……	14	2.1	9092	353	25.8	18.8	1.2
Eminent 125 SL 13 fl oz / Topsin M 70 WSB 0.375 lb + TPTH 80 WP 3.75 oz / TPTH 80 WP 5 oz……..…..……	14	2.9	9092	343	26.6	18.4	1.3
Eminent 125 SL 13 fl oz / TPTH 80 WP 5 oz……	14	2.8	9081	347	26.2	18.5	1.2
BAS 500 2.09 EC 0.15 lb a.i / TPTH 80 WP 5 oz..……	14	2.3	9072	348	26.1	18.6	1.2
Eminent 125 SL 13 fl oz / Topsin M 70 WSB 0.375 lb + TPTH 80 WP 3.75 oz / BAS 500 2.09 EC 0.15 lb a.i ..……..	21/14/21	2.3	9028	337	26.8	18.2	1.3
Eminent 125 SL 13 fl oz / Quadris 2.08 SC 0.15 lb a.i ..……	14	2.0	8941	345	25.9	18.5	1.3
BAS 500 2.09 EC 0.15 lb a.i……..	21	2.0	8926	341	26.2	18.3	1.3
BAS 500 2.09 EC 0.15 lb a.i / RH-7592 2F + Agridex COC 1% v/v	14	2.6	8878	336	26.4	18.1	1.3
Eminent 125 SL 13 fl oz / TPTH 80 WP 5 oz……	21/14	2.4	8841	336	26.4	18.2	1.4
BAS 500 2.09 EC 0.15 lb a.i / Eminent 125 SL 13 fl oz……	14	2.0	8797	338	26.0	18.2	1.3
DG 14161 0.2 lb a.i....……..…	14	4.0	8747	339	25.8	18.3	1.4
USF 2004 2.5 oz..……	14	3.6	8710	341	25.5	18.4	1.3
RH-7592 2F + Agridex COC 1% v/v……..……	14	3.4	8707	342	25.5	18.4	1.3
Eminent 125 SL 13 fl oz / Flint 50 WG 2 oz…….	14	2.9	8664	334	26.0	18.0	1.4
Topsin M 70 WSB 0.375 lb + TPTH 80 WP 3.75 oz / Eminent 125 SL 13 fl oz / BAS 510 F 0.15 lb a.i……	14/21/21	2.8	8660	335	25.8	18.1	1.3
Eminent 125 SL 13 fl oz / USF 2004 2 oz…….	14	2.3	8660	336	25.8	18.2	1.4
Stratego 2.1 EC 10 fl oz ……	14	2.5	8620	329	26.2	17.8	1.3
USF 2004 3 oz……	14	2.6	8538	339	25.1	18.3	1.3
Armicarb 100 5lb /100 gal……	7/7/7/14/ 14	4.0	8428	329	25.6	17.9	1.5
BAS 510F 0.15 lb a.i……..……	14	4.8	8394	341	24.6	18.4	1.3
Eminent 125 SL 13 fl oz / BAS 500 2.09 EC 0.15 lb a.i / TPTH 80 WP 5 oz……	14	2.3	8337	325	25.7	17.7	1.4
Messenger 4.5 oz./ Messenger 4.5 oz + TPTH 80 WP 5 oz……..	14	4.5	8326	321	25.9	17.6	1.5
BAS 510F 0.25lb a.i……	14	5.0	8256	326	25.3	17.7	1.4
Quadris 2.08 SC 0.15 lb a.i / TPTH 80 WP 5 oz…….	14	2.6	8159	329	24.9	17.8	1.4
Messenger 4.5 oz…….	14	4.9	7860	332	23.7	17.9	1.3
Untreated Check		6.1	7357	322	23.2	17.4	1.5
LSD (P=0.05)		0.76	732	18.3	1.7	.81	.18
CV%		18.39	5.96	3.9	4.8	3.2	10.2

*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 2001 with registered and experimental fungicides.

Treatment and rate/A	App. Interval	CLS*	Recoverable Sucrose		Root Yield	Sucrose Content	LTM**
	(d)	11-Sep	(lb/A)	(lb/T)	(T/A)	(%)	(%)
BAS 500 2.09 EC 0.15 lb a.i + AG 01005 1% v/v……..	14	1.8	7441	316	23.9	17.1	1.4
Eminent 125 SL 13 fl oz / BAS 500 2.09 EC 0.15 lb a.i……..	14	1.3	7215	316	23.1	17.1	1.3
Eminent 125 SL 13 fl oz (App 1) /	21	1.5	7081	300	23.9	16.5	1.5
Topsin M 70 WSB 0.375 lb + TPTH 80 WP 3.75 oz (App 2) /	14						
BAS 500 2.09 EC 0.15 lb a.i (App 3)	21						
BAS 500 2.09 EC 0.15 lb a.i / Eminent 125 SL 13 fl oz..……..	14	1.3	6669	327	20.6	17.7	1.4
BAS 500 2.09 EC 0.15 lb a.i (App 1, 4) / TPTH 80 WP 5 oz (App 2) / Eminent 125 SL 13 fl oz (App 3)……..	14	1.1	6392	319	20.2	17.3	1.4
Stratego 2.1 EC 10 fl oz……..	14	1.5	6383	306	21.1	16.7	1.4
DG 14161 250 SC 0.2 lb a.i……	14	2.1	6280	302	21	16.6	1.5
BAS 500 2.09 EC 0.15 lb a.i……..	21	2.0	6263	303	21.1	16.6	1.4
BAS 500 2.09 EC 0.15 lb a.i + Agridex COC 1% v/v……	14	1.3	6259	300	21.1	16.5	1.5
Eminent 125 SL 13 fl oz (App 1,4) / TPTH 80 WP 5 oz (App 2) /	14	1.1	6250	300	21	16.5	1.5
BAS 500 2.09 EC 0.15 lb a.i (App 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	1.3	6243	322	19.6	17.5	1.4
Quadris 2.08 SC 0.15 lb a.i (App 1,3) / TPTH 80 WP 5 oz (App 2,4)	14	1.6	6235	305	20.5	16.6	1.4
Eminent 125 SL 13 fl oz / USF 2004 3 oz…….	14	1.4	6219	300	20.8	16.5	1.5
BAS 500 2.09 EC 0.15 lb a.i……..	14	1.3	6185	309	20.3	16.9	1.4
Eminent 125 SL 13 fl oz / BAS 500 2.09 EC 0.15 lb a.i……	21	1.3	6154	310	20.1	17.0	1.5
Eminent 125 SL 13 fl oz / TPTH 80 WP 5 oz……	21/14	1.4	6150	311	19.9	17.0	1.4
RH 7592- 2F+ Agridex COC 1% v/v…….	14	2.0	6118	310	19.9	16.9	1.4
BAS 500 2.09 EC 0.15 lb a.i /RH-7592 2F+Agridex COC 1% v/v…	14	1.3	6084	306	20.0	16.7	1.4
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	1.2	6042	311	19.6	17.0	1.4
Eminent 125 SL 13 fl oz / TPTH 80 WP 5 oz……	14	1.2	6037	294	20.9	16.1	1.4
BAS 500 2.09 EC 0.15 lb a.i / TPTH 80 WP 5 oz	14	1.6	5949	301	20.0	16.5	1.5
Topsin M 70 WSB 0.375 lb + TPTH 80 WP 3.75 oz (App 1) / Eminent 125 SL 13 fl oz (App 2) / BAS 500 2.09 EC 0.15 lb a.i (App 3) ..……	14/21/21	1.8	5839	308	19.1	16.9	1.5
BAS 510 F 0.25 lb a.i……...	14	3.4	5790	287	20.1	15.9	1.6
Topsin M 70 WSB 0.5 lb + Pennocozeb 75DF 2.0 lb (App 1)/ Eminent 125 SL 13 fl oz (App 2) / TPTH 80 WP 5 oz (App 3) / BAS 500 2.09 EC 0.15 lb a.i (App 4)…….	14	1.3	5752	300	19.2	16.5	1.5
BAS 510 F 0.15 lb a.i……..	14	3.6	5569	298	18.9	16.4	1.5
USF 2004 3 oz……	14	1.2	5541	304	18.4	16.6	1.4
Stratego 2.1 EC 10 fl oz / TPTH 80 WP 5 oz……	14	1.1	5523	311	17.9	17.1	1.5
Topsin M 70 WSB 0.375 lb + Pennocozeb 75DF 2.0 lb (App 1)/ Eminent 125 SL 13 fl oz (App 2) / TPTH 80 WP 5 oz (App 3) / BAS 500 2.09 EC 0.15 lb a.i (App 4)…….	14	1.3	5473	299	18.4	16.4	1.4
Untreated Check……..		4.6	4680	309	15.3	16.9	1.4
LSD (P=0.05)		0.7	1246	27.4	3.7	1.2	0.2
CV%		29.4	14.55	6.4	13.2	5.3	9.2

*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 Gluek in 2001 with registered and experimental fungicides.

Treatment and rate/A	App. Interval	CLS*	Recoverable Sucrose		Root Yield	Sucrose Content	LTM**
	(d)	14-Sep	(lb/A)	(lb/T)	(T/A)	(%)	(%)
Eminent 125 SL 13 fl oz / BAS 500 2.09 EC 0.15 lb a.i …	21	1.5	6287	320.	19.6	17.1	1.1
BAS 500 2.09 EC 0.15 lb a.i / TPTH 80 WP 5 oz……	14	1.5	6083	320	19.0	17.1	1.1
BAS 510F 0.25lb a.i……	14	1.5	6066	314	19.4	16.8	1.1
Eminent 125 SL 13 fl oz / BAS 500 2.09 EC 0.15 lb a.i / TPTH 80 WP 5 oz……	14	1.5	6060	296	20.4	16.0	1.2
BAS 500 2.09 EC 0.15 lb a.i / TPTH 80 WP 5 oz……	14	1.5	6013	321	18.7	17.1	1.0
Eminent 125 SL 13 fl oz / TPTH 80 WP 5 oz / BAS 500 2.09 EC 0.15 lb a.i……	14	1.7	6012	312	19.2	16.7	1.1
BAS 500 2.09 EC 0.15 lb..……	14	1.3	5977	315	19.0	16.8	1.1
Eminent 125 SL 13 fl oz / TPTH 80 WP 3.75 oz……	14	1.3	5957	306	19.6	16.4	1.1
BAS 500 2.09 EC 0.15 lb a.i + Agridex COC 1% v/v……	14	1.3	5900	302	19.4	16.2	1.1
Eminent 125 SL 13 fl oz……	21	1.5	5899	324	18.3	17.2	1.1
BAS 500 2.09 EC 0.15 lb a.i……	21	1.2	5857	324	18.2	17.3	1.1
Eminent 125 SL 9 fl oz / TPTH 80 WP 3.75 oz / Eminent 125 SL 13 fl oz……	14	1.3	5833	311	18.9	16.7	1.1
Eminent 125 SL 13 fl oz / TPTH 80 WP 5 oz……	14	1.3	5744	314	18.4	16.8	1.1
BAS 510 F 0.15 lb a.i……	14	1.5	5736	321	17.9	17.1	1.1
Eminent 125 SL 13 fl oz / TPTH 80 WP 5 oz……..	21/14	1.5	5716	304	18.9	16.3	1.1
BAS 500 2.09 EC 0.15 lb a.i + AG 01005 1% v/v……	14	1.5	5679	313	18.2	16.8	1.1
Eminent 125 SL 13 fl oz / USF 2004 3 oz……	14	1.3	5665	310	18.4	16.6	1.1
BAS 500 2.09 EC 0.15 lb a.i / Eminent 125 SL 13 fl oz…	14	1.8	5651	312	18.1	16.7	1.1
Eminent 125 SL 13 fl oz / Topsin M 70 WSB 0.375 lb + TPTH 80 WP 3.75 oz / BAS 500 2.09 EC 0.15 lb a.i……	21/14/21	1.5	5632	307	18.4	16.5	1.1
Eminent 125 SL 13 fl oz / BAS 500 2.09 EC 0.15 lb a.i….	14	1.7	5598	326	17.3	17.3	1.1
RH-7592 2F + Agridex COC 1% v/v……	14	3.5	5545	302	18.3	16.3	1.1
Eminent 125 SL 13 fl oz / Topsin M 70 WSB 0.5 lb + Penncozeb 75DF 2 lb/ TPTH 80 WP 3.75 oz……	14	1.2	5519	317	17.4	16.9	1.1
Eminent 125 SL 13 fl oz / BAS 500 2.09 EC 0.15 lb a.i…	14	1.3	5177	310	16.7	16.6	1.1
BAS 500 2.09 EC 0.15 lb a.i / RH-7592 2F + Agridex COC 1% v/v……	14	1.5	5057	305	16.5	16.4	1.1
Stratego 2.1 EC 10 fl oz……	14	3.3	4886	287	17.0	15.6	1.1
USF 2004 2.5 oz……..…….	14	3	4612	294	15.7	15.9	1.1
Untreated Check……..		4.3	4413	281	15.6	15.3	1.1
Quadris 2.08 SC 0.15 lb a.i / TPTH 80 WP 5 oz……	14	3.3	4306	283	15.2	15.4	1.1
LSD (P=0.05)		0.63	943	21.23	3.0	0.98	NS

[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

2001 CERCOSPORA LEAF SPOT

	CLARA CITY				OLIVIA				RENVILLE			
DATE	**# HRS**	**> 87% RH**	**CLS**	**2 DAY**	**# HRS**	**> 87% RH**	**CLS**	**2 DAY**	**# HRS**	**> 87% RH**	**CLS**	**2 DAY**
7/11/01	9	56	0		18	69	4		8	56	0	
7/12/01	1	65	0	0	15	68	4	8	1	65	0	0
7/13/01	8	57	0	0	12	68	3	7	8	58	0	0
7/14/01	9	63	2	2	13	67	3	6	8	63	1	1
7/15/01	11	68	3	5	12	67	3	6	6	68	1	2
7/16/01	17	69	4	7	16	70	4	7	12	68	3	4
7/17/01	13	73	4	8	12	59	4	8	12	73	4	7
7/18/01	11	71	3	7	24	55	3	7	11	73	3	7
7/19/01	16	73	4	7	NOT AVAILABLE			3	16	75	5	8
7/20/01	20	74	6	10	13	59	0	0	21	74	6	11
7/21/01	16	71	4	10	12	52	0	0	17	72	5	11
7/22/01	14	73	4	8	11	53	0	0	16	74	4	9
7/23/01	16	72	4	8	11	57	4	4	17	73	5	9
7/24/01	20	65	5	9	17	66	4	8	22	66	6	11
7/25/01	13	60	0	5	16	67	4	8	14	61	0	6
7/26/01	14	62	1	1	15	65	4	8	15	63	3	3
7/27/01	24	66	6	7	13	65	3	7	24	66	6	9
7/28/01	17	66	4	10	13	65	3	6	19	67	5	11
7/29/01	17	69	4	8	16	65	4	7	16	68	4	9
7/30/01	19	78	7	11	14	64	7	11	19	79	7	11
7/31/01	15	80	7	14	11	64	7	14	11	80	7	14
8/1/01	16	75	5	12	12	68	3	10	17	77	6	13
8/2/01	13	65	3	8	11	60	3	6	16	67	4	10
8/3/01	14	69	3	6	13	60	0	3	15	70	4	8
8/4/01	15	75	4	7	14	67	3	3	16	76	5	9
8/5/01	13	76	4	8	17	70	4	7	13	78	6	11
8/6/01	12	74	4	8	15	65	4	8	15	78	6	12
8/7/01	13	70	3	7	14	64	3	7	14	73	4	10
8/8/01	13	73	4	7	19	69	5	8	12	74	4	8
8/9/01	12	67	3	7	13	63	3	8	13	69	3	7
8/10/01	13	52	0	3	14	65	0	3	12	52	0	3

2001 CERCOSPORA LEAF SPOT

	CLARA CITY				OLIVIA				RENVILLE			
DATE	# HRS	> 87% RH	CLS	2 DAY	# HRS	> 87% RH	CLS	2 DAY	# HRS	> 87% RH	CLS	2 DAY
8/11/01	17	58	0	0	13	68	0	0	13	57	0	0
8/12/01	13	60	0	0	15	75	0	0	12	62	0	0
8/13/01	12	51	0	0	14	67	0	0	12	51	0	0
8/14/01	16	60	0	0	14	69	0	0	14	61	0	0
8/15/01	16	64	4	4	13	65	3	3	20	66	5	5
8/16/01	13	58	0	4	17	57	0	3	15	59	0	5
8/17/01	16	56	0	0	21	61	4	4	14	56	0	0
8/18/01	16	57	0	0	14	56	0	4	15	58	0	0
8/19/01	14	57	0	0	16	59	0	0	15	58	0	0
8/20/01	14	60	0	0	15	64	0	0	14	59	0	0
8/21/01	15	65	4	4	20	67	5	5	21	67	5	5
8/22/01	15	69	4	8	18	63	3	8	18	71	5	10
8/23/01	11	65	3	7	15	63	3	6	12	67	3	8
8/24/01	18	68	4	7	14	62	1	4	19	69	5	8
8/25/01	14	65	3	7	22	71	6	7	15	67	4	9
8/26/01	17	63	3	6	11	70	3	9	18	65	4	8
8/27/01	14	59	0	3	14	65	0	3	13	61	0	4
8/28/01	14	57	0	0	22	69	0	0	13	57	0	0
8/29/01	17	64	4	4	13	55	0	0	15	64	4	4
8/30/01	15	60	0	4	18	68	4	4	13	62	0	4
8/31/01	14	53	0	0	23	69	0	4	14	55	0	0
9/1/01	15	57	0	0	24	61	0	0	15	58	0	0
9/2/01	14	63	3	3	24	65	0	0	13	65	3	3
9/3/01	12	57	0	3	20	65	0	0	13	60	0	3
9/4/01	10	50	0	0	15	57	0	0	10	51	0	0

Tachigaren influence over time on Aphanomyces cochlioides presence in soil and the effect on sugar beet yield and sugar production

Objective:

1. Study the influence of Aphanomyces cochlioides innoculumn over time (proposed 3+ years) in soil subjected to consecutive sugar beet production with 3 different levels of Tachigaren.
2. Investigate the influence of Tachigaren at 0, 45, and 75 grams per unit of seed (100,000 seeds) on yield and quality differences in soil subjected to consecutive years (3+) of sugar beet production.

Experimental procedure:

The experiment was established in the spring of 2000 to determine the influence of Tachigaren on the presence of Aphanomyces cochlioides and sugar beet yield. Experimental design was a randomized complete block design with 4 replications. Experimental units were 44 ft wide and 30 ft long, with sugar beets planted in 22-inch wide rows at 4-inch spacing. Soil barriers (fence) were installed after planting was conducted, removed prior to harvest and reinstalled after harvest to prevent movement of soil across experimental units. Treatments 0, 45, and 75 grams of Tachigaren 70WP per unit (100,00 seed) were applied to seed pelleted to a regular size (9.5-11.5/64 Diam.). Herbicides were applied with small plot equipment to avoid disruption of soil barriers (fence) and fungicides for cercospora leaf spot control were applied with aerial application. Sugar beet stands were collected at

Results and Discussion

Root Rot Index

Presence of Aphanomyces cochlioides in the soil tested was indexed by the plant disease clinic at the University of Minnesota – Crookston (table 1). The initial disease index for Aphanomyces cochlioides indicated very low levels or no presence of the fungal disease in the soils tested at both locations. Soil index after one year of sugar beet production increase to high levels at the Buffalo Lake, Mn location and remained low at the Gluek, Mn site in the presence or absence of Tachigaren on the seed. The root rot index for Aphanomyces (RRI), although non-significant statistically, showed higher levels at the lower rates of Tachigaren. Sugar beets with no Tachigaren at the Buffalo Lake site gave a RRI 12.37 % higher than seed treated at the 75-gram rate. The treatment with the highest RRI at the Gluek site was 4% with the 0-gram Tachigaren treatment.

The high RRI at the Buffalo Lake site (Table 1.) after one year of testing indicates a low level of Aphanomyces cochlioides was probably present at initiation of the test. The very low level of Aphanomyces cochlioides at Gluek site indicates this site will probably have the greatest potential for testing the therapeutic ability of Tachigaren in soils. The Buffalo Lake site has the greatest potential for testing Tachigaren ability to reduce the presence of Aphanomyces cochlioides in the soil.

Yield

Yield factors as influenced by Tachigaren treatments were non-homogeneous between years, but were homogeneous between locations within years. Therefore, the yield data is presented as separate location by years (tables 2-5) and also combined data between locations with in years (table 6-7).

Yield Summary

1. In 2000 the sugar beet yield was higher at 45 and 75 gram rate than with 0 gram Tachigaren applied to the seed.
2. Recoverable sugar per acre in 2000 was higher at the 45 and 75 gram rate compared to the 0 gram of Tachigaren rate at the 0050 (Buffalo Lake) site. There were no differences between treatments statistically at the 0051 (Clara City) site.
3. Yield and recoverable sugar per acre were higher at location 0050 (Buffalo Lake) and 0051 (Clara City) in 2001 for the 45 and 75 gram rate compared to the 0 gram rate applied to the seed.
4. When considering the sites combined within years (tables 6&7) yield and recoverable sugar per acre was significantly higher with Tachigaren applied at the 45 and 75 gram rate compared to 0 gram Tachigaren applied to the seed.

Table 1. Soil indices after Tachigaren treatments, 0050 and 0051 experiments

Key #	Tachigaren Rate Treatment	0050 Root Rot Index	0051 Root rot Index
1	0 Tachigaren	94.825	4.00
2	45 Tachigaren	90.625	1.48
3	75 Tachigaren	82.45	1.25
Mean		**89.30**	**2.24**
LSD (0.05)		**21.93**	**6.40**

Table 2. Tachigaren Influence on Aphanomyces Presence, 2000

Palke 0051 location (Clara City/Maynard MN Area)

Key #	Treatment	Ton/Acre	Sugar %	LTM	RST	RSA
1	0 Tachigaren	21.53	17.42	1.05	327	7048
2	45 Tachigaren	22.54	17.37	1.06	326	7350
3	75 Tachigaren	22.97	17.54	1.05	330	7576
Mean		**22.35**	**17.44**	**1.05**	**328**	**7325**
LSD (0.05)		**1.17**	**NS**	**NS**	**NS**	**NS**

Table 3. Tachigaren influence on Aphanomyces presence, 2000

Kadelbach 0050 location (Buffalo Lake, MN area)

Key #	Treatment	Ton/Acre	Sugar %	LTM	RST	RSA
1	0 Tachigaren	19.66	17.96	1.02	339	6664
2	45 Tachigaren	21.55	18.03	1.02	340	7332
3	75 Tachigaren	21.65	18.12	1.02	342	7339
Mean		**20.95**	**18.04**	**1.02**	**340**	**7112**
LSD (0.05)		**0.77**	**NS**	**NS**	**NS**	**377**

Table 4. Tachigaren Influence on Aphanomyces Presence, 2001

Palke 0051 location (Clara City/Maynard MN Area)

Key #	Treatment	TONS	SUCROSE	LTM	RST	RSA
1	0 Tachigaren	16.91	15.69	1.18	290	4905
2	45 Tachigaren	20.87	16.22	1.14	302	6296
3	75 Tachigaren	19.45	16.16	1.14	300	5843
Mean		**19.08**	**16.03**	**1.16**	**297**	**5681**
LSD		**0.55**	**0.33**	**0.03**	**7**	**205**

Table 5. Tachigaren influence on Aphanomyces presence, 2001

Kadelbach location (Buffalo Lake, MN area)

Key #	Treatment	Tons	SUCROSE	LTM	RST	RSA
1	0 Tachigaren	14.87	13.70	1.33	247	3680
2	45 Tachigaren	18.11	13.83	1.32	250	4532
3	75 Tachigaren	17.18	14.17	1.30	257	4419
Mean		**16.72**	**13.90**	**1.32**	**252**	**4210**
LSD		**1.65**	**0.34**	**0.02**	**7**	**291**

Table 6 . Tachigaren influence on Aphanomyces presence

0050 and 0051 sites data combined, 2000

Key #	Treatment	Tons	SUCROSE	LTM	RST	RSA
1	0 Tachigaren	20.60	17.69	1.04	333	6856
2	45 Tachigaren	22.04	17.70	1.04	333	7341
3	75 Tachigaren	22.31	17.83	1.03	336	7457
Mean		**21.65**	**17.74**	**1.04**	**334**	**7218**
LSD		**1.23**	**NS**	**NS**	**NS**	**394**

Table 7. Tachigaren influence on Aphanomyces presence

0050 and 0051 sites data combined, 2001

Key #	Treatment	Tons	SUCROSE	LTM	RST	RSA
1	0 Tachigaren	15.89	14.69	1.25	269	4292
2	45 Tachigaren	19.49	15.02	1.23	276	5414
3	75 Tachigaren	18.31	15.17	1.22	279	5131
Mean		**17.90**	**14.96**	**1.24**	**275**	**4946**
LSD		**1.31**	**0.72**	**0.07**	**16**	**867**

Nitrogen Management for Sugar beet Grown on Irrigated Sandy Soils in Southern Minnesota

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Justification and Objectives:

During the late 1990's, increases in the Southern Minnesota Beet Sugar Cooperative (SMBSC) sugar beet growing area have been on irrigated sandy soils. Nitrogen fertilizer management is important for quality sugar beet production in any part of the cooperative – but extremely important on sandy soils. The present recommendation is for application of nitrogen fertilizer based on a soil nitrate-N test in the fall after the soil temperature is below 50 degrees. Most of the soils in Southern Minnesota are heavy textured (clay loams and silty clay loams). The loss of nitrogen from leaching is not a major concern with these soils. Sandy soils on the other hand can and do have nitrogen losses from leaching. This is a concern both agronomically and environmentally. The best management practice for corn is to reduce these losses is to apply N in the amount and at the time the plant needs it. Nitrogen management for sugar beet production is much more complicated than corn because of possible decreases in quality by over application and late application of N. The sandy soils in the SMBSC growing area also have a large capacity to mineralize N because of their relatively large amounts of organic matter – 3 % or greater. Little information exists on N management for sugar beet grown on irrigated sandy soils in Minnesota so a study was conducted to determine if split application of N fertilizer during the growing season was superior to an earlier season application.

Materials and Methods:

A study was conducted at four locations in the northern part of the SMBSC growing area. The sites were near Hancock, Minnesota in 1999 (H99) and 2000 (H00) and Belgrade, Minnesota in 2000 (B00) and 2001 (B01). All sites were irrigated. The N treatments included a check where no N fertilizer was applied, a series of N rates which involved a preplant application of 40 lb N/A in the spring and N fertilizer applied June 1 at rates of 0, 40, 80, 120, and 160 lb N/A, and also a combination of split N applications with 40 lb N/A at preplant plus 40 lb N/A on June 1 plus 40 lb N/A on July1, 40 lb N/A preplant plus 40 lb N/A June 1 plus 40 lb N/A July 1 plus 40 lb N/A on August 1, and 40 lb N/A preplant plus 80 lb N/A on June1 plus 40 lb N/A on July 1. Table 1. has a complete list of the treatments.

Urea fertilizer was broadcasted as the N fertilizer source at the prescribed times required by the treatments. Sugar beet roots were harvested and quality determined by the SMBSC quality laboratory each fall.

Table 1. List of N management treatments.

Total N applied	Preplant	June 1	July 1	August 1	Treatment name
---------- Fertilizer N (lb N/A) ----------					
0	0	0	0	0	0 – 0 – 0 – 0
40	40	0	0	0	40 – 0 – 0 – 0
80	40	40	0	0	40 – 40 – 0 – 0
120	40	80	0	0	40 - 80 - 0 – 0
160	40	120	0	0	40 – 120 - 0 – 0
200	40	160	0	0	40 – 160 – 0 – 0
120	40	40	40	0	40 – 40 – 40 – 0
160	40	40	40	40	40 – 40 – 40 – 40
160	40	80	40	0	40 – 80 – 40 – 0

Results and Discussion:

Root yield was significantly increased by nitrogen fertilizer application at three of the four sites (H99, H00, and B00), Table 2. Root yield was not affected at the B01 site. At H99 and B00, the use of nitrogen fertilizer increased root yields over the check. The optimum treatments at H99 and B00 were 40 lb N/A applied at preplant and 40 lb N/A preplant plus 40 lb N/A on June 1, respectively, Figure 1. Of the split treatments, 40 lb N/A preplant plus 40 lb N/A on June 1 plus 40 lb N/A on July 1 was equal or superior to the 40 lb N/A preplant plus 40 lb N/A on June 1 treatment at H99, H00, and B00. At the B00 site, only the 40 lb N/A preplant plus 40 lb N/A on June 1 plus 40 lb N/A on July 1 was better than the check. Overall for root yield, 40 lb N/A preplant plus 40 lb N/A on June 1 plus 40 lb N/A on July 1 provided the best yields when a response to N fertilizer occurred, Figure 2.

Table 2. Combined and individual sugar beet root yields as affected by N management.

Preplant	June 1	July 1	August 1	H99	H00	B00	B01	Mean
--------- Fertilizer N (lb N/A) ---------				---------- Root yield (tons/A) --------				
0	0	0	0	21.0	26.6	17.1	24.4	22.4
40	0	0	0	27.9	28.7	20.9	24.0	25.3
40	40	0	0	27.4	28.5	24.8	28.7	27.4
40	80	0	0	27.9	24.3	24.5	26.3	25.8
40	120	0	0	27.2	23.0	22.8	26.7	25.0
40	160	0	0	27.4	27.1	26.6	27.3	27.1
40	40	40	0	28.7	30.2	30.1	25.5	28.4
40	40	40	40	29.1	26.6	25.3	25.4	26.5
40	80	40	0	27.6	24.2	25.2	27.6	26.3
Treatment				0.0001	0.007	0.002	0.19	0.0001
Trt * Loc								0.0001
$LSD_{0.05}$				1.5	3.0	4.9	3.6	1.7

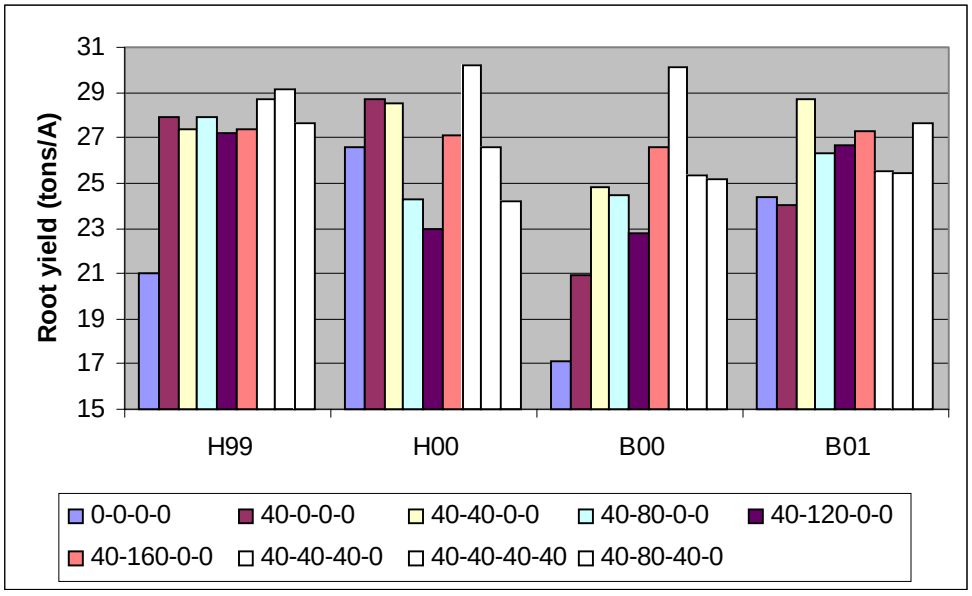

Figure 1. Sugar root yields for each location.

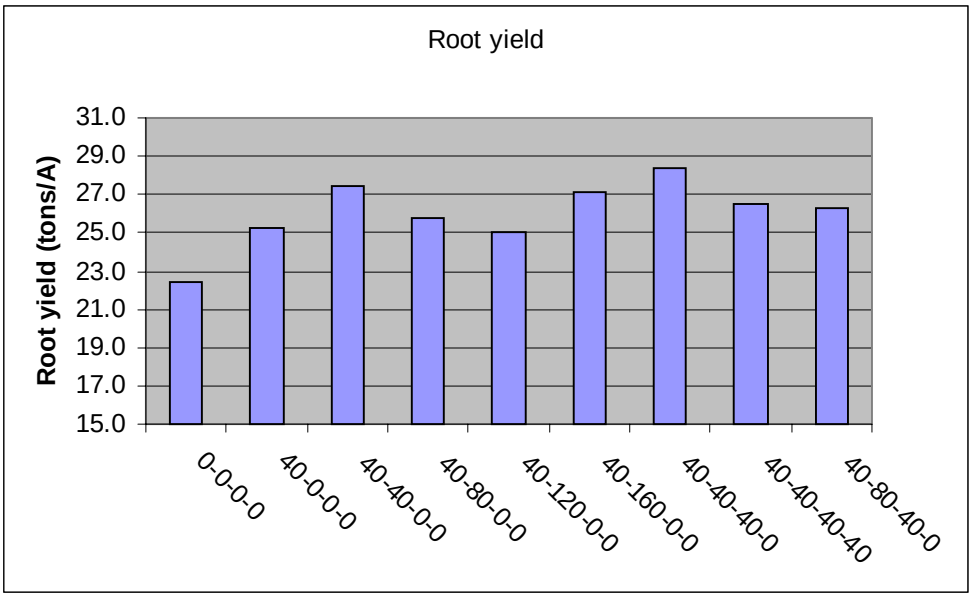

Figure 2. Mean sugar beet root yields.

Sugar beet sucrose was affected at all four sites by N fertilizer application , Table 3. As the amount of N fertilizer application increased the sucrose concentration decreased, Figure 2. The timing of the application in the growing season did not affect this reduction except when N fertilizer was applied August 1. This reinforces the recommendation that no application of N fertilizer to sugar beet should occur after the first week of July. Over application of N fertilizer and late application significantly decreases the sucrose concentration.

Table 3. Combined and individual sugar beet sucrose as affected by N management.

Preplant	June 1	July 1	August 1	H99	H00	B00	B01	Mean
--------- Fertilizer N (lb N/A) ---------				---------- Sucrose (%) --------				
0	0	0	0	17.6	17.1	17.3	16.5	17.1
40	0	0	0	17.2	17.8	17.9	16.3	17.2
40	40	0	0	16.8	16.8	17.1	16.0	16.6
40	80	0	0	17.2	16.9	17.0	15.7	16.7
40	120	0	0	16.5	16.7	17.0	15.4	16.3
40	160	0	0	16.3	16.2	16.9	14.7	15.9
40	40	40	0	17.3	16.5	16.9	15.8	16.6
40	40	40	40	16.5	16.1	16.3	15.3	16.0
40	80	40	0	16.1	16.2	17.1	15.5	16.2
Treatment				0.0001	0.08	0.03	0.001	0.0001
Trt * Loc								0.21
$LSD_{0.05}$				0.4	1.1	0.7	0.5	0.4

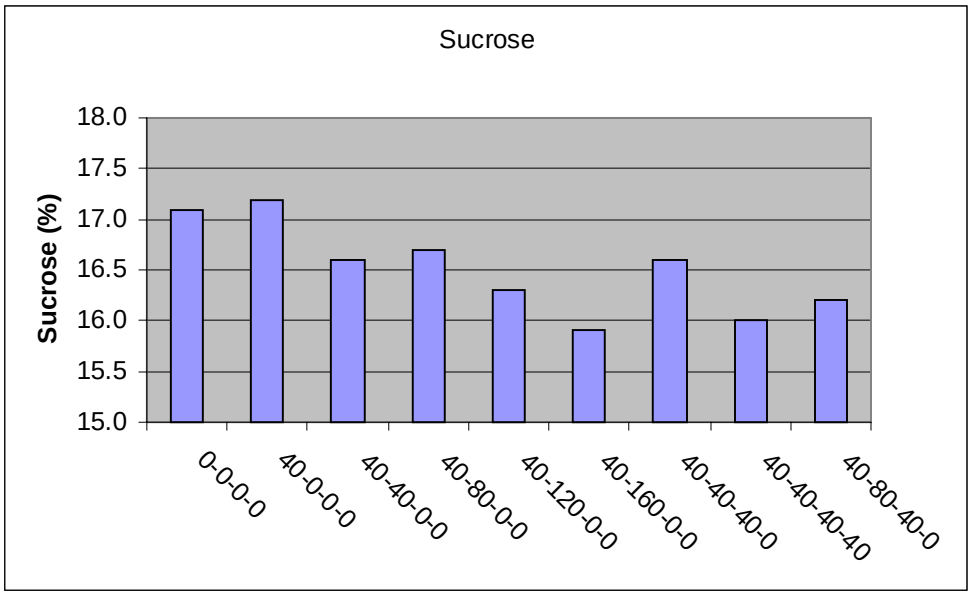

Figure 3. Mean sugar beet root sucrose concentration for each N management system.

Like root yield, N fertilizer significantly affected recoverable sucrose per acre at three of the four sites (H99, H00, and B00), Table 4. At the H99 site, four treatments had the greatest recoverable sucrose per acre. These treatments were 40 lb N/A preplant, 40 lb N/A preplant plus 80 lb N/A on June 1, 40 lb N/A preplant plus 40 lb N/A on June 1 plus 40 lb N/A on July 1, and 40 lb N/A preplant plus 40 lb N/A on June 1 plus 40 lb N/A on July 1 plus 40 lb N/A on August 1. The optimal treatment was 40 lb N/A preplant. At the H00 site, the best treatments were 40 lb N/A preplant and 40 lb N/A preplant plus 40 lb N/A on June 1 plus 40 lb N/A on July 1.

At this time our recommendation when N fertilizer is needed for sugar beet grown under irrigation in sandy soils is apply the N fertilizer as 40 lb N/A preplant in the spring and split the remaining N into to two applications; the first around June 1 and the second around July 1. ***Do not apply nitrogen fertilizer after the first week of July*** *because of increasing risk to severely decrease sugar beet quality.*

Table 4. Combined and individual sugar beet recoverable sucrose per acre as affected by N management.

Preplant	June 1	July 1	August 1	H99	H00	B00	B01	Mean
--------- Fertilizer N (lb N/A) ---------				---------- Recoverable sucrose (lb/A) --------				
0	0	0	0	6975	8518	5581	7488	7161
40	0	0	0	9075	9613	7042	7274	8193
40	40	0	0	8695	8974	7917	8563	8539
40	80	0	0	9123	7698	7786	7621	8031
40	120	0	0	8388	7187	7244	7531	7584
40	160	0	0	8436	8163	8409	7320	8037
40	40	40	0	9383	9301	9496	7452	8822
40	40	40	40	9098	7959	7698	7177	7935
40	80	40	0	8387	7296	8096	7890	7916
Treatment				0.0008	0.002	0.004	0.28	0.0001
Trt * Loc								0.0001
$LSD_{0.05}$				500	1173	1553	1060	547

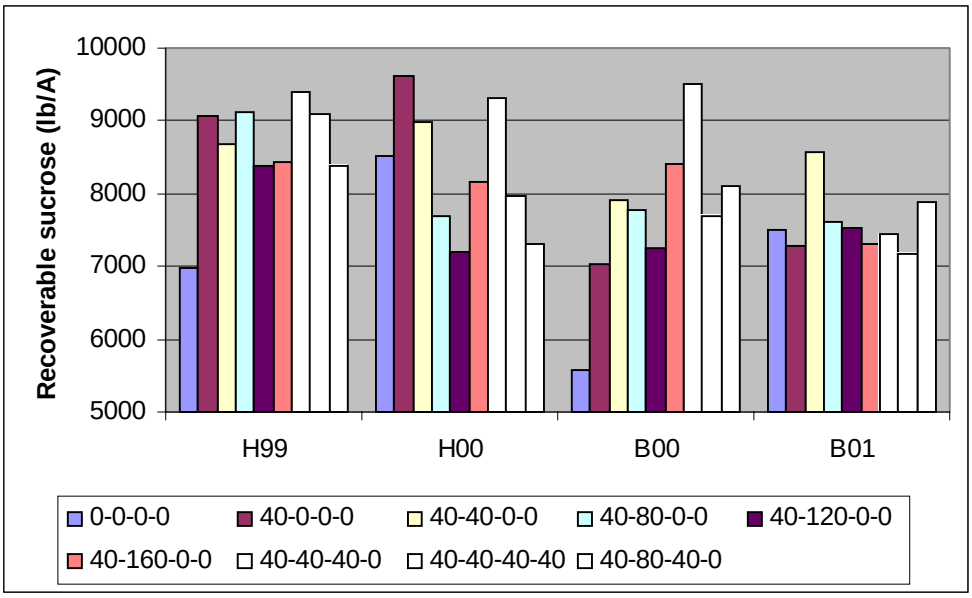

Figure 4. Sugar beet recoverable sucrose per acre for each location.

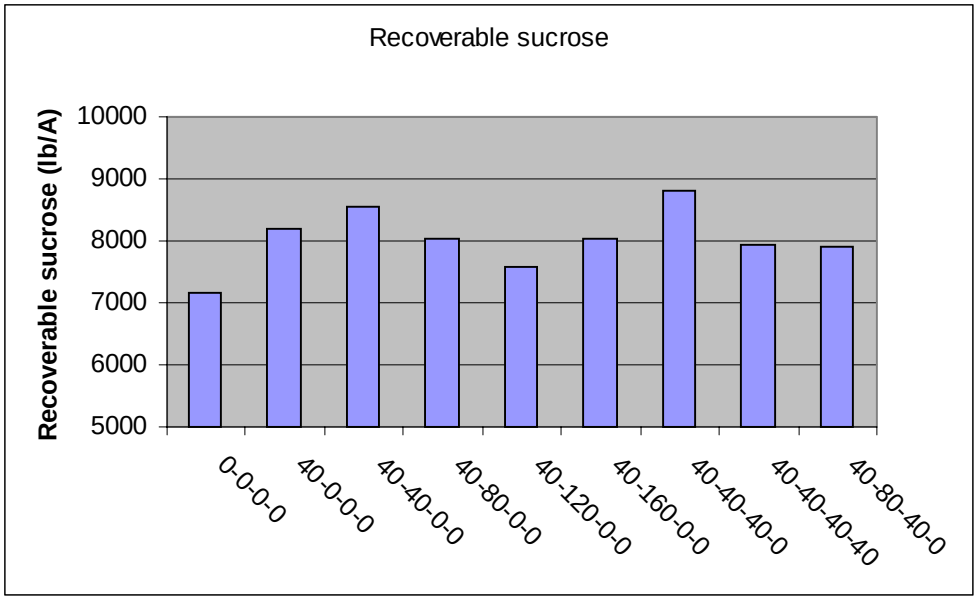

Figure 5. Mean sugar beet recoverable sucrose per acre.

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 fields where manure has been applied. 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 may depend 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 beet. This research project has been designed to: 1) measure 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 1 and 2, a study was conducted in 1999, 2000, and 2001 to measure the effects of manure application directly before sugar beet production. The treatments include fertilizer nitrogen, turkey manure, and swine manure (Table 1). The manure applications occurred early November 1998 at the Renville 1 site, November 1999 at the Raymond site, and November 2000 at the Renville 2 site. The liquid swine manure was injected into the soil to a depth of six inches and with injector knifes spaced 30 inches apart. The turkey manure was broadcast applied and incorporated. The nitrogen analysis for each manure source and for each year of the study is reported in Table 2. 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 1 site, Fall 1999 and early May 2000 at the Raymond site, and in the fall 2000 at the Renville 2 site. The initial soil nitrate values for each site are reported in Table 3. Soil samples to one foot for nitrate-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 all sites after sugar beet harvest to measure residual nitrate-N.

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.

Table 1. Treatments for manure study.

Treatment	Total N applied		
	1999	2000	2001
	---------- lb N A^{-1} ----------		
Check	0	0	0
Fertilizer 40	40	40	40
Fertilizer 80	80	80	80
Fertilizer 120	120	120	120
Fertilizer 160	160	160	160
Fertilizer 200	200	200	200
Swine manure 2500 gallon A^{-1}	228	104	196
Swine manure 5000 gallon A^{-1}	456	208	391
Turkey manure 2.5 ton A^{-1}	45	153	123
Turkey manure 5.0 ton A^{-1}	90	306	245

Table 2. Total nitrogen content of manure each year of study.

Manure type	Year of study		
	1999	2000	2001
Liquid swine (lb N per 1000 gallons)	91.2	41.6	78.2
Dry turkey litter (lb N per ton)	18	61.2	49.2

Table 3. Initial soil nitrate-N values for the study.

Location	Soil nitrate-N		
	0 – 2 ft.	2 – 4 ft.	0 – 4 ft.
	---------- lb A^{-1} ----------		
Renville 1 (1999)	27	18	45
Raymond (2000)	50	25	75
Renville 2 (2001)	55		

Results and Discussion:

Sugar beet root yield and quality:

Renville 1 site 1999 - 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 4). 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.

Raymond site 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, Table 5. 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 4. Root yield, sucrose concentration, loss to molasses, recoverable sucrose per ton, and recoverable sucrose per acre at Renville 1 site in 1999.

Treatment	Root yield	Sucrose concentration	Loss to molasses	Recoverable sucrose	
	ton A^{-1}	------- % -------		lb ton^{-1}	lb A^{-1}
Check	23.9	18.3	0.93	348	8301
Fertilizer 40	24.9	18.2	1.01	345	8570
Fertilizer 80	25.3	18.1	0.94	342	8634
Fertilizer 120	25.7	17.5	0.86	332	8546
Fertilizer 160	26.1	17.4	0.94	329	8492
Fertilizer 200	24.2	17.6	1.03	331	8033
Swine manure 2500	25.3	17.5	1.00	329	8353
Swine manure 5000	28.0	17.5	0.94	330	9371
Turkey manure 2.5	26.2	17.8	0.93	337	8849
Turkey manure 5.0	27.3	17.3	1.10	323	8819
$LSD_{0.05}$	2.6	NS	0.10	NS	NS

Table 5. Root yield, sucrose concentration, loss to molasses, recoverable sucrose per ton, and recoverable sucrose per acre at Raymond site in 2000.

Treatment	Root yield	Sucrose concentration	Loss to molasses	Recoverable sucrose	
	ton A^{-1}	------- % -------		lb ton^{-1}	lb A^{-1}
Check	18.5	18.8	0.99	356	6593
Fertilizer 40	24.1	18.9	0.98	359	5632
Fertilizer 80	27.5	18.5	1.01	349	9644
Fertilizer 120	28.5	18.9	0.99	358	10206
Fertilizer 160	26.7	18.4	1.00	348	9300
Fertilizer 200	26.0	17.8	1.03	335	8701
Swine manure 2500	23.5	18.1	1.02	342	8026
Swine manure 5000	29.9	18.0	1.02	339	10135
Turkey manure 2.5	31.4	18.2	1.02	344	10819
Turkey manure 5.0	26.4	19.3	0.88	366	9643
$LSD_{0.05}$	3.4	1.3	0.06	28	1419

Renville 2 site 2001 – Maximum root yield occurred at 160 pounds fertilizer N per acre (Fertilizer 160) while the Swine 2500, Turkey 2.5, and Turkey 5.0 yielded as well or better than the Fertilizer 160 treatment, Table 6. The greatest sucrose concentration occurred for sugar beet grown with 0 pounds fertilizer N per acre (check) or 40 pounds fertilizer N per acre (Fertilizer 40). As the amount of fertilizer N increased the sucrose concentration decreased. The reduction was 2.4 % between the check and Fertilizer 40 treatments and the Fertilizer 200 treatment. The sucrose concentrations for the manure treatments decreased with increasing rates of application but did not reduce the sucrose concentration as much as the Fertilizer 200 treatment. The optimum recoverable sucrose per acre for the fertilizer treatments was the Fertilizer 40 treatment. The greatest recoverable sucrose per acre was the Swine manure 2500 treatment with the roots treated with Turkey manure at 2.5 tons per acre similar to the Fertilizer 40 treatment.

Table 6. Root yield, sucrose concentration, loss to molasses, recoverable sucrose per ton, and recoverable sucrose per acre at Renville 2 site in 2001.

Treatment	Root yield	Sucrose concentration	Loss to molasses	Recoverable sucrose	
	ton A^{-1}	------- % -------		lb ton^{-1}	lb A^{-1}
Check	17.3	17.5	1.04	329	5704
Fertilizer 40	18.6	17.5	1.04	330	6141
Fertilizer 80	18.9	17.0	1.08	319	6011
Fertilizer 120	18.9	15.9	1.17	295	5570
Fertilizer 160	19.5	15.7	1.18	291	5659
Fertilizer 200	17.4	15.1	1.23	279	4845
Swine manure 2500	19.9	17.0	1.08	319	6334
Swine manure 5000	19.0	16.3	1.14	303	5750
Turkey manure 2.5	19.6	16.9	1.09	315	6190
Turkey manure 5.0	20.1	15.7	1.19	290	5838
$LSD_{0.05}$	1.9	0.5	0.04	10	583

Soil nitrate in surface one foot during growing season:

Renville 1 1999 - Soil nitrate-N contents in the surface one 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 soils 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, Figure 1. By August this difference was not measured. Sugar beet roots are very efficient at utilizing nitrate-N from the soil and leaves little nitrate-N in soil compared to corn.

Table 7. Soil nitrate-N content for the surface one foot measured during the 1999 growing season at Renville 1 site.

Treatment	Soil nitrate-N content in surface one foot				
	June	July	August	September	November
	---------- lb nitrate-N A^{-1} ----------				
Check	61	34	15	17	16
Fertilizer 40	76	40	16	16	22
Fertilizer 80	90	36	15	19	16
Fertilizer 120	101	40	14	18	18
Fertilizer 160	122	64	17	20	19
Fertilizer 200	126	63	28	19	25
Swine manure 2500	62	36	13	18	16
Swine manure 5000	132	54	18	21	18
Turkey manure 2.5	99	37	17	19	19
Turkey manure 5.0	160	74	22	20	19
$LSD_{0.05}$	38	23	NS	NS	NS

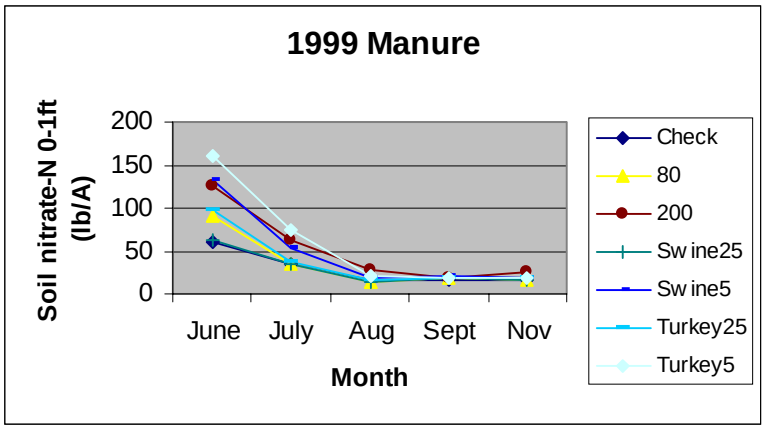

Figure 1. Soil nitrate-N contents in the surface foot of soil for check, optimum (Fertilizer 80), Fertilizer 200, and manure treatments from June 1999 to November 1999.

Raymond 2000 - In 2000, soil nitrate-N content in the surface foot was not affected by treatment, Table 8 and Figure 2. Soil nitrate was elevated in the early part of the growing season but as plant growth increased the amount of soil nitrate-N in the surface foot decreased. There was a marked increase in nitrate-N content from early September until November. This increase was caused by drought conditions in September which reduced the nitrate-N uptake by the sugar beet plant. No treatment differences in soil nitrate-N occurred in the later part of the growing season.

Table 8. Soil nitrate-N content for the surface one foot measured during the 2000 growing season at Raymond site.

Treatment	Soil nitrate-N content in surface one foot				
	June	July	August	September	November
	---------- lb nitrate-N A^{-1} ----------				
Check	57	10	18	10	20
Fertilizer 40	50	11	17	11	22
Fertilizer 80	63	10	20	11	34
Fertilizer 120	50	11	17	10	31
Fertilizer 160	72	17	17	12	30
Fertilizer 200	71	13	17	11	24
Swine manure 2500	70	12	17	12	30
Swine manure 5000	58	12	16	11	21
Turkey manure 2.5	57	13	16	11	23
Turkey manure 5.0	76	13	18	17	37
$LSD_{0.05}$	NS	4	NS	NS	NS

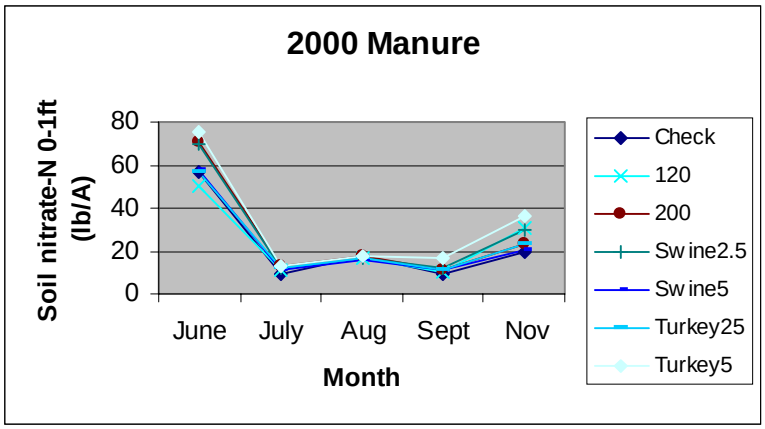

Figure 2. Soil nitrate-N contents in the surface foot of soil for check, optimum (Fertilizer 120), Fertilizer 200, and manure treatments from June 2000 to November 2000.

Renville 2 2001 - Soil nitrate-N content in the surface foot in 2001 was similar to soil nitrate-N values at the other two sites, Table 9 and Figure 3. Soil nitrate-N in the surface foot was elevated at the June sampling. In June, there were significant differences in soil nitrate values between the check, Fertilizer 40, and Fertilizer 80 treatments and the Fertilizer 160, Fertilizer 200, and Swine Manure at 5000 gallons. As the amount of fertilizer N applied increase about 80 pounds per acre, the soil nitrate-N in the surface foot increased in June. The July samples were still being analyzed at the time this report was being written. In August and September there were differences between treatments. At the late October sampling date, there was a small difference between the check and the Fertilizer 200 and the Swine manure 5000 treatments.

Table 9. Soil nitrate-N content for the surface one foot measured during the 2001 growing season at Renville 2 site.

Treatment	Soil nitrate-N content in surface one foot				
	June	July	August	September	November
	---------- lb nitrate-N A^{-1} ----------				
Check	43		29	12	13
Fertilizer 40	45		24	12	16
Fertilizer 80	50		30	13	14
Fertilizer 120	68		32	14	18
Fertilizer 160	85		33	13	15
Fertilizer 200	92		34	20	16
Swine manure 2500	60		33	14	16
Swine manure 5000	78		32	15	22
Turkey manure 2.5	40		24	13	13
Turkey manure 5.0	69		30	15	16
$LSD_{0.05}$	32		NS	NS	5

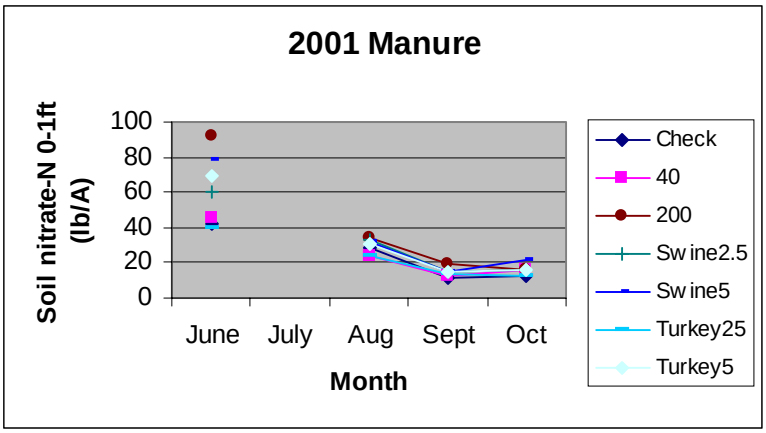

Figure 3. Soil nitrate-N contents in the surface foot of soil for check, optimum (Fertilizer 40), Fertilizer 200, and manure treatments from June 2001 to late October 2001.

Residual soil nitrate-N in surface four feet:

Residual soil nitrate-N for each treatment was determined on soil samples taken to a depth of four feet at the end of each growing season. The results from each site are presented in Tables 10, 11, and 12 and Figures 4, 5, and 6. The overall results show that at most soil depths at the three site there were no significant differences in soil nitrate-N content. When there were significant differences, these differences were very small in magnitude and had little practical implication.

Table 10. Residual soil nitrate-N content in surface four feet at Renville 1 site, fall 1999.

Treatment	Residual soil nitrate-N content						
	0-1 ft.	1-2 ft.	2-3 ft.	3-4 ft.	0-2 ft.	0-3 ft.	0-4 ft.
	---------- lb nitrate-N A^{-1} ----------						
Check	16	7	5	5	23	28	33
Fertilizer 40	22	7	6	5	29	35	40
Fertilizer 80	16	7	6	6	23	29	35
Fertilizer 120	18	8	6	6	26	32	38
Fertilizer 160	19	8	6	5	26	32	38
Fertilizer 200	25	8	6	6	34	40	46
Swine manure 2500	16	7	6	5	23	29	34
Swine manure 5000	18	7	7	6	25	32	38
Turkey manure 2.5	19	8	6	5	27	33	38
Turkey manure 5.0	19	7	5	5	26	32	37
$LSD_{0.05}$	NS	NS	1	1	NS	NS	NS

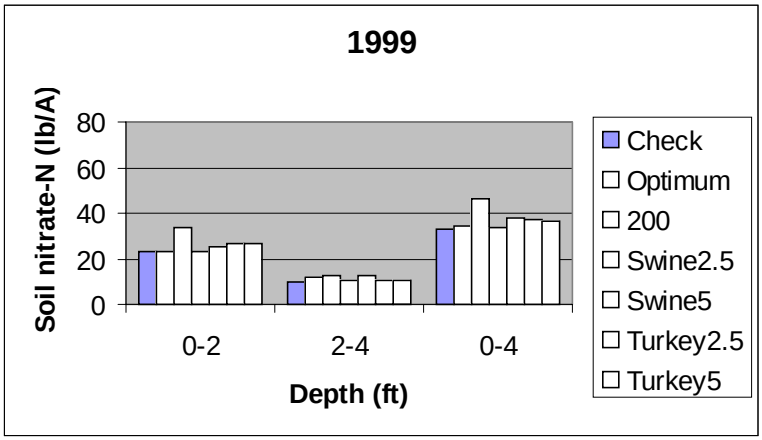

Figure 4. Fall residual soil nitrate for 0 to 2 feet, 2 to 4 feet, and 0 to 4 feet at Renville 1 in 1999.

Table 11. Residual soil nitrate-N content in surface four feet at Raymond site, fall 2000.

Treatment	Residual soil nitrate-N content						
	0-1 ft.	1-2 ft.	2-3 ft.	3-4 ft.	0-2 ft.	0-3 ft.	0-4 ft.
	---------- lb nitrate-N A^{-1} ----------						
Check	20	10	6	6	29	36	42
Fertilizer 40	22	8	7	7	31	37	44
Fertilizer 80	34	10	8	8	44	52	60
Fertilizer 120	31	10	7	7	41	48	55
Fertilizer 160	30	9	6	6	39	45	51
Fertilizer 200	24	12	7	6	35	42	48
Swine manure 2500	30	13	7	8	43	50	58
Swine manure 5000	21	10	6	6	30	37	42
Turkey manure 2.5	23	10	9	7	33	42	48
Turkey manure 5.0	37	9	7	7	45	52	60
$LSD_{0.05}$	NS	NS	NS	NS	NS	NS	NS

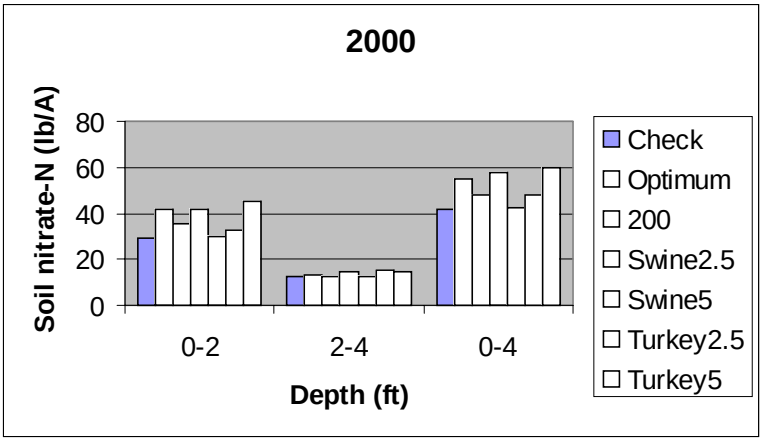

Figure 5. Fall residual soil nitrate for 0 to 2 feet, 2 to 4 feet, and 0 to 4 feet at Raymond in 2000.

Table 12. Residual soil nitrate-N content in surface four feet at Renville 2 site, fall 2001.

Treatment	Residual soil nitrate-N content						
	0-1 ft.	1-2 ft.	2-3 ft.	3-4 ft.	0-2 ft.	0-3 ft.	0-4 ft.
	---------- lb nitrate-N A^{-1} ----------						
Check	13	6	6	5	19	24	29
Fertilizer 40	16	7	5	5	22	28	33
Fertilizer 80	14	6	5	5	20	26	31
Fertilizer 120	18	7	6	5	25	31	36
Fertilizer 160	15	7	6	5	22	27	32
Fertilizer 200	16	7	6	6	23	29	34
Swine manure 2500	16	6	6	5	22	28	33
Swine manure 5000	22	7	6	5	29	35	40
Turkey manure 2.5	13	7	6	6	20	25	31
Turkey manure 5.0	16	7	5	5	23	28	33
$LSD_{0.05}$	5	NS	NS	NS	NS	NS	NS

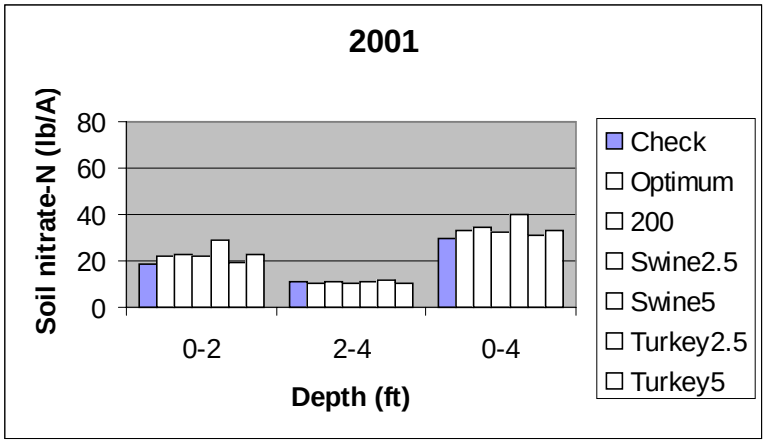

Figure 6. Fall residual soil nitrate for 0 to 2 feet, 2 to 4 feet, and 0 to 4 feet at Renville 2 in 2001.

Sugar beet top yield, N concentration, and N uptake:

Sugar beet top yield, N concentration, and N uptake values for Renville 1 and Raymond sites are presented in Table 13. The samples for 2001 are being analyzed at the time of the preparation of this report. Sugar beet top yield was not affected by treatments at Renville 1 or Raymond site. In 1999 at the Renville 1 site, there were significant differences in N concentration and N uptake in the sugar beet tops caused by the treatments. In general as the amount of N fertilizer increased the N concentration and N uptake increased. The application of manure also increased the N concentration and N uptake. The greater application amounts of manure (swine and turkey) increased N concentration and N uptake by the sugar beet tops. At the Raymond site, the top yields were less than at the Renville 1 site in 1999. The reduced top yield was attributed to drought conditions in August and September in 2000. These drought conditions probably contributed to the lack of significant differences in N concentration and N uptake in 2000.

Table 13. Sugar beet top yield, N concentration, and N uptake in 1999 and 2000.

	1999			2000		
Treatment	Top yield	N concentration	N uptake	Top yield	N concentration	N uptake
	lb A^{-1}	%	lb A^{-1}	lb A^{-1}	%	lb A^{-1}
Check	3963	1.93	77	991	2.06	21
Fertilizer 40	3861	1.94	75	1076	2.28	24
Fertilizer 80	3977	2.15	84	1092	2.27	26
Fertilizer 120	4856	2.41	117	1095	2.51	38
Fertilizer 160	4790	2.51	121	1276	2.53	33
Fertilizer 200	5608	2.72	160	1439	2.40	35
Swine manure 2500	4162	2.01	84	1385	2.61	36
Swine manure 5000	4520	2.46	111	1363	2.35	32
Turkey manure 2.5	4726	2.12	102	1101	2.38	26
Turkey manure 5.0	5485	2.58	143	1205	2.61	32
$LSD_{0.05}$	NS	0.42	43	NS	NS	NS

Overall conclusions:

The results from the three sites of this study indicate that the use of manure on field with no prior manure application may not be as detrimental to sugar beet quality as originally thought. The effect of manure application to sugar beet root yield and quality on field with a history of manure applications was not been answered with this study. If manure is applied at reasonable rates equivalent to the N fertilizer recommendation, it does not negatively affect sugar beet recoverable sucrose per acre on fields with no manure application history. **Excessive application rates of manure will reduce quality.**

Soil nitrate-N values during the growing season indicate that while the sugar beet plant is actively growing, it will utilize most of the nitrate-N mineralized into the soil from manure. This utilization is greater than corn or soybean. A soil test for nitrate-N taken in the later stages of corn or soybean growth will reflect excess nitrate-N mineralized from manure. A nitrate-N soil test will not reflect excess soil nitrate-N during sugar beet production.

Preliminary results from 1999 indicate that sugar beet top N concentration and N uptake at harvest do reflect the N additions from both fertilizer and manure. This did not occur in the 2000 growing season. A long period of drought conditions during August and September in which the sugar beet plant was under moisture stress affected the plant uptake of soil nitrate-N.

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Phosphorus Fertilizer Studies in Southern Minnesota

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Justification:

A considerable amount of interest has been generated in phosphorus management with environmental concerns surrounding the Minnesota River basin and the phosphorus (P) trading agreement in which Southern Minnesota Beet Sugar Cooperative has entered into as part of the water treatment at the refinery. Research results nationwide indicate that using the correct application rate of phosphate is important to reduce the environmental effects of P in fresh water. Phosphorus fertilizer can be the most expensive fertilizer input in sugar beet production on a per unit basis. Little field research has been done in the Southern Minnesota sugar beet growing area with regard to phosphorus use in a sugar beet production system. Lamb 1986 reported results from two locations, one site with a low phosphorus soil test and one with a very high soil test phosphorus. The low soil test P site had a positive root yield response to phosphate fertilizer application while the very high soil test P site had no response. These studies did not have sufficient rates to determine what the optimum application rates should be. Sims 1999 reported small root yield responses to a broadcast application of phosphate in the Red River Valley. In further reports of this work, Sims 2000, indicated that the use of starter phosphate produced the same root yield responses at much reduced application rates. In response to concerns that the P recommendations were not current and the lack of recent information from the Southern Minnesota sugar beet growing area, a series of P rate studies were conducted in 2000 and 2001 with the objective to update fertilizer recommendations for sugar beet grown in the Southern Minnesota Beet Sugar Cooperative area.

Materials and Methods:

To meet the objectives, three P rate trials were conducted, two in 2000 and one in 2001. The sites for these studies were near Raymond and Bird Island, Minnesota in 2000 and near Renville, Minnesota in 2001. The initial Olsen soil test phosphorus results were 17 ppm at Raymond, 4 ppm at Bird Island, and 9 ppm at the Renville site. This represents at range of soil test P categories from low at Bird Island to very high at Raymond. At the Raymond site, phosphate fertilizer rates of 0, 20, 40, 60, and 80 pounds per acre were broadcast applied and incorporated in the spring 2000. The same rates of phosphate were applied at the Bird Island site. In addition to the broadcast and incorporated set of treatments at Bird Island, phosphate was also knifed into the soil to a depth of 5 inches with the knifes spaced 22 inches apart. In 2001, the phosphate was broadcast applied at 0, 15, 30, 45, and 60 pounds per acre at the Renville site. Root yield and quality was determined in the fall.

Results and Discussion:

There were no significant root yield or quality responses to broadcast phosphate fertilizer application at any of the three research sites, Table 1, 2, and 3. At the Bird Island site, there were no root yield or quality responses to knife application. The lack of response at the Bird Island site was surprising as the Olsen soil test P was in the low category at 4 ppm. At this time it is not recommended to apply phosphate fertilizer at rates greater that the current University of Minnesota or North Dakota State University recommendations. Further research with the use of seed placement of phosphorus is warranted. The use of a knife placement (not in the sugar beet row) is not any better than a broadcast application.

Table 1. Root yield, sucrose concentration, loss to molasses, recoverable sucrose per ton, and recoverable sucrose per acre for phosphorus study near Raymond, Minnesota in 2000.

P rate	Root yield	Sucrose concentration	Loss to molasses	Recoverable sucrose	
lb phosphate A^{-1}	tons A^{-1}	------ % ------		lb ton^{-1}	lb A^{-1}
0	26.8	16.8	1.09	315	8430
20	26.2	16.9	1.09	316	8273
40	29.1	17.1	1.08	320	9240
60	28.2	16.7	1.09	313	8829
80	28.0	16.7	1.10	313	8754
Rate significance	NS	NS	NS	NS	NS

Table 2. Root yield, sucrose concentration, loss to molasses, recoverable sucrose per ton, and recoverable sucrose per acre for phosphorus study near Bird Island, Minnesota in 2000.

P rate	Root yield	Sucrose concentration	Loss to molasses	Recoverable sucrose	
lb phosphate A^{-1}	tons A^{-1}	------ % ------		lb ton^{-1}	lb A^{-1}
0	25.4	17.7	1.03	333	8446
20	27.4	17.3	1.06	325	8891
40	26.5	17.5	1.05	328	8703
60	26.2	17.4	1.04	328	8586
80	27.2	17.1	1.07	321	8711
Rate significance	NS	NS	NS	NS	NS

Table 3. Root yield, sucrose concentration, loss to molasses, recoverable sucrose per ton, and recoverable sucrose per acre for phosphorus study near Renville, Minnesota in 2001.

P rate	Root yield	Sucrose concentration	Loss to molasses	Recoverable sucrose	
lb phosphate A^{-1}	tons A^{-1}	------ % ------		lb ton^{-1}	lb A^{-1}
0	24.6	16.4	1.13	305	7477
15	26.1	16.3	1.14	303	7865
30	25.0	16.3	1.14	303	7563
45	25.0	16.3	1.14	304	7585
60	24.6	16.3	1.13	304	7506
Rate significance	NS	NS	NS	NS	NS

Table 1A is a list of the treatments tested and there cost per acre. The treatment cost are based on prices acquired as payment in spring of 2002. These prices may vary depending on the source and yet the prices of the treatment are relative. The treatment list is for the following three trial presented in experiments 0121, 0122, 0123.

Table 1A. Treatment list cost for experiment 0121. 0122, 0123

Treatment Number	*Herbicide Treatment*	*Treatment Cost Per Acre*
1	Weed free check	0.00
2	Betanex A) 24 oz. B) 32 oz. C) 48 oz.	73.32
3	Betamix A) 16 oz. B) 20 oz. C) 24 oz	42.30
4	Betanex A) 16 oz. B) 20 oz. C) 24 oz	42.30
5	A,B,C) Betamix with Microrate	50.26
6	A,B,C,D) Betamix with Microrate	67.00
7	A,B,C) Microrate	50.26
8	A,B,C,D) Microrate	67.00
9	A,B) Betamix with Microrate C,D) Microrate	67.00
10	A,B) Microrate C)12 oz. Microrate	53.08
11	A) Microrate B,C)12 oz./Microrate	55.90
12	A) Microrate B,C,D)12 oz./Microrate	58.72
13	A) Microrate B) 12 oz. Microrate C) 16 oz. Microrate	58.72
14	Microrate/no Upbeet Microrate/no Upbeet+*Outlook Microrate/no Upbeet	54.04
15	Microrate/no stinger Microrate/no stinger+*Outlook Microrate/no stinger	55.99
16	Microrate/no stinger Microrate/no stinger Microrate	41.83
17	Microrate/no Upbeet Microrate/no Upbeet Microrate	40.53
18	Microrate/no stinger Microrate/no stinger+*Outlook Microrate	60.20
19	Microrate/no Upbeet Microrate/no Upbeet+*Outlook Microrate with 1/4 oz. Upbeet	63.76
20	A) Betanex B) Microrate+Outlook C)12 oz./Microrate	65.97
21	A,B) Betanex C,D) 12 oz. Microrate	61.70
22	A,B,C) Microrate with 1/4 oz. Upbeet	64.83
23	A,B,C,D) Microrate with 1/4 oz. Upbeet	86.44
24	A,B) Microrate C)Microrate1/4 oz. Upbeet	55.11
25	A,B) Microrate C,D)Microrate1/4 oz. Upbeet	76.72

SMBSC Program – Buffalo Lake location
Experiment 0121

Objectives:

Evaluate postemergence sugar beet herbicides alone and in combination at various rates for weed control efficacy and crop phytotoxicity considering economics of the treatment.

Experiment Procedure:

The experiment was a randomized complete block design with 4 replications. Experimental units (plots) were 11 ft wide (6, 22" wide sugar beet rows) and 30 ft long. Treatments were applied to the middle 4 rows of 6 row wide plots with a bicycle wheel type sprayer delivering 8.5 gal./acre at 40 psi using 8001flat fan nozzles traveling at 3 mph.

Treatments are described as follows:

-Microrate	is always	8 oz./acre Betanex
	Unless otherwise	1/8 oz./acre Upbeet
	determined	1.25 oz./acre Stinger
		1.5% v/v Methylated seed oil

-Betamix with Microrate is the Microrate with Betamix instead of Betanex
-12 oz./Microrate is the Microrate with the Betanex at 12 oz./acre
-16 oz./Microrate is the Microrate with the Betanex at 16 oz./acre
-+Outlook indicates Dimethenamid or other wise known as Frontier.
The Outlook is always applied at 21 oz./acre, which equates to 32 oz. Frontier.
-Microrate without Upbeet is the Microrate with no Upbeet
-Microrate without Stinger is the Microrate with no Stinger
-Microrate ¼ oz. Upbeet is the microrate with Upbeet increased from 1/8 oz. To ¼ oz.

Table 1. Specifics for SMBSC Program weed control program

Location	Experiment Number	Planting Date	Comments	Application A	Application B	Application C	Application D
SMBSC program-Kadelbach	0121	4-May		17-May	24-May	31-May	7-Jun
Crop Stage				Cotyl.	2-4 lf	early 4lf	4-6 lf
Wind (Mph)				5	10-20 NW	10 SE	calm
PSI				40	40	40	40
Temp				60	60	70	75
Weed Stage				Cotyl.	cotyl -2lf	cotl-4lf	cotyl.-6lf
Finish time				1:45	1:00	2:00	12:00

Table 2. Experiment 0121
Evaluation of herbicide influence on sugarbeet yield and quality

Treatment Number	Herbicide	TON	Sucrose Percent	LTM Percent	Rec. Suc. per Ton	Rec. Suc. per Acre
1	Weed free check	14.73	15.05	1.24	276	4143
2	Betanex A) 24 oz. B) 32 oz. C) 48 oz.	7.66	15.09	1.23	277	2124
3	Betamix A) 16 oz. B) 20 oz. C) 24 oz	11.78	14.34	1.29	261	3099
4	Betanex A) 16 oz. B) 20 oz. C) 24 oz	8.95	14.52	1.28	265	2371
5	A,B,C) Betamix with Microrate	14.64	14.62	1.28	267	3878
6	A,B,C,D) Betamix with Microrate	19.89	14.02	1.32	254	5079
7	A,B,C) Microrate	13.86	13.54	1.34	244	3427
8	A,B,C,D) Microrate	15.35	14.47	1.29	264	4088
9	A,B) Betamix with Microrate C,D) Microrate	11.70	14.91	1.25	273	3264
10	A,B) Microrate C)12 oz. Microrate	13.74	15.03	1.23	276	3913
11	A) Microrate B,C)12 oz./Microrate	10.38	15.05	1.24	276	2866
12	A) Microrate B,C,D)12 oz./Microrate	10.93	15.17	1.24	279	3052
13	A) Microrate B) 12 oz. Microrate C) 16 oz. Microrate	9.58	14.83	1.26	272	2538
14	Microrate/no Upbeet Microrate/no Upbeet+*Outlook Microrate/no Upbeet	13.65	15.24	1.23	280	3840
15	Microrate/no stinger Microrate/no stinger+*Outlook Microrate/no stinger	13.03	14.42	1.28	263	3465
16	Microrate/no stinger Microrate/no stinger Microrate	12.88	14.53	1.28	265	3433
17	Microrate/no Upbeet Microrate/no Upbeet Microrate	11.10	14.49	1.29	264	2971

Table 2. 0121 (Continued)

Treatment Number	Herbicide	TON	Sucrose Percent	LTM Percent	Rec. Suc. per Ton	Rec. Suc. per Acre
18	Microrate/no stinger Microrate/no stinger+*Outlook Microrate	13.03	14.31	1.30	261	3378
19	Microrate/no Upbeet Microrate/no Upbeet+*Outlook Microrate with 1/4 oz. Upbeet	16.94	13.73	1.33	248	4202
20	A) Betanex B) Microrate+Outlook C)12 oz./Microrate	15.38	14.34	1.29	261	3991
21	A,B) Betanex C,D) 12 oz. Microrate	15.13	14.31	1.30	260	3924
22	A,B,C) Microrate with 1/4 oz. Upbeet	8.86	14.71	1.27	269	2396
23	A,B,C,D) Microrate with 1/4 oz. Upbeet	16.76	14.56	1.27	266	4562
24	A,B) Microrate C)Microrate1/4 oz. Upbeet	10.70	14.00	1.32	253	2724
25	A,B) Microrate C,D)Microrate1/4 oz. Upbeet	15.98	14.21	1.31	258	4115
	LSD (0.05)	**6.75**	**1.17**	**0.08**	**25**	**936**

Table 3. Experiment 0121
Evaluation of herbicide influence on control of Amaranth species, common lambsquarter, wild proso mill and phytotoxicity to sugar beets (sugarbeet injury and sugarbeet stand)

		Evaluation 1 06-21-01					Evaluation 2 07-05-01			Evaluation 3 07-17-01	
Treat-Ment Timing	Herbicide	Amaranth species	Common Lambs Quarter	Wild Proso Millet	Sugar Beet INJ	Percent Sugar Beet Stand	Amaranth species	Wild Proso Millet	Common Lambs Quarter	Amaranth species	Wild Proso Millet
1	Weed free check	99	99	99	0	80	99	99	99	99	99
2	Betanex A) 24 oz. B) 32 oz. C) 48 oz.	75	97	92	3	63	54	76	60	41	39
3	Betamix A) 16 oz. B) 20 oz. C) 24 oz	64	91	94	0	84	52	85	52	46	53
4	Betanex A) 16 oz. B) 20 oz. C) 24 oz	64	94	89	2	90	63	74	62	39	51
5	A,B,C) Betamix with Microrate	81	94	89	2	85	76	76	74	73	78
6	A,B,C,D) Betamix with Microrate	89	98	97	4	91	80	89	81	82	90
7	A,B,C) Microrate	77	97	90	1	93	73	84	72	64	66
8	A,B,C,D) Microrate	78	97	88	2	94	76	82	79	79	81
9	A,B) Betamix with Microrate C,D) Microrate	87	96	97	2	87	75	92	77	73	91
10	A,B) Microrate C)12 oz. Microrate	85	99	90	1	93	78	85	79	78	82
11	A) Microrate B,C)12 oz./Microrate	77	99	91	3	90	71	82	72	67	80
12	A) Microrate B,C,D)12 oz./Microrate	87	99	91	7	80	73	82	73	64	70
13	A) Microrate B) 12 oz. Microrate C) 16 oz. Microrate	71	98	93	3	82	66	78	66	51	50
14	Microrate/no Upbeet Microrate/no Upbeet+*Outlook Microrate/no Upbeet	95	99	98	4	90	93	97	94	92	97

Table 3. 0121 (Continued)

		Evaluation One					Evaluation Two			Evaluation Three	
Treat-Ment Timing	Herbicide	Amaranth species	Common Lambs Quarter	Wild Proso Millet	Sugar Beet INJ	Percent Sugar Beet Stand	Amaranth species	Wild Proso Millet	Common Lambs Quarter	Amaranth species	Wild Proso Millet
15	Microrate/no stinger Microrate/no stinger+*Outlook Microrate/no stinger	98	99	99	5	78	94	99	95	93	99
16	Microrate/no stinger Microrate/no stinger Microrate	81	98	92	5	85	71	84	74	66	76
17	Microrate/no Upbeet Microrate/no Upbeet Microrate	77	99	92	3	86	66	76	64	63	75
18	Microrate/no stinger Microrate/no stinger+*Outlook Microrate	95	99	99	7	82	92	96	92	92	95
19	Microrate/no Upbeet Microrate/no Upbeet+*Outlook Microrate with 1/4 oz. Upbeet	98	99	99	2	88	97	98	98	98	98
20	A) Betanex B) Microrate+Outlook C)12 oz./Microrate	98	99	99	4	83	91	97	93	90	97
21	A,B) Betanex C,D) 12 oz. Microrate	89	99	86	2	93	78	77	78	82	74
22	A,B,C) Microrate with 1/4 oz. Upbeet	78	92	91	3	79	66	82	67	59	54
23	A,B,C,D) Microrate with 1/4 oz. Upbeet	91	94	91	3	83	81	82	81	83	84
24	A,B) Microrate C)Microrate1/4 oz. Upbeet	78	95	97	4	87	74	89	76	74	91
25	A,B) Microrate C,D)Microrate1/4 oz. Upbeet	94	98	89	3	86	80	79	78	80	81
	LSD (0.05)	**12**	**NS**	**9**	**4**	**16**	**15**	**14**	**15**	**21**	**26**

Summary

- Amaranth species were evaluated as a group due to the difficulty in differentiating between amaranth species.
- Increase rates of Betanex or Betamix alone or in micro rate generally increased weed control
- Four compared to three applications either tended or did give better weed control with similar treatments
- Leaving Upbeet or Stinger out of the micro rate for all applications or all but the last application did not reduce lambsquarter or wild proso millet control
- Increasing Upbeet to ¼ oz./acre at any point in the spray program did not increase weed control.
- Including Outlook in the spray mixture increased Amaranth species control regardless of the treatment
- Recoverable sucrose per acre was or tended to be higher with four applications or when Outlook was in the treatments
- Recoverable sucrose per acre tended to directly relate to cost of treatment; thus, dollars spent were returned in total revenue

SMBSC Program – Renville, MN location
Experiment 0122

Objectives:

Evaluate postemergence sugar beet herbicides alone and in combination at various rates for weed control efficacy and crop phytotoxicity considering economics of the treatment.

Experiment Procedure:

The experiment was a randomized complete block design with 4 replications. Experimental units (plots) were 11 ft wide (6, 22" wide sugar beet rows) and 30 ft long. Treatments were applied to the middle 4 rows of 6 row wide plots with a bicycle wheel type sprayer delivering 8.5 gal./acre at 40 psi using 8001flat fan nozzles traveling at 3 mph.

Treatments are described as follows.

-Microrate	is always	8 oz./acre Betanex
	Unless otherwise	1/8 oz./acre Upbeet
	determined	1.25 oz./acre Stinger
		1.5% v/v Methylated seed oil

-Betamix with Microrate is the Microrate with Betamix instead of Betanex
-12 oz./Microrate is the Microrate with the Betanex at 12 oz./acre
-16 oz./Microrate is the Microrate with the Betanex at 16 oz./acre
-+Outlook indicates Dimethenamid or other wise known as Frontier.
Outlook is always applied at 21 oz./acre, which equates to 32 oz. Frontier.
-Microrate without Upbeet is the Microrate with no Upbeet
-Microrate without Stinger is the Microrate with no Stinger

Table 1. Specifics for SMBSC Program weed control program

Location	Experiment Number	Planting Date	1st	2nd	3rd	4th
SMBSC program-Barret	0122	11-May	31-May	7-May	15-May	22-Jun
Crop Stage			Cotyl.	2 lf	4lf	6 lf
Wind (Mph)			5	10-15 NW	10 SE	5 S
PSI			40	40	40	40
Temp			65	60	68	72
Weed Stage			cotyl.	cotl -2lf	cotl-4lf	cotyl.-6lf
Finish time			12:30	1:30	12:00	11:30
Variety		Beta 6904				

Table 2. Experiment 0122
Evaluation of herbicide influence on sugar beet yield and quality

Eval 1 **21-Jun**
Eval 2 **19-Jul**

Treatment Number	Herbicide	Tons/A	Sucrose	ltm	RST	RSA
1	Weed free check	26.90	15.27	1.21	281	7563
2	Betanex A) 24 oz. B) 32 oz. C) 48 oz.	15.01	15.94	1.17	295	4432
3	Betamix A) 16 oz. B) 20 oz. C) 24 oz	6.78	15.35	1.15	284	1927
4	Betanex A) 16 oz. B) 20 oz. C) 24 oz	6.93	14.15	1.28	257	1783
5	A,B,C) Betamix with Microrate	12.27	13.80	1.30	250	3067
6	A,B,C,D) Betamix with Microrate	22.36	15.01	1.23	276	6162
7	A,B,C) Microrate	6.67	14.55	1.27	266	1771
8	A,B,C,D) Microrate	11.63	14.96	1.25	274	3190
9	A,B) Betamix with Microrate C,D) Microrate	10.34	14.65	1.26	268	2768
10	A,B) Microrate C)12 oz. Microrate	4.65	13.81	1.32	250	1162
11	A) Microrate B,C)12 oz./Microrate	12.30	14.36	1.29	262	3215
12	A) Microrate B,C,D)12 oz./Microrate	19.76	14.38	1.29	262	5176
13	A) Microrate B) 12 oz. Microrate C) 16 oz. Microrate	7.63	14.86	1.25	272	2076
14	A) Microrate/no Upbeet B) Microrate/no Upbeet+*Outlook C) Microrate/no Upbeet	14.65	14.40	1.28	262	3845
15	A) Microrate/no stinger B) Microrate/no stinger+*Outlook C) Microrate/no stinger	8.12	13.50	1.32	244	1978
16	A) Microrate/no stinger B)Microrate/no stinger C) Microrate	10.50	14.76	1.26	270	2834
17	A) Microrate/no Upbeet B) Microrate/no Upbeet C) Microrate	11.13	14.81	1.24	271	3022
18	A) Microrate/no stinger B) Microrate/no stinger+*Outlook C) Microrate	24.40	14.83	1.25	272	6626
19	A) Microrate/no Upbeet B) Microrate/no Upbeet+*Outlook C) Microrate with 1/4 oz. Upbeet	11.55	15.39	1.21	284	3275
20	A) Betanex B) Microrate+Outlook C)12 oz./Microrate	16.34	15.48	1.20	286	4665
21	A,B) Betanex C,D) 12 oz. Microrate	9.48	14.87	1.25	272	2581
22	A,B,C) Microrate with 1/4 oz. Upbeet	11.84	14.84	1.25	272	3220
23	A,B,C,D) Microrate with 1/4 oz. Upbeet	18.12	15.34	1.21	283	5121
24	A,B) Microrate C)Microrate1/4 oz. Upbeet	11.09	15.61	1.19	288	3200
25	A,B) Microrate C,D)Microrate1/4 oz. Upbeet	21.92	15.58	1.19	288	6306
	LSD (0.05)	**3.31**	**1.50**	**0.11**	**32**	**1208**

Table 3. Experiment 0122
Evaluation of herbicide influence on sugar beet injury and common lambsquarter and proso millet control

Eval 1	21-Jun	Herbicide	Evaluation one			Evaluation two	
Eval 2	19-Jul		Sugar Beet Injury	Lambs Quarter Control	Proso Millet Control	Lambs Quarter Control	Proso Millet
Treatment Number	Treatment Timing						
			Percent				
1	A,B,C,D	Weed free check	0	99	99	99	99
2	A	Betanex A) 24 oz. B) 32 oz. C) 48 oz.	0	86	75	76	68
3	A	Betamix A) 16 oz. B) 20 oz. C) 24 oz	0	83	55	68	45
4	A	Betanex A) 16 oz. B) 20 oz. C) 24 oz	0	71	40	64	34
5	A	A,B,C) Betamix with Microrate	0	81	80	71	71
6	A	A,B,C,D) Betamix with Microrate	0	95	93	89	85
7	A	A,B,C) Microrate	1	84	74	78	63
8	A	A,B,C,D) Microrate	0	94	88	90	80
9	A	A,B) Betamix with Microrate C,D) Microrate	0	89	90	86	81
10	A	A,B) Microrate C)12 oz. Microrate	0	89	78	84	71
11	A	A) Microrate B,C)12 oz./Microrate	0	91	75	86	70
12	A	A) Microrate B,C,D)12 oz./Microrate	0	97	91	92	84
13	A	A) Microrate B) 12 oz. Microrate C) 16 oz. Microrate	0	89	73	83	65
14	A B C	Microrate/no Upbeet Microrate/no Upbeet+*Outlook Microrate/no Upbeet	0	86	87	78	90
15	A B C	Microrate/no stinger Microrate/no stinger+*Outlook Microrate/no stinger	0	80	86	78	86
16	A B C	Microrate/no stinger Microrate/no stinger Microrate	0	79	79	71	74
17	A B C	Microrate/no Upbeet Microrate/no Upbeet Microrate	0	78	58	69	55
18	A B C	Microrate/no stinger Microrate/no stinger+*Outlook Microrate	0	89	84	86	91
19	A B C	Microrate/no Upbeet Microrate/no Upbeet+*Outlook Microrate with 1/4 oz. Upbeet	0	93	74	91	82
20	A	A) Betanex B) Microrate+Outlook C)12 oz./Microrate	3	99	98	97	99
21	A	A,B) Betanex C,D) 12 oz. Microrate	0	96	93	88	86
22	A	A,B,C) Microrate with 1/4 oz. Upbeet	0	91	80	90	68
23	A	A,B,C,D) Microrate with 1/4 oz. Upbeet	0	95	85	93	79
24	A	A,B) Microrate C)Microrate1/4 oz. Upbeet	0	87	65	80	59
25	A	A,B) Microrate C,D)Microrate1/4 oz. Upbeet	0	95	88	92	87
		LSD (0.05)	**1.6**	**6**	**10**	**6**	**10**

Summary

- Increased rates of Betamix, or Betanex gave greater weed control; however, increased application gave better results than increased rates
- Including Outlook gave greater control of lambsquarter and proso millet than including Upbeet in last application
- Outlook did increase control of proso millet but did not increase lambsquarter control compared to including Stinger only in the last application
- Increased cost of treatment generally gave increased recoverable sucrose per acre

SMBSC Program – Maynard location
Experiment 0123

Objectives:

Evaluate postemergence sugar beet herbicides alone and in combination at various rates for weed control efficacy and crop phytotoxicity considering economics of the treatment.

Experiment Procedure:

The experiment was a randomized complete block design with 4 replications. Experimental units (plots) were 11 ft wide (6, 22" wide sugar beet rows) and 30 ft long. Treatments were applied to the middle 4 rows of 6 row wide plots with a bicycle wheel type sprayer delivering 8.5 gal./acre at 40 psi using 8001flat fan nozzles traveling at 3 mph.

Treatments are described as follows:

-Microrate is always / Unless otherwise determined: 8 oz./acre Betanex; 1/8 oz./acre Upbeet; 1.25 oz./acre Stinger; 1.5% v/v Methylated seed oil

-Betamix with Microrate is the Microrate with Betamix instead of Betanex

-12 oz./Microrate is the Microrate with the Betanex at 12 oz./acre

-16 oz./Microrate is the Microrate with the Betanex at 16 oz./acre

-+Outlook indicates Dimethenamid or other wise known as Frontier.

The Outlook is always applied at 21 oz./acre, which equates to 32 oz. Frontier.

-Microrate without Upbeet is the Microrate with no Upbeet

-Microrate without Stinger is the Microrate with no Stinger

Table 1. Specifics for SMBSC Program weed control program

Location	Experiment Number	Planting Date	1st	2nd	3rd	4th
SMBSC program-Petersen	0123	10-May	31-May	8-Jun	15-Jun	22-Jun
Crop Stage			Cotyl.	2-4 lf	4lf	4-6 lf
Wind (Mph)			5	10 N	10 SE	calm
PSI			40	40	40	40
Temp			60	65	70	75
Weed Stage			cotyl.	cotl -2lf	cotl-4lf	Cotyl.-6lf
Finish time			5:00	12:30	3:00	3:30
Variety		Beta 6904				

Table 2. Experiment 123
Evaluation of herbicide influence on yield and quality of sugarbeets

		TON	SUCROSE	LTM	RST	RSA
A,B,C,D	Weed free check	18.71	17.10	1.07	321	5998
A	Betanex A) 24 oz. B) 32 oz. C) 48 oz.	15.52	16.95	1.08	317	4925
A	Betamix A) 16 oz. B) 20 oz. C) 24 oz	14.40	16.34	1.33	304	4380
A	Betanex A) 16 oz. B) 20 oz. C) 24 oz	15.24	16.66	1.10	311	4738
A	A,B,C) Betamix with Microrate	15.06	17.26	1.06	324	4876
A	A,B,C,D) Betamix with Microrate	15.57	16.87	1.09	316	4915
A	A,B,C) Microrate	12.91	16.51	1.12	308	3972
A	A,B,C,D) Microrate	18.07	16.93	1.08	317	5728
A	A,B) Betamix with Microrate C,D) Microrate	18.31	16.96	1.09	318	5818
A	A,B) Microrate C)12 oz. Microrate	15.52	16.57	1.11	309	4795
A	A) Microrate B,C)12 oz./Microrate	16.28	16.80	1.10	314	5111
A	A) Microrate B,C,D)12 oz./Microrate	16.22	17.18	1.06	322	5225
A	A) Microrate B) 12 oz. Microrate C) 16 oz. Microrate	13.60	16.37	1.28	305	4144
A B C	Microrate/no Upbeet Microrate/no Upbeet+*Outlook Microrate/no Upbeet	18.18	16.86	1.09	315	5730
A B C	Microrate/no stinger Microrate/no stinger+*Outlook Microrate/no stinger	18.30	17.24	1.06	324	5921
A B C	Microrate/no stinger Microrate/no stinger Microrate	14.60	16.40	1.28	306	4459
A B C	Microrate/no Upbeet Microrate/no Upbeet Microrate	16.46	17.55	1.04	330	5432
A B C	Microrate/no stinger Microrate/no stinger+*Outlook Microrate	18.98	16.72	1.10	312	5925
A B C	Microrate/no Upbeet Microrate/no Upbeet+*Outlook Microrate with 1/4 oz. Upbeet	18.45	16.65	1.11	311	5737
A	A) Betanex B) Microrate+Outlook C)12 oz./Microrate	18.54	16.64	1.11	311	5760
A	A,B) Betanex C,D) 12 oz. Microrate	16.86	16.53	1.11	309	5201
A	A,B,C) Microrate with 1/4 oz. Upbeet	13.43	16.87	1.08	316	4241
A	A,B,C,D) Microrate with 1/4 oz. Upbeet	20.39	16.57	1.11	309	6299
A	A,B) Microrate C)Microrate1/4 oz. Upbeet	16.66	16.08	1.15	299	4978
A	A,B) Microrate C,D)Microrate1/4 oz. Upbeet	15.53	17.15	1.07	322	4991
		5.34	**0.10**	**0.08**	**22**	**1026**

Table 3. Experiment 123
Evaluation of herbicide influence on control of yellow foxtail and common lambsquarter and injury to sugar beets

Evaluation 07-13-01		Sugar Beet Injury	Eval. One Yellow Foxtail	Eval. Two Yellow Foxtail	Common Lambs Quarter
A,B,C,D	Weed free check	1	99	99	99
A	Betanex A) 24 oz. B) 32 oz. C) 48 oz.	1	55	59	84
A	Betamix A) 16 oz. B) 20 oz. C) 24 oz	3	79	70	92
A	Betanex A) 16 oz. B) 20 oz. C) 24 oz	0	50	35	83
A	A,B,C) Betamix with Microrate	0	83	76	95
A	A,B,C,D) Betamix with Microrate	1	86	88	93
A	A,B,C) Microrate	0	58	34	89
A	A,B,C,D) Microrate	0	92	85	94
A	A,B) Betamix with Microrate C,D) Microrate	3	85	86	90
A	A,B) Microrate C)12 oz. Microrate	5	68	49	87
A	A) Microrate B,C)12 oz./Microrate	3	78	60	86
A	A) Microrate B,C,D)12 oz./Microrate	4	89	66	96
A	A) Microrate B) 12 oz. Microrate C) 16 oz. Microrate	4	83	68	90
A B C	Microrate/no Upbeet Microrate/no Upbeet+*Outlook Microrate/no Upbeet	3	92	92	89
A B C	Microrate/no stinger Microrate/no stinger+*Outlook Microrate/no stinger	3	94	94	94
A B C	Microrate/no stinger Microrate/no stinger Microrate	3	74	58	83
A B C	Microrate/no Upbeet Microrate/no Upbeet Microrate	0	60	38	79
A B C	Microrate/no stinger Microrate/no stinger+*Outlook Microrate	1	92	98	98
A B C	Microrate/no Upbeet Microrate/no Upbeet+*Outlook Microrate with 1/4 oz. Upbeet	1	94	96	95
A	A) Betanex B) Microrate+Outlook C)12 oz./Microrate	6	92	92	85
A	A,B) Betanex C,D) 12 oz. Microrate	3	80	76	86
A	A,B,C) Microrate with 1/4 oz. Upbeet	1	65	55	90
A	A,B,C,D) Microrate with 1/4 oz. Upbeet	1	86	87	91
A	A,B) Microrate C)Microrate1/4 oz. Upbeet	1	64	56	92
A	A,B) Microrate C,D)Microrate1/4 oz. Upbeet	1	88	83	94
		4	**18**	**20**	**15**

Summary

- Betamix alone gave better control than Betanex alone for yellow foxtail and lambsquarter.
- Three applications of Betamix in micro rate gave similar control as Betanex in micro rate for yellow foxtail and lambsquarter.
- The addition of Outlook significantly increased yellow foxtail control.
- Increasing Upbeet from 1/8 oz./A to ¼ oz./A in micro rate did not significantly increase control of yellow foxtail or lambsquarter when considering three application programs.
- Four application micro rate programs gave very good control of yellow foxtail and lambsquarter regardless of Upbeet rate.
- Recoverable sucrose per acre was related to weed control.

Table 1B is a list of the treatments tested and there cost per acre. The treatment cost are based on prices acquired as payment in spring of 2002. These prices may vary depending on the source and yet the prices of the treatment are relative. The treatment list is for the following three trial presented in experiments 0124 and 0125.

Table 1B. Cost per acre for experiments 0124 and 0125

Treatment Number	App. Time	Treatment Description	Herbicide rate	Cost Per Acre
1	N/A	Weed free check		0
2	A	Betamix	1 pt	42.3
	B	Betamix	1.25 pt	
	C	Betamix	1.5 pt	
3	A	Betamix + Outlook	1 pt + 12 oz.	52.8
	B	Betamix	1.25 pt	
	C	Betamix	1.5 pt	
4	A	Betamix + Outlook	1 pt + 17 oz.	56.71
	B	Betamix	1.25 pt	
	C	Betamix	1.5 pt	
5	A	Betamix + Outlook	1 pt + 21.oz.	60.67
	B	Betamix	1.25 pt	
	C	Betamix	1.5 pt	
6	A	Betamix	1 pt	52.8
	B	Betamix + Outlook	1.25 pt + 12 oz.	
	C	Betamix	1.5 pt	
7	A	Betamix	1 pt	56.71
	B	Betamix + Outlook	1.25 pt + 17 oz.	
	C	Betamix	1.5 pt	
8	A	Betamix	1 pt	60.67
	B	Betamix + Outlook	1.25 pt + 21 oz.	
	C	Betamix	1.5 pt	
9	A	Betamix	1 pt	52.8
	B	Betamix	1.25 pt	
	C	Betamix + Outlook	1.5 pt + 12 oz.	
10	A	Betamix	1 pt	56.71
	B	Betamix	1.25 pt	
	C	Betamix + Outlook	1.5 pt + 17 oz.	
11	A	Betamix	1 pt	60.67
	B	Betamix	1.25 pt	
	C	Betamix + Outlook	1.5 pt + 21 oz.	
12	A	Micro rate	Micro rate	50.25
	B	Micro rate	Micro rate	
	C	Micro rate	Micro rate	
13	A	Micro rate + Outlook	Micro rate + 12 oz.	60.84
	B	Micro rate	Micro rate	
	C	Micro rate	Micro rate	
14	A	Micro rate + Outlook	Micro rate + 17 oz.	64.66
	B	Micro rate	Micro rate	
	C	Micro rate	Micro rate	

Table 1B (Continued)

Treatment Number	App. Time	Treatment Description	Herbicide rate	Cost Per Acre
15	A	Micro rate + Outlook	Micro rate + 21 oz.	68.62
	B	Micro rate	Micro rate	
	C	Micro rate	Micro rate	
16	A	Micro rate	Micro rate	60.84
	B	Micro rate + Outlook	Micro rate + 12 oz.	
	C	Micro rate	Micro rate	
17	A	Micro rate	Micro rate	64.66
	B	Micro rate + Outlook	Micro rate +17 oz.	
	C	Micro rate	Micro rate	
18	A	Micro rate	Micro rate	68.62
	B	Micro rate + Outlook	Micro rate + 21 oz.	
	C	Micro rate	Micro rate	
19	A	Micro rate	Micro rate	60.84
	B	Micro rate	Micro rate	
	C	Micro rate + Outlook	Micro rate + 12 oz.	
20	A	Micro rate	Micro rate	64.66
	B	Micro rate	Micro rate	
	C	Micro rate + Outlook	Micro rate + 17 oz.	
21	A	Micro rate	Micro rate	68.62
	B	Micro rate	Micro rate	
	C	Micro rate + Outlook	Micro rate + 21 oz.	
22	A	Betamix	1 pt	60.67
	B	Betamix + Outlook	1.25 pt + 13 oz.	
	C	Betamix + Outlook	1.5 + 9 oz.	
23	A	Micro rate	Micro rate	68.62
	B	Micro rate + Outlook	Micro rate +13 oz.	
	C	Micro rate + Outlook	Micro rate + 9 oz.	

SMBSC Program – Maynard location
Experiment 0124

Objectives:

Evaluate postemergence sugar beet herbicides alone and in combination at various rates for weed control efficacy and crop phytotoxicity considering economics of the treatment.

Experiment Procedure:

The experiment was a randomized complete block design with 4 replications. Experimental units (plots) were 11 ft wide (6, 22" wide sugar beet rows) and 30 ft long. Treatments were applied to the middle 4 rows of 6 row wide plots with a bicycle wheel type sprayer delivering 8.5 gal./acre at 40 psi using 8001flat fan nozzles traveling at 3 mph. The micro-rate included Betamix, Upbeet, Stinger, and methylated seed oil at .5 pt., 1/8 oz., 1.25 oz., and 1.5%v/v, respectively.

Table 1. Specifics for SMBSC Program weed control program

Location	Experiment Number	Planting Date	1st	2nd	3rd	4th
outlook rate-petersen	0124	10-May	31-May	6-Jun	14-Jun	22-Jun
Crop Stage			Cotyl.	2-4 lf	eary 4lf	4-6 lf
Wind (Mph)			5	10-20 NW	10 SE	Calm
PSI			40	40	40	40
Temp			60	60	70	75
Weed Stage			cotyl.	cotl -2lf	cotl-4lf	cotyl.-6lf
Finish time			2:00	11:30	9:00	5:00
Variety		ACH 952				

Table 2. (Experiment 0124) Weed control in Sugar Beets yield as influenced by postemergence herbicide and timing of Outlook

Exp. 0024 **Evaluation 1 07-13-01** **Evaluation 2 07-27-01**

Application Timing	Herbicide	Herbicide Rate	Evaluation1 Sugar Beet Injury	Evaluation1 Yellow Foxtail	Evaluation2 Sugar Beet Injury	Evaluation2 Yellow Foxtail
N/A	Weed free check		0	99	0	99
A B C	Betamix Betamix Betamix	1 pt 1.25 pt 1.5 pt	0	71	0	35
A B C	Betamix + Outlook Betamix Betamix	1 pt + 12 oz. 1.25 pt 1.5 pt	4	91	0	90
A B C	Betamix + Outlook Betamix Betamix	1 pt + 17 oz. 1.25 pt 1.5 pt	10	96	0	98
A B C	Betamix + Outlook Betamix Betamix	1 pt + 21.oz. 1.25 pt 1.5 pt	8	97	0	98
A B C	Betamix Betamix + Outlook Betamix	1 pt 1.25 pt + 12 oz. 1.5 pt	10	97	0	90
A B C	Betamix Betamix + Outlook Betamix	1 pt 1.25 pt + 17 oz. 1.5 pt	11	99	0	97
A B C	Betamix Betamix + Outlook Betamix	1 pt 1.25 pt + 21 oz. 1.5 pt	10	99	0	98
A B C	Betamix Betamix Betamix + Outlook	1 pt 1.25 pt 1.5 pt + 12 oz.	1	70	0	46
A B C	Betamix Betamix Betamix + Outlook	1 pt 1.25 pt 1.5 pt + 17 oz.	5	76	0	38

Exp. 0024 (Continued)

Application Timing	Herbicide	Herbicide Rate	Evaluation1		Evaluation2	
			Sugar Beet Injury	Yellow Foxtail	Sugar Beet Injury	Yellow Foxtail
A B C	Betamix Betamix Betamix + Outlook	1 pt 1.25 pt 1.5 pt + 21 oz.	1	60	0	51
A B C	Micro rate Micro rate Micro rate	Micro rate Micro rate Micro rate	0	74	0	40
A B C	Micro rate + Outlook Micro rate Micro rate	Micro rate + 12 oz. Micro rate Micro rate	1	94	0	93
A B C	Micro rate + Outlook Micro rate Micro rate	Micro rate + 17 oz. Micro rate Micro rate	1	99	0	99
A B C	Micro rate + Outlook Micro rate Micro rate	Micro rate + 21 oz. Micro rate Micro rate	0	99	0	99
A B C	Micro rate Micro rate + Outlook Micro rate	Micro rate Micro rate + 12 oz. Micro rate	3	95	0	99
A B C	Micro rate Micro rate + Outlook Micro rate	Micro rate Micro rate +17 oz. Micro rate	4	99	0	97
A B C	Micro rate Micro rate + Outlook Micro rate	Micro rate Micro rate + 21 oz. Micro rate	4	99	0	97
A B C	Micro rate Micro rate Micro rate + Outlook	Micro rate Micro rate Micro rate + 12 oz.	0	58	0	40

Exp. 0024 (Continued)

Application Timing	Herbicide	Herbicide Rate	Evaluation1 Sugar Beet Injury	Evaluation1 Yellow Foxtail	Evaluation2 Sugar Beet Injury	Evaluation2 Yellow Foxtail
A B C	Micro rate Micro rate Micro rate + Outlook	Micro rate Micro rate Micro rate + 17 oz.	1	69	0	59
A B C	Micro rate Micro rate Micro rate + Outlook	Micro rate Micro rate Micro rate + 21 oz.	1	76	0	56
			6	10	NS	17

Table 3. (Experiment 0124) Sugar Beets yield as influenced by Postemergence herbicides and timing of outlook

Exp. 0024

Appl. Timing	Herbicide	Herbicide Rate	Tons	Sucrose	Loss to Molasses	Recoverable Sucrose/Ton	Recoverable Sucrose/Acre
N/A	Weed free check		16.83	17.58	1.13	331	5584
A B C	Betamix Betamix Betamix	1 pt 1.25 pt 1.5 pt	14.22	16.96	1.13	318	4517
A B C	Betamix + Outlook Betamix Betamix	1 pt + 12 oz. 1.25 pt 1.5 pt	16.14	17.53	1.11	330	5281
A B C	Betamix + Outlook Betamix Betamix	1 pt + 17 oz. 1.25 pt 1.5 pt	16.92	16.87	1.10	316	5374
A B C	Betamix + Outlook Betamix Betamix	1 pt + 21.oz. 1.25 pt 1.5 pt	15.78	16.40	1.09	306	4817

Exp. 0024 (Continued)

Appl. Timing	Herbicide	Herbicide Rate	Tons	Sucrose	Loss to Molasses	Recoverable Sucrose/Ton	Recoverable Sucrose/Acre
A B C	Betamix Betamix + Outlook Betamix	1 pt 1.25 pt + 12 oz. 1.5 pt	17.32	16.89	1.09	316	5455
A B C	Betamix Betamix + Outlook Betamix	1 pt 1.25 pt + 17 oz. 1.5 pt	16.72	17.09	1.08	320	5344
A B C	Betamix Betamix + Outlook Betamix	1 pt 1.25 pt + 21 oz. 1.5 pt	15.44	17.14	1.08	322	4956
A B C	Betamix Betamix Betamix + Outlook	1 pt 1.25 pt 1.5 pt + 12 oz.	17.56	17.25	1.08	324	5661
A B C	Betamix Betamix Betamix + Outlook	1 pt 1.25 pt 1.5 pt + 17 oz.	10.96	17.38	1.07	327	3577
A B C	Betamix Betamix Betamix + Outlook	1 pt 1.25 pt 1.5 pt + 21 oz.	12.28	16.61	1.07	310	3872
A B C	Micro rate Micro rate Micro rate	Micro rate Micro rate Micro rate	16.74	17.21	1.06	323	5396
A B C	Micro rate + Outlook Micro rate Micro rate	Micro rate + 12 oz. Micro rate Micro rate	18.97	17.42	1.06	328	6196
A B C	Micro rate + Outlook Micro rate Micro rate	Micro rate + 17 oz. Micro rate Micro rate	16.62	17.19	1.06	323	5338
A B C	Micro rate + Outlook Micro rate Micro rate	Micro rate + 21 oz. Micro rate Micro rate	19.01	16.72	1.06	313	5934

Exp. 0024 (Continued)

Appl. Timing	Herbicide	Herbicide Rate	Tons	Sucrose	Loss to Molasses	Recoverable Sucrose/Ton	Recoverable Sucrose/Acre
A B C	Micro rate Micro rate + Outlook Micro rate	Micro rate Micro rate + 12 oz. Micro rate	16.77	17.37	1.06	326	5454
A B C	Micro rate Micro rate + Outlook Micro rate	Micro rate Micro rate +17 oz. Micro rate	17.76	16.31	1.05	304	5368
A B C	Micro rate Micro rate + Outlook Micro rate	Micro rate Micro rate + 21 oz. Micro rate	17.57	17.11	1.05	321	5632
A B C	Micro rate Micro rate Micro rate + Outlook	Micro rate Micro rate Micro rate + 12 oz.	12.54	16.93	1.05	317	3964
A B C	Micro rate Micro rate Micro rate + Outlook	Micro rate Micro rate Micro rate + 17 oz.	13.52	17.19	1.04	323	4367
A B C	Micro rate Micro rate Micro rate + Outlook	Micro rate Micro rate Micro rate + 21 oz.	13.00	16.95	1.04	317	4147
			4.15	**0.84**	**0.06**	**18**	**1277**

Summary

- Yellow foxtail control with Betamix and micro rate was significantly increased with the addition of Outlook regardless of rate at cotyledon and 2 leaf stage.
- Yellow foxtail control was maintained later in the season with the addition of Outlook to Betamix or micro rate applied at cotyledon or 2 leaf sugar beet stage.
- Recoverable sucrose per acre tended to be related to yellow foxtail control.

SMBSC Program – Buffalo Lake location
Experiment 0125

Objectives:

Evaluate postemergence sugar beet herbicides alone and in combination at various rates for weed control efficacy and crop phytotoxicity considering economics of the treatment.

Experiment Procedure:

The experiment was a randomized complete block design with 4 replications. Experimental units (plots) were 11 ft wide (6, 22" wide sugar beet rows) and 30 ft long. Treatments were applied to the middle 4 rows of 6 row wide plots with a bicycle wheel type sprayer delivering 8.5 gal./acre at 40 psi using 8001flat fan nozzles traveling at 3 mph.

Table 1. Specifics for SMBSC Program weed control program

Location	Experiment Number	Planting Date	1st	2nd	3rd	4th
Outlook rate-Roedl	0125	15-May	30-May	6-Jun	16-Jun	23-Jun
Crop Stage			Cotyl.	2-4 lf	eary 4lf	4-6 lf
Wind (Mph)			5	10-20 NW	10 SE	calm
PSI			40	40	40	40
Temp			62	55	70	75
Weed Stage			Cotyl.	cotl -2lf	cotl-4lf	cotyl.-6lf
Finish time						
Variety		VDH 46109	11:30	2:30	12:30	1:30

Table 2. (Experiment 0125) Weed control in Sugar Beets as influenced by postemergence herbicides and timing of outlook

			Evaluation One 06-28-01					Evaluation Two 07-12-01				Evaluation Three 07-26-01			
Treatment Timing	Herbicide	Herbicide Rate	Common Lambs Quarter	Amaranth Species	Venice Mallow	Wild Proso Millet	Sugar Beet Injury	Common Lambs Quarter	Amaranth Species	Venice Mallow	Wild Proso Millet	Common Lambs Quarter	Amaranth Species	Venice Mallow	Wild Proso Millet
N/A	Weed free check		99	99	99	99	0	99	99	99	99	99	99	99	99
A	Betamix	1 pt	73	70	68	58	0	51	37	52	33	50	46	38	39
B	Betamix	1.25 pt													
C	Betamix	1.5 pt													
A	Betamix + Outlook	1 pt + 12 oz.	78	86	71	94	0	73	79	62	91	60	77	70	92
B	Betamix	1.25 pt													
C	Betamix	1.5 pt													
A	Betamix + Outlook	1 pt + 17 oz.	79	85	63	80	0	68	68	66	73	71	76	99	73
B	Betamix	1.25 pt													
C	Betamix	1.5 pt													
A	Betamix + Outlook	1 pt + 21.oz.	84	99	78	96	0	80	96	74	94	67	90	87	89
B	Betamix	1.25 pt													
C	Betamix	1.5 pt													
A	Betamix	1 pt	80	94	71	93	0	69	77	69	87	63	75	89	83
B	Betamix + Outlook	1.25 pt + 12 oz.													
C	Betamix	1.5 pt													
A	Betamix	1 pt	77	94	77	95	0	68	91	66	98	58	90	81	99
B	Betamix + Outlook	1.25 pt + 17 oz.													
C	Betamix	1.5 pt													
A	Betamix	1 pt	80	89	71	85	0	73	81	77	87	80	91	99	82
B	Betamix + Outlook	1.25 pt + 21 oz.													
C	Betamix	1.5 pt													
A	Betamix	1 pt	77	81	58	76	0	66	60	30	60	61	72	43	72
B	Betamix	1.25 pt													
C	Betamix + Outlook	1.5 pt + 12 oz.													

Table 2 (Continued)			Evaluation One					Evaluation Two				Evaluation Three			
Treatment Timing	Herbicide	Herbicide Rate	Common Lambs Quarter	Amaranth Species	Venice Mallow	Wild Proso Millet	Sugar Beet Injury	Common Lambs Quarter	Amaranth Species	Venice Mallow	Wild Proso Millet	Common Lambs Quarter	Amaranth Species	Venice Mallow	Wild Proso Millet
A	Betamix	1 pt	80	86	68	86	0	69	81	59	74	65	81	68	81
B	Betamix	1.25 pt													
C	Betamix + Outlook	1.5 pt + 17 oz.													
A	Betamix	1 pt	81	90	68	74	0	69	76	62	44	61	84	56	59
B	Betamix	1.25 pt													
C	Betamix + Outlook	1.5 pt + 21 oz.													
A	Micro rate	Micro rate	85	82	92	95	0	79	72	94	90	78	68	99	97
B	Micro rate	Micro rate													
C	Micro rate	Micro rate													
A	Micro rate + Outlook	Micro rate + 12 oz.	93	93	91	97	0	90	90	97	95	87	87	99	99
B	Micro rate	Micro rate													
C	Micro rate	Micro rate													
A	Micro rate + Outlook	Micro rate + 17 oz.	80	89	89	98	0	73	91	98	99	65	88	99	99
B	Micro rate	Micro rate													
C	Micro rate	Micro rate													
A	Micro rate + Outlook	Micro rate + 21 oz.	90	94	93	99	2	83	91	91	98	80	92	93	99
B	Micro rate	Micro rate													
C	Micro rate	Micro rate													
A	Micro rate	Micro rate	84	94	96	98	0	76	88	94	99	69	93	99	99
B	Micro rate + Outlook	Micro rate + 12 oz.													
C	Micro rate	Micro rate													
A	Micro rate	Micro rate	86	93	99	98	2	78	90	97	98	65	85	97	98
B	Micro rate + Outlook	Micro rate +17 oz.													
C	Micro rate	Micro rate													

Table 2 (Continued)

			Evaluation One					Evaluation Two				Evaluation Three			
Treatment Timing	Herbicide	Herbicide Rate	Common Lambs Quarter	Amaranth Species	Venice Mallow	Wild Proso Millet	Sugar Beet Injury	Common Lambs Quarter	Amaranth Species	Venice Mallow	Wild Proso Millet	Common Lambs Quarter	Amaranth Species	Venice Mallow	Wild Proso Millet
A	Micro rate	Micro rate	84	91	91	97	4	75	87	90	98	65	85	90	98
B	Micro rate + Outlook	Micro rate + 21 oz.													
C	Micro rate	Micro rate													
A	Micro rate	Micro rate	86	94	90	93	1	79	79	92	92	64	75	97	93
B	Micro rate	Micro rate													
C	Micro rate + Outlook	Micro rate + 12 oz.													
A	Micro rate	Micro rate	76	80	85	82	1	61	68	95	80	51	66	97	96
B	Micro rate	Micro rate													
C	Micro rate + Outlook	Micro rate + 17 oz.													
A	Micro rate	Micro rate	83	94	82	91	1	73	75	91	86	65	74	99	88
B	Micro rate	Micro rate													
C	Micro rate + Outlook	Micro rate + 21 oz.													
A	Betamix	1 pt	84	99	77	96	13	76	88	65	92	68	86	87	98
B	Betamix + Outlook	1.25 pt + 12 oz.													
C	Betamix + Outlook	1.5 + 9 oz.													
A	Micro rate	Micro rate	92	95	90	90	14	92	95	90	90	92	95	90	90
B	Micro rate + Outlook	Micro rate +12 oz.													
C	Micro rate + Outlook	Micro rate + 9 oz.													
		LSD (0.05)	11	13	17	15	4	20	23	26	21	25	21	20	21

Table 3. (Experiment 0125)
Sugar Beets yield as influenced by postemergence herbicides and timing of outlook

Exp. 0025

Treatment Timing	Herbicide	Herbicide Rate	Tons	Sucrose	LTM	RST	RSA
N/A	Weed free check		18.30	15.85	1.17	294	5371
A	Betamix	1 pt	6.19	15.13	1.23	278	1720
B	Betamix	1.25 pt					
C	Betamix	1.5 pt					
A	Betamix + Outlook	1 pt + 12 oz.	6.93	14.60	1.28	266	1847
B	Betamix	1.25 pt					
C	Betamix	1.5 pt					
A	Betamix + Outlook	1 pt + 17 oz.	6.93	14.60	1.28	266	1846
B	Betamix	1.25 pt					
C	Betamix	1.5 pt					
A	Betamix + Outlook	1 pt + 21.oz.	9.77	15.17	1.23	279	2718
B	Betamix	1.25 pt					
C	Betamix	1.5 pt					
A	Betamix	1 pt	7.58	14.82	1.26	271	2050
B	Betamix + Outlook	1.25 pt + 12 oz.					
C	Betamix	1.5 pt					
A	Betamix	1 pt	14.20	15.74	1.18	291	4135
B	Betamix + Outlook	1.25 pt + 17 oz.					
C	Betamix	1.5 pt					
A	Betamix	1 pt	12.23	15.54	1.19	287	3534
B	Betamix + Outlook	1.25 pt + 21 oz.					
C	Betamix	1.5 pt					
A	Betamix	1 pt	6.08	14.85	1.26	272	1652
B	Betamix	1.25 pt					
C	Betamix + Outlook	1.5 pt + 12 oz.					
A	Betamix	1 pt	9.19	15.53	1.20	287	2625
B	Betamix	1.25 pt					
C	Betamix + Outlook	1.5 pt + 17 oz.					
A	Betamix	1 pt	7.88	16.47	1.12	307	2419
B	Betamix	1.25 pt					
C	Betamix + Outlook	1.5 pt + 21 oz.					
A	Micro rate	Micro rate	6.26	15.47	1.21	285	1788
B	Micro rate	Micro rate					
C	Micro rate	Micro rate					

Exp. 0025 (Continued)

Treatment Timing	Herbicide	Herbicide Rate	Tons	Sucrose	LTM	RST	RSA
A	Micro rate + Outlook	Micro rate + 12 oz.	10.37	15.41	1.21	284	2943
B	Micro rate	Micro rate					
C	Micro rate	Micro rate					
A	Micro rate + Outlook	Micro rate + 17 oz.	8.00	15.41	1.21	284	2285
B	Micro rate	Micro rate					
C	Micro rate	Micro rate					
A	Micro rate + Outlook	Micro rate + 21 oz.	10.60	15.10	1.23	277	2951
B	Micro rate	Micro rate					
C	Micro rate	Micro rate					
A	Micro rate	Micro rate	12.43	14.06	1.30	255	3153
B	Micro rate + Outlook	Micro rate + 12 oz.					
C	Micro rate	Micro rate					
A	Micro rate	Micro rate	11.96	14.15	1.28	257	2996
B	Micro rate + Outlook	Micro rate +17 oz.					
C	Micro rate	Micro rate					
A	Micro rate	Micro rate	16.03	15.36	1.21	283	4545
B	Micro rate + Outlook	Micro rate + 21 oz.					
C	Micro rate	Micro rate					
A	Micro rate	Micro rate	12.49	15.09	1.23	277	3461
B	Micro rate	Micro rate					
C	Micro rate + Outlook	Micro rate + 12 oz.					
A	Micro rate	Micro rate	17.71	15.96	1.16	296	5258
B	Micro rate	Micro rate					
C	Micro rate + Outlook	Micro rate + 17 oz.					
A	Micro rate	Micro rate	18.31	15.17	1.23	279	5099
B	Micro rate	Micro rate					
C	Micro rate + Outlook	Micro rate + 21 oz.					
A	Betamix	1 pt	17.08	14.94	1.25	274	4678
B	Betamix + Outlook	1.25 pt + 12 oz.					
C	Betamix + Outlook	1.5 + 9 oz.					

A	Micro rate	Micro rate	18.73	14.58	1.28	266	4990
B	Micro rate + Outlook	Micro rate +12 oz.					
C	Micro rate + Outlook	Micro rate + 9 oz.					

LSD (0.05)	3.09	1.16	0.08	25	896

Summary

- Amaranth species were evaluated as a group due to the difficulty in differentiating between amaranth species.
- Outlook applied with Betamix gave the best overall weed control at 21 oz./acre and when sugarbeets were at the 2 leaf stage.
- Outlook applied with Betamix (4 leaf sugarbeets) late gave the poorest weed control of the three application stages tested.
- Micro rate control of venice mallow and proso millet was not enhanced by the addition of Outlook.
- Outlook added to microrate in the first (cotylodon sugarbeet) or second (2 leaf sugarbeets) application either tended or did enhance amaranth species control similarly.
- The highest overall weed control was achieved with a split application of Outlook at 12 oz./A at 2 leaf sugarbeet stage and 9 oz./A at 4 leaf sugarbeet stage with the micro rate.
- Recoverable sucrose per acre was similar to the weed free check and higher than all other treatments with the micro rate and Outlook of 17 oz./A at 4 leaf stage of sugarbeets, Outlook of 21 oz./A at 2 and 4 leaf stage of sugarbeets or split applied with micro rate or Betamix.

Table 1C is a list of the treatments tested and there cost per acre. The treatment cost are based on prices acquired as payment in spring of 2002. These prices may vary depending on the source and yet the prices of the treatment are relative. The treatment list is for the following three trial presented in experiments 0126, 0127, 0128.

Table 1C. Cost per acre for experments 0126, 0127, 0128.

Treatment Number	App. Time	Treatment Description	Herbicide rate	Cost Per Acre
1	N/A	Weed free check		0.00
2	A	Betanex	16 oz.	45.12
	B	Betanex	16 oz.	
	C	Betanex	16 oz.	
	D	Betanex	16 oz.	
3	A	Betamix	16 oz.	45.12
	B	Betamix	16 oz.	
	C	Betamix	16 oz.	
	D	Betamix	16 oz.	
4	A	Betamix + Mso	8 oz. + 1.5 % v/v	30.72
	B	Betamix + Mso	8 oz. + 1.5 % v/v	
	C	Betamix + Mso	8 oz. + 1.5 % v/v	
	D	Betamix + Mso	8 oz. + 1.5 % v/v	
5	A	Betamix	16 oz.	63.49
	B	Betamix + Frontier	16 oz. + 21 oz.	
	C	Betamix	16 oz.	
	D	Betamix	16 oz.	
6	A	Betamix+Stinger	16 oz. + 1.25 oz.	61.96
	B	Betamix+Stinger	16 oz. + 1.25 oz.	
	C	Betamix+Stinger	16 oz. + 1.25 oz.	
	D	Betamix+Stinger	16 oz. + 1.25 oz.	
7	A	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v	47.56
	B	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v	
	C	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v	
	D	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v	
8	A	Betamix+Stinger + Mso	8 oz.+ 1.25 oz. +1.5% v/v	65.93
	B	Betamix+Stinger + Mso + Outlook	8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.	
	C	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v	
	D	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v	
9	A	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v	68.53
	B	Betamix+Upbeet+Mso + Outlook	8 oz.+ 1/8 oz. +.5% v/v + 21 oz.	
	C	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v	
	D	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v	
10	A	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	67.00
	B	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	
	C	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	
	D	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	
11	A	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	85.37
	B	Betamix+Upbeet+Stinger+Mso + Outlook	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.	
	C	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	
	D	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	

SMBSC Program – Maynard location
Experiment 0126

Objectives:

Evaluate postemergence sugar beet herbicides alone and in combination at various rates for weed control efficacy and crop phytotoxicity considering economics of the treatment.

Experiment Procedure:

The experiment was a randomized complete block design with 4 replications. Experimental units (plots) were 11 ft wide (6, 22" wide sugar beet rows) and 30 ft long. Treatments were applied to the middle 4 rows of 6 row wide plots with a bicycle wheel type sprayer delivering 8.5 gal./acre at 40 psi using 8001 flat fan nozzles traveling at 3 mph.

Table 1. Specifics for SMBSC Program weed control program

Location	Experiment Number	Planting Date	1st	2nd	3rd	4th
Outlook economics-petersen	0126	10-May	31-May	6-Jun	14-Jun	22-Jun
Crop Stage			Cotyl.	2-4 lf	eary 4lf	4-6 lf
Wind (Mph)			5	10-20 NW	10 SE	Calm
PSI			40	40	40	40
Temp			70	52	70	75
Weed Stage			Cotyl.	cotl -2lf	cotl-4lf	cotyl.-6lf
Finish time						
Variety		Beta 6904				

Table 2. Yield and foxtail control as influenced by Sugar Beet herbicides and economics of herbicide treatments.

Evaluation 1 07-13-01
Evaluation 2 07-27-01

			Sugar Beet Injury	Eval 1 Yellow Foxtail	Eval 2 Yellow Foxtail
N/A	Weed free check		0	99	99
A	Betanex	16 oz.	0	41	40
B	Betanex	16 oz.			
C	Betanex	16 oz.			
D	Betanex	16 oz.			
A	Betamix	16 oz.	0	83	71
B	Betamix	16 oz.			
C	Betamix	16 oz.			
D	Betamix	16 oz.			
A	Betamix + Mso	8 oz. + 1.5 % v/v	0	69	65
B	Betamix + Mso	8 oz. + 1.5 % v/v			
C	Betamix + Mso	8 oz. + 1.5 % v/v			
D	Betamix + Mso	8 oz. + 1.5 % v/v			
A	Betamix	16 oz.	0	97	98
B	Betamix + Outlook	16 oz. + 21 oz.			
C	Betamix	16 oz.			
D	Betamix	16 oz.			
A	Betamix+Stinger	16 oz. + 1.25 oz.	0	55	58
B	Betamix+Stinger	16 oz. + 1.25 oz.			
C	Betamix+Stinger	16 oz. + 1.25 oz.			
D	Betamix+Stinger	16 oz. + 1.25 oz.			
A	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v	0	73	63
B	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v			
C	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v			
D	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v			
A	Betamix+Stinger + Mso	8 oz.+ 1.25 oz. +1.5% v/v	0	99	97
B	Betamix+Stinger + Mso + Outlook	8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.			
C	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v			
D	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v			

Table 2 (Continued)

			Sugar Beet Injury	Eval 1 Yellow Foxtail	Eval 2 Yellow Foxtail
A	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v	0	96	96
B	Betamix+Upbeet+Mso + Outlook	8 oz.+ 1/8 oz. +.5% v/v + 21 oz.			
C	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v			
D	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v			
A	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	0	94	87
B	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v			
C	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v			
D	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v			
A	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	0	99	99
B	Betamix+Upbeet+Stinger+Mso + Outlook	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.			
C	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v			
D	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v			
		LSD (0.05)	**NS**	**16**	**19**

Table 3. Yield and foxtail control as influenced by Sugar Beet herbicides and economics of herbicide treatments.

App. Time	Treatment Description	Herbicide rate	Tons/ Acre	Suc. %	LTM %	RST	RSA
N/A	Weed free check		20.38	15.84	1.17	293	6001
A	Betanex	16 oz.	16.16	15.99	1.16	297	4782
B	Betanex	16 oz.					
C	Betanex	16 oz.					
D	Betanex	16 oz.					
A	Betamix	16 oz.	16.48	16.31	1.13	303	5005
B	Betamix	16 oz.					
C	Betamix	16 oz.					
D	Betamix	16 oz.					
A	Betamix + Mso	8 oz. + 1.5 % v/v	15.50	16.58	1.11	309	4791
B	Betamix + Mso	8 oz. + 1.5 % v/v					
C	Betamix + Mso	8 oz. + 1.5 % v/v					
D	Betamix + Mso	8 oz. + 1.5 % v/v					
A	Betamix	16 oz.	19.63	16.18	1.14	301	5905
B	Betamix + Outlook	16 oz. + 21 oz.					
C	Betamix	16 oz.					
D	Betamix	16 oz.					
A	Betamix+Stinger	16 oz. + 1.25 oz.	16.58	16.19	1.14	301	4991
B	Betamix+Stinger	16 oz. + 1.25 oz.					
C	Betamix+Stinger	16 oz. + 1.25 oz.					
D	Betamix+Stinger	16 oz. + 1.25 oz.					
A	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v	15.73	16.68	1.10	311	4888
B	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
C	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
A	Betamix+Stinger + Mso	8 oz.+ 1.25 oz. +1.5% v/v	19.36	16.48	1.12	307	5936
B	Betamix+Stinger + Mso + Outlook	8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.					
C	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					

Table 3 (Continued)

App. Time	Treatment Description	Herbicide rate	Tons/ Acre	Suc. %	LTM %	RST	RSA
A	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v	19.04	16.63	1.11	310	5907
B	Betamix+Upbeet+Mso + Outlook	8 oz.+ 1/8 oz. +.5% v/v + 21 oz.					
C	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v					
D	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v					
A	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	15.65	16.43	1.13	306	4827
B	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
C	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
A	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	19.97	16.67	1.10	311	6211
B	Betamix+Upbeet+Stinger+Mso + Outlook	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.					
C	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
		LSD (0.05)	**3.14**	**NS**	**NS**	**NS**	**1011**

Summary

- Yellow foxtail control was enhanced by including all components of the micro rate or by adding Outlook to the spray program.
- Excluding Upbeet from the spray program reduced yellow foxtail control by 21% (evaluation 1) and 24% (evaluation 2).
- Micro rate plus Outlook was the only treatment that gave recoverable sucrose per acre higher than the weed free check.
- All treatments, which included Outlook, gave recoverable sucrose per acre of 5,905 lb./A or greater which was 900 lb/A better than the next best treatment without Outlook.

SMBSC Program – Renville location
Experiment 0127

Objectives:

Evaluate postemergence sugar beet herbicides alone and in combination at various rates for weed control efficacy and crop phytotoxicity considering economics of the treatment.

Experiment Procedure:

The experiment was a randomized complete block design with 4 replications. Experimental units (plots) were 11 ft wide (6, 22" wide sugar beet rows) and 30 ft long. Treatments were applied to the middle 4 rows of 6 row wide plots with a bicycle wheel type sprayer delivering 8.5 gal./acre at 40 psi using 8001flat fan nozzles traveling at 3 mph.

Table 1. Specifics for SMBSC Program weed control program

Location	Experiment Number	Planting Date	1st	2nd	3rd	4th
Outlook economics-Nagens	0127	20-May	7-Jun	14-Jun	21-Jun	28-Jun
Crop Stage			Cotyl.	2-4 lf	eary 4lf	4-6 lf
Wind (Mph)			5	10-20 NW	10 SE	calm
PSI			40	40	40	40
Temp			62	80	75	80
Weed Stage			cotyl.	cotl -2lf	cotl-4lf	cotyl.-6lf
Finish time			6:00	2:00	3:00	10:00
Variety		ACH 952				

Table 2. (Experiment 0127) Sugar Beets yield as influenced by sugarbeet herbicides and economics of herbicide treatment

App. Time	Herbicide Treatment	Herbicide Rate	Tons/ Acre	Suc. %	LTM %	RST	RSA
N/A	Weed free check		20.26	15.58	1.20	288	5836
A	Betanex	16 oz.	17.13	16.09	1.15	299	5115
B	Betanex	16 oz.					
C	Betanex	16 oz.					
D	Betanex	16 oz.					
A	Betamix	16 oz.	15.16	16.60	1.19	288	4370
B	Betamix	16 oz.					
C	Betamix	16 oz.					
D	Betamix	16 oz.					
A	Betamix + Mso	8 oz. + 1.5 % v/v	17.47	15.89	1.17	295	5142
B	Betamix + Mso	8 oz. + 1.5 % v/v					
C	Betamix + Mso	8 oz. + 1.5 % v/v					
D	Betamix + Mso	8 oz. + 1.5 % v/v					
A	Betamix	16 oz.	18.47	15.81	1.17	293	5402
B	Betamix + Outlook	16 oz. + 21 oz.					
C	Betamix	16 oz.					
D	Betamix	16 oz.					
A	Betamix+Stinger	16 oz. + 1.25 oz.	16.88	15.60	1.19	288	4859
B	Betamix+Stinger	16 oz. + 1.25 oz.					
C	Betamix+Stinger	16 oz. + 1.25 oz.					
D	Betamix+Stinger	16 oz. + 1.25 oz.					
A	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v	17.78	15.82	1.17	293	5214
B	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
C	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
A	Betamix+Stinger + Mso	8 oz.+ 1.25 oz. +1.5% v/v	18.76	15.78	1.18	292	5474
B	Betamix+Stinger + Mso + Outlook	8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.					
C	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					

Table 2 (Continued)

App. Time	Herbicide Treatment	Herbicide Rate	Tons/ Acre	Suc. %	LTM %	RST	RSA
A	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v	19.18	16.21	1.14	301	5788
B	Betamix+Upbeet+Mso + Outlook	8 oz.+ 1/8 oz. +.5% v/v + 21 oz.					
C	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v					
D	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v					
A	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	19.98	15.95	1.17	296	5899
B	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
C	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
A	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	20.53	16.25	1.14	302	6209
B	Betamix+Upbeet+Stinger+Mso + Outlook	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.					
C	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
		LSD (0.05)	**1.75**	**.72**	**.06**	**NS**	**590**

Table 3. (Experiment 0127) Weed control in Sugar Beets as influenced by sugar beet herbicides and economics of herbicide treatments, evaluation one

7/5/2001 -eval 1
7/26/2001 - eval 2
9/9/2001 - eval 3

			Evaluation one				
App. Time	Herbicide Treatment	Herbicide Rate	Sugar Beet Injury	Red Root Pig Weed	Wild Proso Millet	Common Lambs Quarter	Velvet Leaf
N/A	Weed free check		0	99	99	99	99
A	Betanex	16 oz.	0	81	67	88	28
B	Betanex	16 oz.					
C	Betanex	16 oz.					
D	Betanex	16 oz.					
A	Betamix	16 oz.	0	64	70	75	8
B	Betamix	16 oz.					
C	Betamix	16 oz.					
D	Betamix	16 oz.					
A	Betamix + Mso	8 oz. + 1.5 % v/v	0	79	71	88	15
B	Betamix + Mso	8 oz. + 1.5 % v/v					
C	Betamix + Mso	8 oz. + 1.5 % v/v					
D	Betamix + Mso	8 oz. + 1.5 % v/v					
A	Betamix	16 oz.	0	85	91	96	53
B	Betamix + Outlook	16 oz. + 21 oz.					
C	Betamix	16 oz.					
D	Betamix	16 oz.					

Table 3 (Continued)

			Evaluation one				
App. Time	Herbicide Treatment	Herbicide Rate	Sugar Beet Injury	Red Root Pig Weed	Wild Proso Millet	Common Lambs Quarter	Velvet Leaf
A	Betamix+Stinger	16 oz. + 1.25 oz.	0	81	77	88	25
B	Betamix+Stinger	16 oz. + 1.25 oz.					
C	Betamix+Stinger	16 oz. + 1.25 oz.					
D	Betamix+Stinger	16 oz. + 1.25 oz.					
A	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v	0	84	75	96	25
B	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
C	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
A	Betamix+Stinger + Mso	8 oz.+ 1.25 oz. +1.5% v/v	2	87	88	92	15
B	Betamix+Stinger + Mso + Outlook	8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.					
C	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
A	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v	2	91	93	90	83
B	Betamix+Upbeet+Mso + Outlook	8 oz.+ 1/8 oz. +.5% v/v + 21 oz.					
C	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v					
D	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v					
A	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	0	92	88	98	95
B	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
C	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
A	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	5	99	96	99	95
B	Betamix+Upbeet+Stinger+Mso + Outlook	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.					
C	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
		LSD	**3**	**16**	**10**	**17**	**21**

Table 4. (Experiment 0127) Weed control in Sugar Beets as influenced by sugarbeet herbicides and economics of herbicide treatment, evaluation two

			Evaluation two				
App. Time	Herbicide Treatment	Herbicide Rate	Sugar Beet Injury	Red root Pig Weed	wild Proso Millet	Common Lambs Quarter	Common Velvet Leaf
N/A	Weed free check		0	99	99	99	99
A	Betanex	16 oz.	1	88	72	94	22
B	Betanex	16 oz.					
C	Betanex	16 oz.					
D	Betanex	16 oz.					

Table 4 (Continued)

			Evaluation two				
			Sugar	Red root	wild	Common	
App. Time	Herbicide Treatment	Herbicide Rate	Beet Injury	Pig Weed	Proso Millet	Lambs Quarter	Velvet Leaf
A	Betamix	16 oz.	0	68	78	93	30
B	Betamix	16 oz.					
C	Betamix	16 oz.					
D	Betamix	16 oz.					
A	Betamix + Mso	8 oz. + 1.5 % v/v	0	89	84	91	37
B	Betamix + Mso	8 oz. + 1.5 % v/v					
C	Betamix + Mso	8 oz. + 1.5 % v/v					
D	Betamix + Mso	8 oz. + 1.5 % v/v					
A	Betamix	16 oz.	0	89	92	95	42
B	Betamix + Outlook	16 oz. + 21 oz.					
C	Betamix	16 oz.					
D	Betamix	16 oz.					
A	Betamix+Stinger	16 oz. + 1.25 oz.	0	78	83	96	5
B	Betamix+Stinger	16 oz. + 1.25 oz.					
C	Betamix+Stinger	16 oz. + 1.25 oz.					
D	Betamix+Stinger	16 oz. + 1.25 oz.					
A	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v	0	86	80	96	40
B	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
C	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
A	Betamix+Stinger + Mso	8 oz.+ 1.25 oz. +1.5% v/v	0	88	80	90	7.5
B	Betamix+Stinger + Mso + Outlook	8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.					
C	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
A	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v	2	94	98	94	82.5
B	Betamix+Upbeet+Mso + Outlook	8 oz.+ 1/8 oz. +.5% v/v + 21 oz.					
C	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v					
D	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v					
A	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	3	89	91	99	84.5
B	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
C	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
A	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	3	99	95	97	85
B	Betamix+Upbeet+Stinger+Mso + Outlook	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.					
C	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
		LSD	3	14	10	NS	23

Table 5. (Experiment 0127) Weed control in Sugar Beets as influenced by sugar beet herbicides and economics of herbicide treatment, evaluation three

7/5/2001 –eval 1
7/26/2001 - eval 2
9/9/2001 – eval 3

			Evaluation three			
			Red root	Wild	Common	
App. Time	Herbicide Treatment	Herbicide Rate	Pig Weed	Proso Millet	Lambs Quarter	Velvet Leaf
N/A	Weed free check		99	99	99	97
A	Betanex	16 oz.	86	76	96	45
B	Betanex	16 oz.				
C	Betanex	16 oz.				
D	Betanex	16 oz.				
A	Betamix	16 oz.	61	78	80	18
B	Betamix	16 oz.				
C	Betamix	16 oz.				
D	Betamix	16 oz.				
A	Betamix + Mso	8 oz. + 1.5 % v/v	83	81	92	45
B	Betamix + Mso	8 oz. + 1.5 % v/v				
C	Betamix + Mso	8 oz. + 1.5 % v/v				
D	Betamix + Mso	8 oz. + 1.5 % v/v				
A	Betamix	16 oz.	90	95	93	50
B	Betamix + Outlook	16 oz. + 21 oz.				
C	Betamix	16 oz.				
D	Betamix	16 oz.				
A	Betamix+Stinger	16 oz. + 1.25 oz.	73	86	92	1
B	Betamix+Stinger	16 oz. + 1.25 oz.				
C	Betamix+Stinger	16 oz. + 1.25 oz.				
D	Betamix+Stinger	16 oz. + 1.25 oz.				
A	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v	84	87	97	45
B	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v				
C	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v				
D	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v				
A	Betamix+Stinger + Mso	8 oz.+ 1.25 oz. +1.5% v/v	98	86	99	5
B	Betamix+Stinger + Mso + Outlook	8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.				
C	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v				
D	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v				
A	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v	95	98	90	87
B	Betamix+Upbeet+Mso + Outlook	8 oz.+ 1/8 oz. +.5% v/v + 21 oz.				
C	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v				
D	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v				

Table 5 (continued)

			Evaluation three			
			Red root Pig Weed	Wild Proso Millet	Common	
App. Time	Herbicide Treatment	Herbicide Rate			Lambs Quarter	Velvet Leaf
A	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	92	88	99	91
B	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v				
C	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v				
D	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v				
A	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	99	95	99	88
B	Betamix+Upbeet+Stinger+Mso + Outlook	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.				
C	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v				
D	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v				
		LSD (0.05)	24	14	11	25

Summary

- Betanex alone gave significantly higher redroot piweed control than Betamix alone
- Betamix applied with Outlook or in the micro rate gave significantly higher redroot piweed control than Betamix alone
- Betamix with stinger, methylated seed oil (MSO) or stinger and MSO tended to increase redroot piweed
- Outlook significantly increased Betamix control of wild proso millet and the addition of MSO, Stinger and Upbeet tended to increase wild proso millet control compared to Betamix alone
- Common lambsquarter control was increased by all other treatments compared to Betamix alone
- Velvet leaf control was significantly increased by adding Upbeet to the spray mix
- The highest price treatment gave the highest recoverable sucrose per acre
- Betamix plus Upbeet, MSO and Outlook, and Betamix in the micro rate alone or with Outlook statistically gave the highest recoverable sucrose per acre

SMBSC Program – Belgrade location
Experiment 0128

Objectives:

Evaluate postemergence sugar beet herbicides alone and in combination at various rates for weed control efficacy and crop phytotoxicity considering economics of the treatment.

Experiment Procedure:

The experiment was a randomized complete block design with 4 replications. Experimental units (plots) were 11 ft wide (6, 22" wide sugar beet rows) and 30 ft long. Treatments were applied to the middle 4 rows of 6 row wide plots with a bicycle wheel type sprayer delivering 8.5 gal./acre at 40 psi using 8001flat fan nozzles traveling at 3 mph.

Table 1. Specifics for SMBSC Program weed control program

Location	Experiment Number	Planting Date	Comments	1st	2nd	3rd	4th
Outlook economics-Belgrade	0128	28-Apr		16-May	23-May	30-May	6-Jun
Crop Stage				Cotyl.	2-4 lf	4lf	4-6 lf
Wind (Mph)				5	10 NW	5 SE	calm
PSI				40	40	40	40
Temp				85	45	70	55
Weed Stage				cotyl.	Cotl -2lf	cotl-4lf	cotyl.-6lf
Finish time				11:00	2:30	10:00	11:00
Variety		VDH 46109					

Table 2. (Experiment 0128) Weed control in Sugar Beets as influenced by sugarbeet herbicide and economics of herbicide treatment

Evaluation 1 06-28-01
Evaluation 2 07-27-01

			Evaluation one			Evaluation two	
Appl. Time	**Herbicide treatment**	**Herbicicde rate**	**Sugar Beet Injury**	**Yellow Foxtail**	**Lambs Quarter**	**Yellow Foxtail**	**Lambs Quarter**
N/A	Weed free check		0	99	99	99	99
A	Betanex	16 oz.	0	80	84	73	75
B	Betanex	16 oz.					
C	Betanex	16 oz.					
D	Betanex	16 oz.					
A	Betamix	16 oz.	0	84	89	75	80
B	Betamix	16 oz.					
C	Betamix	16 oz.					
D	Betamix	16 oz.					
A	Betamix + Mso	8 oz. + 1.5 % v/v	0	90	89	86	84
B	Betamix + Mso	8 oz. + 1.5 % v/v					
C	Betamix + Mso	8 oz. + 1.5 % v/v					
D	Betamix + Mso	8 oz. + 1.5 % v/v					
A	Betamix	16 oz.	0	95	94	88	90
B	Betamix + Outlook	16 oz. + 21 oz.					
C	Betamix	16 oz.					
D	Betamix	16 oz.					
A	Betamix+Stinger	16 oz. + 1.25 oz.	0	84	93	74	86
B	Betamix+Stinger	16 oz. + 1.25 oz.					
C	Betamix+Stinger	16 oz. + 1.25 oz.					
D	Betamix+Stinger	16 oz. + 1.25 oz.					
A	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v	0	88	94	82	88
B	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
C	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
A	Betamix+Stinger + Mso	8 oz.+ 1.25 oz. +1.5% v/v	0	97	96	94	91
B	Betamix+Stinger + Mso + Outlook	8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.					
C	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					

Table 2 (Continued)

			Evaluation one			Evaluation two	
Appl. Time	**Herbicide treatment**	**Herbicicde rate**	**Sugar Beet Injury**	**Yellow Foxtail**	**Lambs Quarter**	**Yellow Foxtail**	**Lambs Quarter**
A	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v	0	98	92	95	91
B	Betamix+Upbeet+Mso + Outlook	8 oz.+ 1/8 oz. +.5% v/v + 21 oz.					
C	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v					
D	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v					
A	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	0	96	95	90	89
B	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
C	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
A	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	0	99	97	95	93
B	Betamix+Upbeet+Stinger+Mso + Outlook	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.					
C	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
		LSD (0.05)	**NS**	**5**	**5**	**6**	**6**

Table 3. (Experiment 0128) Sugar Beets yield as influenced by sugarbeet herbicides and economics of herbicide treatments

App. Time	**Herbicide treatment**	**Herbicide rate**	**Tons/ acre**	**Sucrose %**	**LTM %**	**RST**	**RSA**
N/A	Weed free check		28.62	16.62	1.11	310	8875
A	Betanex	16 oz.	25.82	16.74	1.10	313	8079
B	Betanex	16 oz.					
C	Betanex	16 oz.					
D	Betanex	16 oz.					
A	Betamix	16 oz.	26.93	16.44	1.13	306	8255
B	Betamix	16 oz.					
C	Betamix	16 oz.					
D	Betamix	16 oz.					

Table 3 (Continued)

App. Time	Herbicide treatment	Herbicide rate	Tons/ acre	Sucrose %	LTM %	RST	RSA
A	Betamix + Mso	8 oz. + 1.5 % v/v	26.49	15.85	1.18	294	7828
B	Betamix + Mso	8 oz. + 1.5 % v/v					
C	Betamix + Mso	8 oz. + 1.5 % v/v					
D	Betamix + Mso	8 oz. + 1.5 % v/v					
A	Betamix	16 oz.	27.10	16.54	1.12	308	8346
B	Betamix + Outlook	16 oz. + 21 oz.					
C	Betamix	16 oz.					
D	Betamix	16 oz.					
A	Betamix+Stinger	16 oz. + 1.25 oz.	26.19	16.81	1.10	314	8244
B	Betamix+Stinger	16 oz. + 1.25 oz.					
C	Betamix+Stinger	16 oz. + 1.25 oz.					
D	Betamix+Stinger	16 oz. + 1.25 oz.					
A	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v	25.74	16.44	1.13	306	7873
B	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
C	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
A	Betamix+Stinger + Mso	8 oz.+ 1.25 oz. +1.5% v/v	26.70	16.05	1.16	298	7935
B	Betamix+Stinger + Mso + Outlook	8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.					
C	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Stinger+Mso	8 oz.+ 1.25 oz. +1.5% v/v					
A	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v	27.86	16.28	1.14	303	8430
B	Betamix+Upbeet+Mso + Outlook	8 oz.+ 1/8 oz. +.5% v/v + 21 oz.					
C	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v					
D	Betamix+Upbeet+Mso	8 oz.+ 1/8 oz.+1.5% v/v					
A	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	27.68	16.43	1.12	306	8442
B	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
C	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
A	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	28.81	16.91	1.09	316	9114
B	Betamix+Upbeet+Stinger+Mso + Outlook	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.					
C	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
D	Betamix+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
		LSD (0.05)	NS	0.60	0.05	13.1	NS

Summary

- Betamix gave significantly greater yellow foxtail control than Betanex
- Yellow foxtail control was significantly increased by adding methylated seed oil to Betamix at 8 oz./acre, or Outlook to Betamix alone
- Standard micro rate gave excellent control of yellow foxtail
- Lambs quarter control was above 90% at last evaluation only when Outlook was included in spray mix
- Recoverable sucrose per acre was highest with the micro rate plus Outlook

Table 1D is a list of the treatments tested and there cost per acre. The treatment cost is based on prices acquired as payment in spring of 2002. These prices may vary depending on the source and yet the prices of the treatment are relative. The treatment list is for the following three trials presented in experiments 0129 and 0130.

Table 1D. Treatment cost for experiment 0129 and 0130

Treatment Cost	*Appl. time*	*Herbicide treatment*	*Herbicide rate*	*Cost Per Acre*
1	A,B,C,D	Weed free check		0.00
2	A	Betanex	16 oz.	42.30
	B	Betanex	20 oz.	
	C	Betanex	24 oz.	
3	A	Betanex	16 oz.	65.07
	B	Betanex + Dual	20 oz. + 32 oz.	
	C	Betanex	24 oz.	
4	A	Betanex + Outlook	16 oz + 21oz.	60.67
	B	Betanex	20 oz.	
	C	Betanex	24 oz.	
5	A	Betanex	16 oz .	60.67
	B	Betanex + Outlook	20 oz.+ 21 oz.	
	C	Betanex	24 oz.	
6	A	Betanex	16 oz	60.67
	B	Betanex	20 oz.	
	C	Betanex + Outlook	24 oz. + 21 oz.	
7	A	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	50.25
	B	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	
	C	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	
8	A	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	73.02
	B	Betanex+Upbeet+Stinger+Mso + Dual	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 32 oz.	
	C	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	
9	A	Betanex+Upbeet+Stinger+Mso + Outlook	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.	68.62
	B	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	
	C	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	
10	A	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	68.62
	B	Betanex+Upbeet+Stinger+Mso + Outlook	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.	
	C	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	
11	A	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	68.62
	B	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	
	C	Betanex+Upbeet+Stinger+Mso + Outlook	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.	

SMBSC Program – Renville location
Experiment 0129

Objectives

Evaluate postemergence sugar beet herbicides alone and in combination at various rates for crop phytotoxicity and yield.

Experiment Procedure

The experiment was a randomized complete block design with 4 replications. Experimental units (plots) were 11 ft wide (6, 22" wide sugar beet rows) and 30 ft long. Treatments were applied to the middle 4 rows of 6 row wide plots with a bicycle wheel type sprayer delivering 8.5 gal./acre at 40 psi using 8001flat fan nozzles traveling at 3 mph. All plots were maintained weed free to eliminate influence of weed population and only test treatment influence on injury, stand, and yield.

Table 1. Specifics for SMBSC Program weed control program

Location	Experiment Number	Planting Date	1st	2nd	3 rd
Outlook/Micro tolerance-Barret	0129	10-May	31-May	8-Jun	15-Jun
Crop Stage			Cotyl	Cotyl.	4 lf
Wind (Mph)			5	5	10 SE
PSI			40	40	40
Temp			65	60	68
Weed Stage			cotyl.	Cotyl.- 2lf	cotyl– 4lf
Finish time			2:30	11:00	3:00
Variety		Beta 6904			

Table 2. (Experiment 0129) Sugar Beets yield and tolerance to herbicides as influenced by postemergence herbicides,Dual and Outlook.

Evaluated 06-29-01

Appl. time	Herbicide treatment	Herbicide rate	Injury %	Stand %	Tons/ acre	Suc. %	LTM %	RST	RSA
A,B,C,D	Untreated check		0	87	17.55	14.75	1.26	270	4738
A	Betanex	16 oz.	0	91	17.96	15.59	1.20	288	5167
B	Betanex	20 oz.							
C	Betanex	24 oz.							
A	Betanex	16 oz.	1	84	19.98	15.36	1.22	283	5681
B	Betanex + Dual	20 oz. + 32 oz.							
C	Betanex	24 oz.							
A	Betanex + Outlook	16 oz + 21oz.	3	89	20.08	14.99	1.25	275	5507
B	Betanex	20 oz.							
C	Betanex	24 oz.							
A	Betanex	16 oz .	4	87	19.38	14.99	1.25	275	5335
B	Betanex + Outlook	20 oz.+ 21 oz.							
C	Betanex	24 oz.							
A	Betanex	16 oz	2	90	21.49	14.80	1.25	271	5790
B	Betanex	20 oz.							
C	Betanex + Outlook	24 oz. + 21 oz.							
A	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	3	88	17.47	15.44	1.21	285	4987
B	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v							
C	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v							
A	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	4	88	18.60	15.54	1.20	287	5318
B	Betanex+Upbeet+Stinger+Mso + Dual	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 32 oz.							
C	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v							
A	Betanex+Upbeet+Stinger+Mso + Outlook	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.	1	90	17.46	14.90	1.24	273	4756
B	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v							
C	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v							
A	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	4	83	19.55	15.29	1.23	281	5485
B	Betanex+Upbeet+Stinger+Mso + Outlook	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.							
C	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v							
A	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	2	82	18.71	15.19	1.22	279	5232
B	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v							
C	Betanex+Upbeet+Stinger+Mso + Outlook	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.							
			3	**NS**	**3.20**	**NS**	**NS**	**NS**	**NS**

Summary

- Sugarbeet injury was not different between treatments
- Sugarbeet stand was not significantly influenced by treatment when compared to untreated check
- All treatments gave higher recoverable sucrose per acre than the untreated check, but the only treatments which are significantly higher than the untreated check were Betanex at 16 oz./A (cotyledon stage), Betanex at 20 oz. (2 leaf stage) and Betanex at 24 oz./A plus Outlook at 21 oz./A at 4 leaf stage
- Higher recoverable sucrose did not tend to be a result of yield or quality, but a function of both factors

SMBSC Program – Maynard location
Experiment 0130

Objectives:

Evaluate postemergence sugar beet herbicides alone and in combination at various rates for weed control efficacy and crop phytotoxicity considering economics of the treatment.

Experiment Procedure:

The experiment was a randomized complete block design with 4 replications. Experimental units (plots) were 11 ft wide (6, 22" wide sugar beet rows) and 30 ft long. Treatments were applied to the middle 4 rows of 6 row wide plots with a bicycle wheel type sprayer delivering 8.5 gal./acre at 40 psi using 8001flat fan nozzles traveling at 3 mph.

Table 1. Specifics for SMBSC Program weed control program

Location	Experiment Number	Planting Date	1st	2nd	3rd	4th
Outlook economics-petersen	0130	10-May	31-May	6-Jun	14-Jun	22-Jun
Crop Stage			Cotyl.	2-4 lf	eary 4lf	4-6 lf
Wind (Mph)			5	10-20 NW	10 SE	calm
PSI			40	40	40	40
Temp			65	75	75	72
Weed Stage			cotyl.	cotl -2lf	cotl-4lf	cotyl.-6lf
Finish time			12:30	2:00	4:30	2:30
Variety		Beta 6904				

Table 2. (Experiment 0130) Yellow foxtail control as influenced by postemergence herbicides, Dual II Magnum, and Outlook

0130-Outlook efficacy

Evaluation 1 07-06-01
Evaluation 2 07-26-01

Treatment Timing	Herbicide	Herbicide Rate	Evaluation One		Evaluation Two	
			Sugar Beet Injury	Yellow Foxtail	Sugar Beet Injury	Yellow Foxtail
A,B,C,D	Weed free check		0	94	0	99
A	Betanex	16 oz.	0	45	0	51
B	Betanex	20 oz.				
C	Betanex	24 oz.				
A	Betanex	16 oz.	0	92	6.25	89
B	Betanex + Dual II Magnum	20 oz. + 32 oz.				
C	Betanex	24 oz.				
A	Betanex + Outlook	16 oz + 21oz.	0	99	6.25	99
B	Betanex	20 oz.				
C	Betanex	24 oz.				
A	Betanex	16 oz .	0	93	2.5	93
B	Betanex + Outlook	20 oz.+ 21 oz.				
C	Betanex	24 oz.				
A	Betanex	16 oz	0	28	1.25	63
B	Betanex	20 oz.				
C	Betanex + Outlook	24 oz. + 21 oz.				
A	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	0	73	0	66
B	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v				
C	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v				
A	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	0	80	1.25	89
B	Betanex+Upbeet+Stinger+Mso + Dual II Magnum	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 32 oz.				
C	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v				
A	Betanex+Upbeet+Stinger+Mso + Outlook	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.	0	97	2.5	96
B	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v				
C	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v				

Table 2 (Continued)

0130-Outlook efficacy

Treatment Timing	Herbicide	Herbicide Rate	Evaluation One		Evaluation Two	
			Sugar Beet Injury	Yellow Foxtail	Sugar Beet Injury	Yellow Foxtail
A	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	0	81	2.5	90
B	Betanex+Upbeet+Stinger+Mso + Outlook	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.				
C	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v				
A	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	0	72	1.25	71
B	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v				
C	Betanex+Upbeet+Stinger+Mso + Outlook	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.				
		LSD (0.05)	NS	22	5	14

Table 3. (Experiment 0130) Sugar Beets yield as influenced by postemergence herbicides, Dual II Magnum, and Outlook

0130-Outlook efficacy

Appl. Time	Herbicide treatment	Herbicide Rate	Tons/ Acre	Sucrose %	LTM %	RST	RSA
N/A	Weed free check		19.23	16.35	1.13	304	5855
A	Betanex	16 oz.	13.17	16.86	1.09	315	4167
B	Betanex	20 oz.					
C	Betanex	24 oz.					
A	Betanex	16 oz.	17.99	16.09	1.15	299	5412
B	Betanex + Dual II Magnum	20 oz. + 32 oz.					
C	Betanex	24 oz.					
A	Betanex + Outlook	16 oz + 21oz.	18.23	16.48	1.12	307	5594
B	Betanex	20 oz.					
C	Betanex	24 oz.					

Table 3 (Continued)

Appl. Time	Herbicide treatment	Herbicide Rate	Tons/ Acre	Sucrose %	LTM %	RST	RSA
A	Betanex	16 oz .	18.11	16.90	1.08	316	5722
B	Betanex + Outlook	20 oz.+ 21 oz.					
C	Betanex	24 oz.					
A	Betanex	16 oz	13.11	16.98	1.08	318	4171
B	Betanex	20 oz.					
C	Betanex + Outlook	24 oz. + 21 oz.					
A	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	16.44	16.92	1.08	317	5203
B	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
C	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
A	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	17.29	16.36	1.13	305	5271
B	Betanex+Upbeet+Stinger+Mso + Dual II Magnum	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 32 oz.					
C	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
A	Betanex+Upbeet+Stinger+Mso + Outlook	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.	17.20	17.13	1.06	321	5536
B	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
C	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
A	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	18.69	16.98	1.08	318	5945
B	Betanex+Upbeet+Stinger+Mso + Outlook	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.					
C	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
A	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v	16.78	16.97	1.08	318	5356
B	Betanex+Upbeet+Stinger+Mso	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v					
C	Betanex+Upbeet+Stinger+Mso + Outlook	8 oz.+ 1/8 oz.+ 1.25 oz. +1.5% v/v + 21 oz.					
		LSD (0.05)	**3.95**	**0.77**	**0.06**	**17**	**1326**

Summary

- Sugarbeet injury did not exceed 6% for all treatments
- Yellow foxtail control was significantly higher with Dual II Magnum or Outlook added to the spray program in the first or second application compared to no Dual II magnum or Outlook
- Yellow foxtail control was the lowest for all herbicide treatments when Outlook was applied in the third application
- Yellow foxtail control either tended to or was higher with Outlook compared to Dual II Magnum with similar treatments
- Recoverable sucrose per acre tended to be inversely related to yellow foxtail control

2001 Weather Station Data

Month/ Day	Olivia, MN			Redwood, MN			Willmar, MN			Hutchinson, MN			Montevideo, MN			Morris, MN		
	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min
Jan 1	0	8	-14	0	1	-14	0	9	-16	0	12	-5	0	3	-16	0	2	-17
2-Jan	0	8	-10	0	33	-9	0	6	-13	0	8	-4	0	32	-18	T	0	-19
3-Jan	T	31	-10	0	33	18	T	29	1	0	30	0	0	28	14	T	30	1
4-Jan	T	32	13	0	41	14	0	28	17	0	29	20	0	42	17	0	27	16
5-Jan	T	40	15	0	33	17	0	41	24	0	41	30	0	42	16	0	42	21
6-Jan	T	33	14	0	39	24	T	29	14	0	32	17	0	36	17	0	36	12
7-Jan	0	38	16	0	27	16	0	38	16	T	38	17	0.01	29	13	0	37	13
8-Jan	T	21	17	0	23	10	T	20	16	0	20	18	0	29	13	T	22	11
9-Jan	0	23	8	0	34	8	0.01	21	5	0	22	13	0	25	16	T	22	8
10-Jan	0	32	12	0	38	24	0	30	12	0	31	27	0	35	23	0	31	10
11-Jan	0	38	12	0	27	20	0	37	18	0.05	38	18	0	39	20	0	33	19
12-Jan	T	28	23	0	30	24	0.02	26	22	0	32	26	0	24	14	T	26	23
13-Jan	T	29	23	0	32	24	0	27	23	0.05	30	24	0	28	22	0	28	25
14-Jan	0.11	31	25	0.18	33	31	0.12	31	23	0	33	26	0.12	31	26	0.08	31	25
15-Jan	0.11	33	17	0.06	31	13	0.02	33	20	0	34	27	0.02	34	10	0.06	33	10
16-Jan	0	18	9	0	17	10	T	20	7	0	27	7	0	16	7	T	16	10
17-Jan	T	15	-4	0	23	-1	T	15	-7	0.01	17	-1	0	25	-4	0	12	-7
18-Jan	0	28	9	0	30	-2	T	26	-5	0	25	17	0	25	-8	0.01	28	0
19-Jan	T	29	-9	0	2	-7	T	29	-12	0	31	-9	0	3	-10	T	28	-6
20-Jan	0	2	-10	0	19	-7	0	2	-12	0	2	-11	0	17	-8	0	0	-9
21-Jan	0	18	-3	0	15	1	0	17	-9	0	19	-3	0	19	-5	0	15	-5
22-Jan	T	16	-1	0	33	4	0	17	0	0	18	-2	0	24	0	T	15	-3
23-Jan	0	34	12	0	29	16	0	34	6	0	34	15	0	34	5	0	34	10
24-Jan	0	27	3	0	16	-2	T	29	3	0	27	9	0	15	-2	0	26	5
25-Jan	0	10	-4	0	27	-3	0	12	-8	0.05	15	3	0	27	1	0	6	-8
26-Jan	T	26	-2	m	28	9	T	25	-4	0	26	24	T	26	-7	0	26	-3
27-Jan	0	26	0	T	32	2	T	26	-4	0	26	-2	0	27	1	0	19	-2
28-Jan	0	31	6	0	24	6	0	30	-1	0	31	2	0	32	-1	0	29	1
29-Jan	0	23	6	0	33	15	0	19	8	0	18	15	0.63	22	3	0	19	2
30-Jan	1.04	32	12	0.63	33	21	0.77	32	16	0.49	35	32	0.31	29	13	0.86	33	16
31-Jan	0.03	33	11	m	25	14	0.08	33	11	0	35	18	0	37	8	0.16	33	11
1-Feb	0	24	-11	0	m	-12	0	23	-10	0	22	-6	0	15	-10	0	25	-10
2-Feb	0	-10	-20	0	9	-16	0	-5	-19	0	-3	-17	0.04	12	-22	0	-8	-31
3-Feb	T	9	-16	0.08	38	9	0.02	9	-18	0	10	-13	0	34	9	0.07	29	-21
4-Feb	0	32	10	0	33	18	0.02	24	9	0	26	14	0	31	17	0	30	12
5-Feb	0	24	15	0	32	14	0	22	12	0	24	18	0	31	11	0	23	13
6-Feb	0	29	11	0	19	14	T	29	9	0	32	20	0	30	8	0	27	13
7-Feb	0.16	28	13	0	23	16	T	28	8	0.15	27	15	0.42	22	15	0.03	26	11
8-Feb	0.32	22	19	0.71	22	10	0.32	22	17	0.05	23	20	0.08	18	1	0.2	20	14
9-Feb	0.09	23	7	0.09	11	-10	0.1	21	4	0	24	10	0	7	-10	0.16	17	-5
10-Feb	0	7	-16	0	3	-14	0	10	-15	0	11	-14	0	3	-17	0	0	-23
11-Feb	0	2	-13	0	19	-5	0	2	-13	0.03	4	-13	0	19	5	0	3	-17
12-Feb	0.07	22	1	0	23	-1	0.04	19	-3	0	21	4	0.04	21	3	0.2	17	-1
13-Feb	0	22	1	0	29	0	0	22	-1	m	25	9	0	29	1	0	15	-2
14-Feb	0	27	-4	0	6	-9	T	25	-4	0	30	-1	0	3	-8	T	21	-8
15-Feb	0	4	-15	0	17	-14	0	8	-18	0	10	-13	0	19	-18	0	0	-20
16-Feb	0	16	-10	0	12	-5	0	13	-18	0	16	-2	0	7	-4	0	13	-16
17-Feb	0	4	-16	0	5	-10	0	4	-13	0	5	-13	0	9	-13	0	4	-12
18-Feb	0	17	-11	0	27	-10	T	7	-13	0	16	-15	0	22	0	0	5	-14
19-Feb	0	24	11	0	24	2	0	23	7	0	26	17	0	24	10	0	21	-1
20-Feb	0	16	-4	0	12	-7	0	20	-2	0	23	-1	0	10	-5	0	12	-3

2001 Weather Station Data

	Olivia, MN			Redwood, MN			Willmar, MN			Hutchinson, MN			Montevideo, MN			Morris, MN		
Month/ Day	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min
21-Feb	0	10	-20	0	9	-18	T	11	-21	0	13	-15	0.02	9	-24	0	7	-25
22-Feb	0	15	-11	m	19	1	T	14	-16	0	14	-8	0	18	4	0.02	14	-23
23-Feb	0	16	m	0	19	-6	T	18	-9	0	19	-5	0.18	15	-4	0	15	-8
24-Feb	0.26	27	-6	0.41	34	19	0.24	22	-6	0.29	22	-1	0.39	29	12	0.21	21	-10
25-Feb	0.34	33	14	0.47	28	6	0.78	31	14	0.47	32	16	0.05	23	5	0.76	25	15
26-Feb	0	19	2	0	12	-1	T	19	4	0	20	7	0	10	0	0	17	0
27-Feb	0	14	-13	0	6	-11	0	13	-14	0	14	-8	0	8	-15	0	9	-14
28-Feb	0	4	-13	0	24	-10	0	5	-12	0	8	-9	0	23	-8	0	4	-14
1-Mar	0	23	-8	0	30	8	0	24	-9	0	26	-4	0	26	8	0	24	-4
2-Mar	0	30	18	0	32	20	0	30	12	0	31	15	0	33	16	0	30	9
3-Mar	0	32	5	0.08	37	10	0	31	5	0	34	9	0	35	6	T	30	1
4-Mar	0	35	7	0	24	11	0	41	10	0	39	9	0	33	6	0	35	1
5-Mar	0	22	4	0	26	8	0	27	10	0	25	12	0	23	7	0	21	6
6-Mar	0	24	2	0	28	4	0	28	2	0	24	7	0	25	8	0	22	1
7-Mar	0	32	6	0	32	19	T	29	10	0	32	12	0	30	18	0	30	3
8-Mar	0	32	20	T	27	17	0	32	21	0	33	21	0	35	21	0	31	14
9-Mar	0	29	8	0	25	13	T	30	2	0	30	9	0	26	23	0	26	12
10-Mar	0	25	16	T	33	13	T	24	11	0	27	11	0	26	20	0	23	15
11-Mar	0	32	-3	T	24	2	0	33	-1	0.1	33	3	0.39	32	-2	0	30	-6
12-Mar	0.61	26	-1	0.08	29	21	0.28	25	4	0.14	27	14	0.22	25	20	0.3	23	-8
13-Mar	T	31	18	0.17	36	24	0.32	29	22	0	29	23	0	28	23	0.19	28	14
14-Mar	T	38	26	0.24	43	31	T	35	23	0	36	22	0	38	28	T	37	24
15-Mar	0	45	21	0	34	23	0	45	24	0	44	25	0	41	20	0	42	19
16-Mar	0	38	14	0	33	18	0	39	23	0	37	24	0	33	20	0	28	9
17-Mar	0	35	7	0	34	10	0	37	8	0	37	13	0.03	31	17	0	28	-5
18-Mar	0	34	7	0.03	35	12	0	36	14	0	40	12	0.02	32	15	0	30	3
19-Mar	0	33	25	T	36	31	0.01	34	19	0	38	22	0	37	29	0.07	35	18
20-Mar	0	35	29	0.06	39	29	0	36	32	0.03	39	31	0.02	37	32	0	36	32
21-Mar	0	37	21	0	35	25	T	42	18	0	43	23	0.02	43	18	0	40	15
22-Mar	0	35	24	0.05	32	22	T	35	25	0	43	29	0	35	19	T	35	14
23-Mar	0	34	14	0	26	15	0	35	18	0	36	23	0	34	12	0	31	12
24-Mar	0	27	5	0	19	8	0	28	7	0	30	8	0	27	13	0	24	5
25-Mar	0	17	4	0	15	6	T	17	5	0	19	5	0	24	4	0	18	-6
26-Mar	0	15	2	0	23	6	0	17	5	0	19	6	0	15	4	0	16	3
27-Mar	0	22	3	0	33	5	0	26	5	0.03	28	8	T	22	4	0	21	-1
28-Mar	T	33	7	0.12	34	31	T	32	11	0	35	14	0.04	36	30	0.04	32	3
29-Mar	T	34	32	0	36	30	T	34	30	0	38	32	0	35	28	T	35	31
30-Mar	0	36	31	T	39	32	0	37	32	0	36	33	0.03	39	32	0	36	32
31-Mar	0.45	37	31	0.47	38	29	0.14	38	32	0.2	43	32	0	40	31	0.06	35	32
1-Apr	0	36	22	0	42	25	0	39	22	0	40	24	0	41	31	0	36	23
2-Apr	0	39	24	0	39	32	T	40	23	0	43	33	0	42	21	0	39	24
3-Apr	0	42	30	0	40	30	0	42	31	0	40	31	0	38	33	0	39	26
4-Apr	0	39	32	0	47	32	0	42	31	0	42	31	0	38	31	0	37	32
5-Apr	T	46	33	0	44	35	0.05	45	34	0	49	33	0	45	33	0.03	40	34
6-Apr	0	42	33	0	46	35	0	41	34	0	43	35	0.52	45	34	0	40	23
7-Apr	0.6	57	35	0.4	58	39	0.54	53	34	0.7	55	33	0.16	43	33	2.49	43	33
8-Apr	0.15	52	33	0.14	47	32	0.18	53	34	0.02	57	34	0	50	32	0.02	45	34
9-Apr	0.03	47	33	0	47	34	0	53	34	0	50	34	0	44	31	0	44	34
10-Apr	0	46	36	0	50	37	T	46	34	0	48	35	0.7	45	33	0	45	31
11-Apr	0.32	47	39	0.69	49	39	0.74	53	38	0.56	50	40	1.43	56	37	0.03	57	35
12-Apr	1.25	41	35	1.21	49	35	1.05	46	35	1.12	48	37	0	46	33	1.12	44	33
13-Apr	0	49	32	0	56	30	0	50	22	0	48	32	0	49	34	0	48	32
14-Apr	0	58	33	0	65	32	T	52	31	0	55	34	0.23	57	31	0	54	33
15-Apr	T	64	45	0.01	47	28	0.33	64	35	0.32	65	37	T	45	31	0.07	62	35
16-Apr	T	46	22	0.16	37	23	T	43	22	0	40	24	0	44	28	T	36	21

2001 Weather Station Data

	Olivia, MN			Redwood, MN			Willmar, MN			Hutchinson, MN			Montevideo, MN			Morris, MN		
Month/ Day	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min
17-Apr	0	37	23	0	47	28	T	41	22	0	36	24	0	38	21	T	37	22
18-Apr	0	42	28	0	64	28	0	47	30	0	48	27	0	63	22	0	44	27
19-Apr	0	62	41	0	65	38	0	61	33	0	61	39	0	64	38	0	61	34
20-Apr	0	62	45	0	71	47	0.01	59	43	0	61	46	0.32	63	42	T	61	43
21-Apr	0.42	69	50	0.39	54	31	0.5	65	50	0.78	69	50	0.35	53	28	T	64	42
22-Apr	0	51	30	2.36	43	31	0.05	50	31	0	52	33	2.37	52	30	T	42	30
23-Apr	3.25	42	35	1.6	46	32	2.92	40	33	2.77	42	37	0.05	41	31	1.77	37	32
24-Apr	0.22	46	32	0.42	65	33	0.45	47	32	0.19	47	34	0	65	33	T	46	33
25-Apr	0	63	36	0	74	36	0	63	34	0	64	38	0	67	31	0	64	35
26-Apr	0	72	36	0	77	52	0	74	41	0	73	42	0	77	45	0	73	43
27-Apr	0	76	44	0	76	46	0	74	41	0	76	43	0	73	48	0	70	41
28-Apr	0	78	47	0	83	53	0	72	48	0	73	52	0	73	45	0	71	50
29-Apr	0	81	45	0	84	56	0	79	56	0	80	57	0.12	85	56	0	82	56
30-Apr	T	84	58	0.06	69	52	0.05	83	58	0.09	83	60	0.23	85	50	0.02	82	55
1-May	0.15	68	50	0.11	85	50	0.18	68	47	0	66	49	0	71	52	0.05	73	51
2-May	0.03	83	50	0.04	70	51	0	79	53	0	84	54	0	68	49	0	75	51
3-May	0	83	50	0	63	55	0	69	53	0	71	56	0	69	49	0	67	53
4-May	0	65	51	0	66	53	0	63	51	0	65	52	0	64	54	0	64	48
5-May	0	66	50	0	56	50	T	67	48	0.41	64	49	0.73	60	51	T	67	47
6-May	0.18	60	52	0	71	48	0.32	57	48	0.79	56	50	0.2	66	48	0.37	57	47
7-May	0.37	69	44	0	64	45	0.21	67	45	0	69	44	0	68	48	0.62	62	44
8-May	0	63	45	0	71	48	T	60	46	0	64	48	0	62	41	0.02	58	45
9-May	0	69	48	0	88	47	0	66	48	0	68	48	0	68	44	0	65	46
10-May	T	84	54	0	68	52	0	80	53	0.18	80	54	0.15	68	49	0	81	50
11-May	0.22	69	49	0.56	66	47	T	70	50	0	69	58	0	67	45	0	67	44
12-May	0	68	44	0	72	43	0	66	45	0	66	43	0	65	46	0	65	41
13-May	0	70	47	0	75	49	0	72	49	0	70	48	0	74	42	0	74	46
14-May	0	77	47	0	m	56	0	78	55	0	75	54	0	94	57	0	80	51
15-May	0	99	58	0	m	63	0	97	58	0	99	56	0	98	55	0	95	57
16-May	0	98	59	0	72	55	0	96	56	0	96	56	0	73	55	0	93	55
17-May	0	73	53	0	78	52	0.02	74	52	0	74	52	0	71	53	0	74	55
18-May	0	77	52	0	80	49	0	74	49	0	76	49	0	73	52	0	73	48
19-May	0	82	58	0	84	53	0	80	49	0.2	80	57	0	78	48	T	79	59
20-May	0	83	56	T	68	47	T	74	55	0	75	58	0.52	76	45	0	76	55
21-May	0.72	68	44	0.47	54	44	0.4	69	44	0.32	69	47	0.21	52	43	0.2	77	43
22-May	0.15	53	42	0.14	53	38	0.24	56	42	0.15	57	41	0.07	52	43	0.19	48	42
23-May	0.09	51	37	T	52	38	0.15	50	38	0.09	47	39	0.1	52	42	0.1	52	37
24-May	0.05	54	40	0.35	60	44	0.1	54	39	0	52	39	0.05	51	37	0.88	52	40
25-May	T	61	47	0	67	48	T	62	46	0.61	59	46	0.2	63	42	0.01	62	48
26-May	0.6	71	47	0.51	60	50	0.4	69	50	T	64	50	0.17	70	47	0.22	69	51
27-May	0.03	61	46	0	63	50	T	60	51	0	59	46	0.07	59	50	0.4	61	51
28-May	0	65	47	0.08	72	49	0	62	46	0	66	44	0	62	50	0.2	62	51
29-May	0	74	50	0	75	48	0	72	52	0	73	49	0	72	49	0	73	51
30-May	0	75	52	0	72	53	0	73	50	0	72	48	0	76	48	0	73	52
31-May	0	74	52	0	68	52	0	72	53	0.07	68	50	0	73	53	0	71	56
1-Jun	0.13	69	50	0	66	49	0.05	67	49	0.14	68	50	0.32	68	54	0.15	69	52
2-Jun	0.05	64	47	0.37	68	49	0.26	64	50	0.13	66	50	0	64	49	0.22	61	50
3-Jun	0	70	45	0	68	48	0	69	47	0	68	44	0	68	47	0	69	48
4-Jun	0	69	47	0	69	49	0	67	49	0.36	67	47	0.23	69	48	0	68	49
5-Jun	0.09	70	51	0.15	55	51	0.22	67	51	0.01	68	51	0.03	68	50	0.26	68	52
6-Jun	T	55	52	0	68	53	T	55	52	0.03	55	52	0.26	56	51	0.27	55	52
7-Jun	0.25	69	54	0.29	74	54	0.03	68	49	0	69	52	0	68	52	0.18	66	53
8-Jun	0	75	53	0	81	52	0	74	50	0	75	52	0	74	52	0	73	53
9-Jun	0	82	58	0	88	57	0	82	56	0.59	84	58	0.61	82	51	T	81	59

2001 Weather Station Data

	Olivia, MN			Redwood, MN			Willmar, MN			Hutchinson, MN			Montevideo, MN			Morris, MN		
Month/ Day	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min
10-Jun	0.27	88	56	0.2	85	64	0.54	86	63	0	87	64	0	87	62	1.46	85	61
11-Jun	0	88	59	0	94	61	0	83	59	0.3	87	59	0	83	64	0	81	60
12-Jun	T	93	57	0.03	78	58	0.69	83	61	1.16	87	60	1.39	78	60	0.07	77	54
13-Jun	1.25	78	63	0.88	86	64	0.66	75	63	0.29	77	64	0.17	79	56	0.6	77	63
14-Jun	0.33	85	63	0.18	75	60	0.09	83	63	0.42	86	64	0	73	62	0.69	79	63
15-Jun	0	75	53	0	75	53	0	74	55	0.05	77	55	0.07	74	53	T	72	54
16-Jun	0	75	52	0	80	53	0.01	73	54	0	75	55	0.1	74	54	T	72	53
17-Jun	0	80	58	0	77	57	0.08	77	54	0.12	78	55	0.1	77	51	0	74	55
18-Jun	0.11	78	59	0	89	56	0.09	75	60	0	77	63	0	75	60	0.11	75	61
19-Jun	T	88	50	0.14	77	50	T	85	51	0	89	52	0	85	49	0	83	48
20-Jun	0	77	52	0	79	53	T	76	54	0	77	55	0.06	74	49	0	73	54
21-Jun	0.06	79	52	0	74	54	0.01	79	55	0	80	56	0	78	53	T	78	53
22-Jun	0	79	48	0	76	47	0	72	46	0	72	48	0	71	51	0	71	50
23-Jun	0	82	49	0	87	54	0	76	55	0	77	57	0	76	48	0	75	54
24-Jun	0	85	55	0	97	65	0	85	64	0	85	64	0	83	65	0	87	63
25-Jun	0	95	66	0	99	74	0	93	68	0	91	72	0	98	66	0	95	67
26-Jun	0	97	73	0.07	88	70	0.71	98	70	0.03	96	76	0	85	74	0	98	70
27-Jun	T	87	68	0	93	65	0	83	67	0	85	67	0	91	73	0.37	81	67
28-Jun	0	92	67	0	91	66	0	91	66	0	94	70	0	92	69	0	91	69
29-Jun	0	89	66	0	86	67	0.09	88	68	0.34	90	68	0.84	91	68	1.2	90	67
30-Jun	0	85	66	0.7	84	63	0.09	85	68	0	89	68	0.03	85	68	0.05	87	65
1-Jul	0	87	53	0.1	68	53	0	86	51	0.03	87	54	0.05	68	56	0	79	49
2-Jul	0.09	70	52	0.01	68	52	0.1	68	51	0	67	50	0.02	67	50	0.03	69	53
3-Jul	0.03	70	52	0	85	60	T	66	52	0	67	53	0	84	52	T	71	56
4-Jul	0	86	59	0	82	60	0	86	61	0	86	63	0	84	59	0	84	60
5-Jul	0	78	54	0	79	53	0	77	54	0	79	52	0	78	58	0	77	50
6-Jul	0	76	61	0	91	58	0	77	57	0	80	59	0.02	78	52	0	77	59
7-Jul	0	87	62	0	90	68	0.02	88	65	0	91	65	0	89	61	0.04	89	63
8-Jul	0	90	65	0	91	70	0	88	69	0	90	69	0	89	65	0	88	63
9-Jul	0	92	63	0	95	62	0	91	60	0	91	62	0	86	69	0	87	61
10-Jul	0	92	62	0	87	64	0	92	62	0	95	64	0	93	60	0	89	62
11-Jul	0	87	55	0	83	59	0	85	60	0	86	56	0	82	60	0	81	58
12-Jul	0	84	61	0	84	64	0	82	63	0	83	62	0	80	56	0	79	62
13-Jul	0	85	56	0	87	57	0	83	57	0	84	57	0	83	63	0	83	59
14-Jul	0	86	60	0	89	60	0	85	64	0	89	62	0	86	58	0	84	62
15-Jul	0	86	63	0	89	64	0	86	67	0	91	67	0	87	62	0	85	66
16-Jul	0	87	65	0	89	63	0	87	65	0	89	65	0	88	66	0	86	65
17-Jul	0	85	71	0	94	70	0.02	86	68	0	88	69	0	86	66	1.37	82	66
18-Jul	0	91	67	0	97	71	0	92	66	0	94	66	0	93	70	0	89	65
19-Jul	0	93	70	0	92	69	0	92	70	0.38	96	69	0	96	70	0	90	64
20-Jul	T	89	70	0	87	69	0.22	88	67	0	90	67	0.91	89	66	0.45	86	68
21-Jul	0.05	85	70	0.23	88	69	0.17	89	69	0.45	87	71	0	85	66	0.33	84	68
22-Jul	0.44	88	69	0.92	88	69	0.12	89	69	0.14	91	75	0.83	88	65	T	88	69
23-Jul	0.43	89	68	0.93	88	67	1.1	88	68	0	90	69	0	89	66	0.58	87	67
24-Jul	T	88	64	0	72	62	0	88	66	T	89	64	0.14	85	67	0	84	64
25-Jul	0	75	54	0.19	78	58	0.08	73	57	0	79	57	0	74	63	0.07	72	56
26-Jul	0	81	56	0	77	58	0	78	58	0	78	56	0	79	57	0	78	59
27-Jul	0	77	59	0.34	77	62	T	77	61	0	76	68	0.1	78	59	0	77	61
28-Jul	0.25	75	63	0	79	64	0.2	72	65	0.2	75	64	0	69	59	1.3	69	64
29-Jul	0	80	62	0	90	61	0	80	63	0	81	62	0	77	62	T	79	63
30-Jul	0	87	64	0	94	71	0	86	64	0	87	69	0	89	64	0	86	67
31-Jul	0	91	71	T	95	78	0	92	73	0	92	76	0.03	91	71	0.01	89	75
1-Aug	0.09	94	76	0.05	84	70	0	95	77	m	96	76	0	85	71	0	93	70
2-Aug	0.09	84	58	0	85	63	0.16	84	64	0	87	64	0	85	61	0	84	59
3-Aug	0	89	61	0	91	65	0	84	64	0	83	62	0	91	65	0	84	64

2001 Weather Station Data

Month/ Day	Olivia, MN			Redwood, MN			Willmar, MN			Hutchinson, MN			Montevideo, MN			Morris, MN		
	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min
4-Aug	0	89	65	0	93	70	0	89	66	0	92	72	0	93	72	0	90	70
5-Aug	0	91	74	0	96	74	0	92	76	0	93	76	0	97	75	0	92	74
6-Aug	0	94	74	0	96	75	0	95	76	0	96	75	0	91	73	0	93	73
7-Aug	0	96	68	0	97	70	0	96	65	0	98	70	0	96	66	0	92	66
8-Aug	0	94	68	0	93	71	0	95	71	0	99	73	0	92	70	0	93	72
9-Aug	0	91	69	0	78	58	0	92	71	0	94	71	0	74	57	0	91	65
10-Aug	0	80	47	0	72	49	0	77	51	0	79	52	0	73	49	0	73	49
11-Aug	0	76	49	0	81	49	0	73	52	T	80	53	0	81	49	0	75	51
12-Aug	0	81	51	0	83	56	T	80	56	0	80	62	0	78	49	0	79	56
13-Aug	0	84	45	0	78	50	0	81	48	0	82	51	0	78	48	0	75	45
14-Aug	0	78	54	0	77	54	0	77	55	0	80	56	0.01	78	55	0	76	56
15-Aug	0	74	63	m	79	60	T	76	63	0	79	63	0.88	81	59	0.03	80	60
16-Aug	0.29	78	56	m	78	56	0.74	80	58	0.32	80	59	0	77	53	0	80	57
17-Aug	0	78	49	m	85	50	0	77	52	0	78	54	0.66	84	52	0	76	52
18-Aug	0.46	82	53	1.5	72	54	0.3	82	55	0.42	85	56	0	71	47	0.03	83	54
19-Aug	0	75	51	0	78	54	0	75	57	0	74	55	0	78	52	0	73	51
20-Aug	0	79	56	0	81	54	0	77	55	0	77	53	0	81	55	0	78	56
21-Aug	0	79	62	0	76	61	0	80	62	0	81	59	0	84	63	0	80	61
22-Aug	T	77	66	0	88	68	0	82	65	0	79	64	0	85	67	0	85	63
23-Aug	0	89	64	0	88	65	0	88	66	0	87	65	0	88	64	0	84	65
24-Aug	0	90	62	0	83	64	0	88	60	0	85	58	0	81	63	0	87	61
25-Aug	0	83	64	0	85	65	0	83	62	0.08	84	62	0	83	59	0	81	62
26-Aug	0	87	58	0	85	58	0	86	58	0.08	82	57	0.05	85	59	0	85	60
27-Aug	0.04	84	54	0	84	56	0.26	83	59	0	85	57	0	83	53	0.63	83	54
28-Aug	0	84	53	0	85	52	0	83	54	0	83	54	0.08	84	51	0	81	52
29-Aug	T	85	58	0.1	87	62	0.09	84	55	0.12	86	54	0.45	87	61	0.02	83	59
30-Aug	0.12	86	56	0.1	80	58	0.07	84	55	0	83	59	0	78	55	1.43	83	56
31-Aug	0	79	47	0	73	50	0	77	53	0	79	52	0	72	46	0	75	49
1-Sep	0	75	48	0.05	81	51	0	72	52	T	72	49	0	73	50	0	70	54
2-Sep	0	75	52	0	88	59	0.12	76	55	0	78	56	0	78	52	0.26	74	57
3-Sep	0	87	52	0	82	55	0	87	59	0	88	58	0	87	51	0	85	53
4-Sep	0	84	52	0	84	50	0	80	50	0	81	49	0	78	52	0	77	51
5-Sep	0	83	54	0	91	61	0	83	59	0	82	61	0	84	51	0	81	56
6-Sep	0	89	66	0	84	68	0	89	67	1.74	87	66	0.39	91	62	0	89	65
7-Sep	2.02	82	64	1.11	73	58	1.63	83	64	0	82	64	0.16	84	56	1.33	84	64
8-Sep	0.04	74	44	0	66	52	0.03	69	53	0	77	56	0	70	47	0.77	64	49
9-Sep	0	74	44	0	71	52	0	66	52	0	65	53	0	66	50	0	65	49
10-Sep	0	71	41	0	72	47	T	70	49	0	71	49	0	72	50	0	70	45
11-Sep	0	73	52	0	86	51	0	71	49	0	71	50	0	72	45	0	70	48
12-Sep	0	85	53	0	76	55	0	82	55	0	86	54	0	81	52	0	76	51
13-Sep	0	77	52	0	69	52	0	74	51	0	74	52	0.03	72	51	0	69	45
14-Sep	T	70	49	0.1	54	50	T	66	51	0.15	66	49	0.35	55	51	0.01	65	48
15-Sep	0.2	54	49	0.35	61	50	0.15	54	50	0	55	50	0.15	54	49	1.04	54	49
16-Sep	0.33	61	51	0	57	51	0.01	64	51	T	64	52	0.3	60	47	0.14	60	50
17-Sep	0.02	57	53	0.19	64	53	0.07	56	53	0	58	55	0	57	51	0.04	56	53
18-Sep	0	68	54	0	63	52	0	63	54	0	64	52	0	63	53	0	62	55
19-Sep	0.05	64	54	0	69	50	0	64	55	0.05	66	55	0	63	54	0	63	51
20-Sep	0	70	47	0.02	62	47	0	68	47	0.2	67	45	0.53	70	50	0	71	50
21-Sep	0.15	69	47	0.08	73	49	0.25	63	49	0	60	48	0.96	64	49	0.45	62	48
22-Sep	0	72	48	0	63	46	0	69	46	1.33	70	43	0	70	46	0	68	47
23-Sep	1.03	61	46	1.32	59	40	0.54	62	49	0	51	45	0	54	48	0.34	68	48
24-Sep	0	60	32	0	59	33	0	59	35	0	61	34	0	58	31	0	56	34
25-Sep	0	61	34	0	63	33	0	59	35	0	58	32	0	59	32	0	60	35
26-Sep	0	64	35	0	72	35	0	63	36	0	63	35	0	63	33	0	64	38
27-Sep	0	75	41	0	77	39	0	72	37	0	72	39	0	71	35	0	74	42

2001 Weather Station Data

	Olivia, MN			Redwood, MN			Willmar, MN			Hutchinson, MN			Montevideo, MN			Morris, MN		
Month/ Day	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min
28-Sep	0	78	42	0	74	44	0	75	40	0	73	39	0	76	38	0	75	45
29-Sep	0	74	45	0	72	42	0	71	43	0	70	42	0	75	43	0	72	46
30-Sep	0	72	45	0	78	46	0	71	50	0	70	46	0	75	40	0	74	49
1-Oct	0	78	40	0	77	42	0	75	41	0	77	43	0	74	50	0	74	38
2-Oct	0	79	40	0	91	46	0	77	42	0	89	48	0	80	39	0	79	40
3-Oct	0	91	40	0	64	45	0	90	50	0	63	44	0	90	47	0	80	44
4-Oct	0	64	42	0	56	36	0	62	45	0	55	32	0	63	43	0	61	42
5-Oct	0	54	30	0	49	29	0	62	32	0	49	26	0	54	43	0	55	30
6-Oct	0	47	21	0	51	25	T	47	27	0	49	30	0	46	29	0	45	22
7-Oct	0	52	29	0	62	26	0	50	28	0	58	44	0.03	51	22	0	50	24
8-Oct	0.06	61	29	0	71	48	T	59	33	0.04	66	44	0	61	30	0	59	29
9-Oct	0	69	45	0	61	42	0.03	68	42	0.19	63	48	0.41	70	48	0	66	42
10-Oct	0.05	63	50	0.19	64	47	0.55	62	48	0	62	39	0	67	41	0.36	68	44
11-Oct	0	55	34	0	69	35	0.03	60	36	0	69	44	0	60	46	0.19	54	36
12-Oct	0	69	34	0	67	43	0	66	37	0.44	67	44	0.21	68	36	0	66	37
13-Oct	0.33	68	44	0.33	56	42	0.22	64	46	0.6	54	40	0.02	68	35	0.3	64	43
14-Oct	0	56	40	0	52	42	0	56	40	0.24	52	40	0.03	63	40	0.03	57	42
15-Oct	0.06	53	36	0	49	37	0.01	52	41	0.02	48	31	0.02	52	37	0.06	51	41
16-Oct	0	48	29	0	48	30	0.01	47	31	0	48	26	0	52	37	0.02	47	29
17-Oct	0	48	28	0	61	27	0	48	28	0	59	32	0	48	29	0	45	29
18-Oct	0	59	34	0	59	37	T	58	34	0	57	34	0	61	28	0	58	33
19-Oct	0	59	31	0.03	64	34	0.02	57	32	0	64	35	0	58	38	0	56	30
20-Oct	0	64	31	0	67	35	0	62	32	0	64	36	0	64	34	0	58	32
21-Oct	0	68	34	0	65	36	0	62	31	0	65	33	0	69	35	0	61	30
22-Oct	0	64	34	0	66	30	0	65	40	0	64	43	0	66	33	0	62	31
23-Oct	0.03	65	35	0.07	65	39	T	64	38	T	65	37	0	67	35	0	63	35
24-Oct	T	64	36	0	48	32	0	67	38	0.07	47	30	0.02	65	35	0.08	64	35
25-Oct	T	47	29	0	35	30	0.03	43	30	0	47	29	0	42	31	0.19	37	28
26-Oct	0	36	29	0	40	23	T	34	29	0	38	20	0	34	28	T	33	26
27-Oct	0	40	16	0	48	16	0	38	18	0	48	25	0	39	27	0	36	19
28-Oct	0	47	25	0	69	38	0	46	18	0	68	36	0	49	14	0	46	21
29-Oct	0	69	34	0	51	38	0	65	38	T	49	39	0	68	39	0	61	34
30-Oct	T	51	39	T	50	40	T	50	39	T	50	46	0	48	33	0.01	50	39
31-Oct	T	50	35	0	63	47	T	50	40	0	60	47	0.03	50	39	0.02	48	39
1-Nov	0	62	45	T	67	47	0	62	47	0	60	47	0.02	64	44	0	62	45
2-Nov	0	66	23	0	64	39	0	60	38	0	66	38	0	57	44	0	61	38
3-Nov	0	70	32	0	71	30	0	59	29	0	60	32	0	64	35	0	59	29
4-Nov	0	67	31	0	64	34	0	68	28	0	68	33	0	71	31	0	66	29
5-Nov	0	63	33	0	75	39	0	62	29	0	59	43	0	64	29	0	62	31
6-Nov	0	75	43	0	68	47	0	74	42	0	72	40	0	75	43	0	75	40
7-Nov	0	72	39	T	74	41	0	70	41	0	70	36	0	61	42	0	61	40
8-Nov	T	74	36	0	45	28	0	64	36	0	70	36	0	66	31	0	55	33
9-Nov	0	46	26	0	69	28	0	43	27	0	44	30	0	46	35	0	44	25
10-Nov	0	68	30	0	57	33	0	67	33	0	63	32	0	70	29	0	66	28
11-Nov	0	59	27	0	61	25	0	57	28	0	55	29	0	70	37	0	55	31
12-Nov	0	61	37	0.39	69	38	0	60	30	0	58	34	0	63	26	0	63	34
13-Nov	0.36	61	43	0	65	43	0.98	68	38	0.25	66	43	0.16	69	40	0	63	33
14-Nov	0	68	44	0.01	64	45	0	68	38	0	62	48	0.02	63	36	0	59	35
15-Nov	0.03	68	34	0	69	37	0	64	39	0	63	41	0	67	48	0	63	34
16-Nov	0	63	33	0	73	34	0	60	38	0	63	37	0	65	35	0	63	36
17-Nov	0	69	39	0	68	47	0	65	43	0	68	42	0	74	33	0	67	40
18-Nov	0	68	46	0.01	57	35	0	67	45	0	67	50	0	69	48	0	70	47
19-Nov	T	55	26	0	44	25	0.01	54	26	T	57	28	0	55	40	0	49	24
20-Nov	0	42	20	0	53	20	0	41	23	0	41	22	0	44	24	0	42	19
21-Nov	0	52	27	0	68	33	0	48	25	0	48	33	0	55	19	0	54	26

2001 Weather Station Data

Month/ Day	Olivia, MN			Redwood, MN			Willmar, MN			Hutchinson, MN			Montevideo, MN			Morris, MN		
	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min	Pre-cip.	Temp Max	Temp Min
22-Nov	0	66	34	0	57	32	0	63	32	0	64	32	0	68	28	0	62	29
23-Nov	0	56	27	0	54	36	0	51	36	0	54	35	0	51	36	0	49	33
24-Nov	0.63	51	35	2.01	46	35	0.44	47	36	0.43	51	33	1.47	50	35	0.38	45	33
25-Nov	1.23	44	16	0.01	35	31	0.85	42	34	1	39	36	0.35	44	41	0.46	41	30
26-Nov	T	33	28	0.15	32	29	0	34	28	0	44	29	0.72	33	31	0	34	28
27-Nov	1.23	31	29	2.01	31	24	1.97	29	24	0.48	31	29	0.22	29	25	0.38	29	22
28-Nov	T	29	23	0	28	21	0.62	25	23	0.11	31	25	0.05	25	22	0.07	25	22
29-Nov	T	29	11	0	28	26	0.07	27	17	0	29	21	0	25	21	0.08	28	19
30-Nov	0	29	13	0	30	25	0	29	16	0	31	21	0	23	16	0	28	15
1-Dec	0	37	15	0	26	17	T	30	19	0	35	21	0	30	23	0.03	31	20
2-Dec	0	40	13	0	39	16	0	27	16	0	30	27	0	40	14	0	31	16
3-Dec	0	38	19	0	37	22	0	39	16	0	41	20	0	40	12	0	37	14
4-Dec	0	38	30	0	42	31	0	38	20	0	42	33	0	39	16	0	39	21
5-Dec	0	46	32	0.02	47	31	0	44	30	0	48	33	0	40	23	0.03	38	27
6-Dec	0	46	23	0	40	21	0	47	28	T	54	31	0	37	32	0	35	20
7-Dec	0	41	19	0	32	18	T	39	15	0	40	21	0	33	26	0	30	12
8-Dec	0	31	13	0.08	25	13	0	31	14	0.07	31	16	0	33	11	0	30	11
9-Dec	0	27	15	0	42	20	0	25	13	0	26	15	0	24	13	0	24	12
10-Dec	0	41	24	0	35	24	0	37	24	0	41	26	0	38	13	0	35	23
11-Dec	0.16	37	30	0	45	25	0	37	23	0	37	24	0	31	22	0	31	19
12-Dec	0	29	29	0	35	24	0	41	27	0	46	28	0	39	15	0	37	20
13-Dec	0	20	20	0	31	21	0	29	19	0	36	20	0	28	23	0	27	18
14-Dec	0	29	20	0	38	22	T	27	19	0	28	21	0	28	20	0	26	20
15-Dec	0	37	29	0	45	34	0	35	25	0	37	28	0	35	21	0	35	25
16-Dec	0	44	32	0	42	26	0	41	35	0	45	37	0	41	32	0	38	34
17-Dec	0	37	22	0	45	22	0	37	24	0	39	24	0	37	33	0	36	25
18-Dec	0	44	23	0	36	23	0	42	23	0	44	25	0	41	21	0	37	25
19-Dec	T	35	16	0	36	16	0	35	16	0	38	18	0	35	28	0	34	15
20-Dec	0	35	16	0	34	18	0	33	15	0	34	17	0	31	15	0	33	16
21-Dec	T	34	16	0	37	15	0	33	15	0	37	16	0	32	15	0	31	13
22-Dec	0.08	37	18	0.31	36	17	0	36	20	0.19	35	21	m	35	14	0	34	20
23-Dec	0.06	25	8	0	19	9	0.3	27	8	0	36	23	T	35	24	0.06	24	7
24-Dec	m	14	7	0	17	4	0	16	6	0	28	6	0	17	9	0	13	8
25-Dec	0	17	0	0	12	2	0	16	1	0	18	4	0	16	10	0	16	2
26-Dec	0	13	-6	T	21	8	0.01	14	1	0	15	8	T	14	3	T	14	2
27-Dec	0	20	13	0	25	13	T	19	14	T	20	13	T	20	6	T	19	13
28-Dec	0	24	7	0.03	19	7	0.06	24	6	T	24	8	0.03	25	16	0.04	24	6
29-Dec	0.03	12	1	0.01	14	3	T	13	1	0	14	0	0	15	11	T	11	3
30-Dec	0.04	14	1	0	14	4	T	14	5	0	12	10	0	14	3	T	14	6
31-Dec	0.03	14	-4	0	8	-4	T	14	-5	0	16	-4	0	12	5	T	11	-6