

November 2008

Dear Crystal Sugarbeet Grower:

The 2008 official coded variety performance trials and disease nurseries were planted at 17 sites by American Crystal and included 13 yield trial sites. Thanks to the dedicated Technical Services staff involved in official trial plot care, harvest, and analyses.

Conventional, Aphanomyces and biotech trials were planted to stand at 4.5 inches. Several sites (Angus, Averill, Hickson, Kindred, Scandia & Stephen) were lost due to wind, excess water, non-uniform emergence and poor growth. Weeds were controlled by herbicides and hand weeding as needed.

Results from the Official Variety Trials sites were good to excellent. Yield losses with rhizomania susceptible commercial checks ranged from light to moderate. Aphanomyces was less prevalent in the 2008 trials than in previous years. Revenue calculations in 2008 are based on a hypothetical \$42.38 payment at 17.5% sugar and 1.5% SLM and do not consider hauling costs.

Fusarium evaluation was conducted at two Minnesota sites. The Rhizoctonia data is from Moorhead and the Aphanomyces data is from Shakopee. The USDA/ARS Rhizoctonia and RRV irrigated Aphanomyces nurseries were lost due to light and erratic disease infection.

The 2008 data has been combined with the previous years' data, and results are enclosed. Data has been combined from sites with similar rhizomania severity (light and moderate to severe). All approved biotech varieties have Rhizoctonia and Fusarium ratings included in this report.

These results and additional information for individual growing sites are available on the World Wide Web at www.crystalsugar.com. More detailed information will be printed later in the Sugarbeet Research and Extension Reports (www.sbreb.org). This information is available on the World Wide Web two to three days before the mail arrives. We are considering eliminating the mailing of copies in the future.

Attached are the following pages of information:

- 1 List of varieties approved for sale to Crystal growers
- 2-3 Multi-year performance of specialty rhizomania approved varieties under various disease levels
- 4 Two-year performance of all varieties from all sites (with disease ratings)
- 5 Two-year performance of all Aphanomyces specialty approved varieties
- 6 Trial sites, disease observations and agronomic information from all trial locations

*Before purchasing seed, please check to make sure the varieties you are buying are on the **current approved list**. In accordance with the grower contract, the cooperative has the option to refuse to purchase beets of a non-approved variety. If you have questions, please contact the Crystal Technical Services Center or your Crystal Agriculture Department.*

Sincerely,

William S. Niehaus
Official Trial Manager

WSN/mlj
Attachments

Varieties Approved for Sale to ACSC Growers for the 2009 Sugarbeet Crop

Full Market Approved Varieties			
Roundup Ready ®		Conventional	
Beta 85RR02 (+Aph)	Hilleshög 4010RR	A Beta 1100R	Holly 317
Beta 86RR44 (+Aph)	Hilleshög 4012RR (+Aph)	A Beta 1140R	A Holly 701 (07HX701)
Beta 86RR66 (+Aph)	A Hilleshög 4000RR(9035)	Beta 1301R (+Aph +Rhc)	
Beta 86RR88 (+Aph)	A Hilleshög 4043RR(9043)	Beta 1305R (+Aph)	A Seedex Vault (SX0842)
A Beta 87RR38	A Hilleshög 4053RR(9053)		Seedex Sonic
A Beta 87RR58		Crystal R308	Seedex Triton
A Beta 87RR68	A SESVanderhave H36711RR	Crystal R431	
		Crystal R434	SESVanderhave H46519
Crystal 539RR (+Aph)		A Crystal R760	SESVanderhave H46531
Crystal 658RR (+Aph)		A Crystal R761 (+Aph)	A SESVanderhave H46711
A Crystal 765RR			SESVanderhave H48607
A Crystal 767RR		Hilleshög 3035Rz (+Aph +Rhc)	A SESVanderhave H48716TT
A Crystal 768RR		Hilleshög 3052Rz (+Aph +Rhc)	A SESVanderhave H48717TT
		S Beta 1115R	S Seedex SX0873TT
		S Beta 1125R	S SESVanderhave H46801
		S Beta 1135R	S SESVanderhave H48810TT
		S Crystal R869	

Aphanomyces Specialty Approved Varieties (Aph)			
Roundup Ready ®		Conventional	
Beta 85RR02	Crystal 539RR	Beta 1301R (+Rhc)	Hilleshög 3035Rz (+Rhc)
Beta 86RR44	Crystal 658RR	Beta 1305R	A Hilleshög 3052Rz (+Rhc)
Beta 86RR66	A Crystal 770RR (+Rhc)		
Beta 86RR88		A Crystal R761	
	A Hilleshög 4012RR		
		S Beta 1115R	
		S Beta 1125R	

Rhizoctonia Specialty Approved Varieties (Rhc)			
Roundup Ready ®		Conventional	
A Crystal 770RR (+Aph)		Beta 1301R (+Aph)	A SESVanderhave H46714
		Hilleshög 3035Rz (+Aph)	S Beta 1135R
		A Hilleshög 3052Rz (+Aph)	S Beta 1833R

A Newly Approved

S Approval granted after 1-year of testing.

(+Aph) additional Aph spec approval

(+Rhc) additional Rhizoctonia spec approval

Roundup Ready ® is a registered trademark of Monsanto Company.

Updated 1-22-2009.

Table 2. Performance Data of Conventional and Biotech Varieties Approved for Sale to ACSC Growers in 2009 Under Light Rhizomania Conditions During 2007 & 2008 Growing Seasons +++

Description	Years		Rev/Ton ++			Rev/Acre ++			Rec/Ton		Rec/Acre		Sugar		Yield		Aph Root+		CR +		Fusarium +		Rhizoctonia +		
	Ploidy	Comm	2008	2 Yr	%Bnch	2008	2 Yr	%Bnch	2008	2 Yr	2008	2 Yr	2008	2 Yr	2008	2 Yr	2 Yr	3Yr	2 Yr	3 Yr	2008	2 Yr	2008	2 Yr	
Roundup Ready	# of Locations	→	5	11		5	11		5	11	5	11	5	11	5	11	3	4	5	6	2	4	1	3	
Beta 85RR02	2N	1	41.34	41.94	105	1092	1142	108	315.6	319.1	8335	8696	16.96	17.16	26.38	27.27	4.2	4.2	4.6	4.6	2.8			3.9	
Beta 86RR44	2N	1	40.44	40.51	101	1088	1099	104	311.9	313.0	8387	8484	16.79	16.87	26.87	27.08	4.6	4.6	5.0	5.1	5.6			3.1	
Beta 86RR66	2N	1	39.84	40.74	102	1079	1076	102	309.4	314.0	8377	8298	16.68	16.91	27.07	26.46	4.8	4.8	5.0	5.0	5.8			2.7	
Beta 86RR88(B6808RR)	2N	1	41.85	42.76	107	1071	1087	103	317.8	322.6	8138	8223	17.05	17.29	25.65	25.60	4.8	4.8	4.6	4.6	4.2	3.7		3.4	
Beta 87RR38	2N	NC	39.44	40.45	101	1164	1165	110	307.7	312.7	9115	9038	16.58	16.80	29.71	29.00			4.1		4.8	4.1		2.7	
Beta 87RR58	2N	NC	39.49	41.00	103	1146	1144	108	308.0	315.2	8944	8813	16.59	16.95	29.08	28.05	5.4		4.8		5.3	4.8		3.3	
Beta 87RR68	2N	NC	44.74	44.76	112	1312	1240	118	329.9	331.0	9661	9178	17.58	17.66	29.24	27.77	7.3		4.5		4.0	4.4		4.3	
Crystal 539RR	2N	1	41.43	42.26	106	1084	1112	105	316.0	320.4	8261	8432	16.96	17.18	26.11	26.33	4.4	4.2	5.0	5.0	2.3	2.6		4.3	
Crystal 658RR	2N	1	38.11	38.51	96	1095	1091	103	302.2	304.5	8683	8642	16.13	16.29	28.72	28.43	5.3	4.8	4.1	4.3	2.4	2.6		1.8	
Crystal 765RR	2N	NC	43.86	45.08	113	1274	1235	117	326.2	332.4	9463	9116	17.39	17.69	28.95	27.46	6.9		4.4		4.1			4.3	
Crystal 767RR	2N	NC	40.59	40.21	101	1167	1149	109	312.5	311.6	8987	8916	16.82	16.79	28.76	28.64	5.9		4.4		4.4			2.8	
Crystal 768RR	2N	NC	39.45	40.58	101	1178	1182	112	307.8	313.3	9192	9145	16.59	16.86	29.86	29.25	5.5		4.6		5.2			3.5	
Crystal 770RR	2N	NC	35.50	37.49	94	1077	1069	101	291.3	300.3	8853	8600	15.72	16.14	30.43	28.79	4.5		4.4		1.7			2.0	
Hilleshög 4010RR	2N	1	42.37	42.80	107	1121	1119	106	320.0	322.7	8463	8454	17.09	17.27	26.45	26.27	5.1	5.3	4.9	5.0	6.9			2.7	
Hilleshög 4012RR	2N	1	40.07	40.60	102	1171	1143	108	310.3	313.3	9070	8841	16.63	16.81	29.21	28.29	4.8	5.0	5.0	5.0	6.4			3.2	
Hilleshög 4000RR(9035RR)	2N	NC	38.95	41.94	105	1019	1065	101	305.7	319.2	8034	8143	16.48	17.10	26.44	25.67	5.3		4.6		7.6			3.0	
Hilleshög 4043RR(9043RR)	2N	NC	41.59	42.63	107	1190	1170	111	316.7	322.0	9052	8845	16.84	17.12	28.59	27.52	5.2		4.4		7.3			3.2	
Hilleshög 4053RR(9053RR)	2N	NC	41.67	42.57	106	1049	1072	102	317.1	321.8	7962	8101	16.93	17.19	25.10	25.20	5.4		4.2		7.3			2.7	
SESVanderhave H36711RR	2N	NC	39.23	41.81	105	1080	1139	108	306.9	318.6	8455	8699	16.48	17.04	27.58	27.35	5.3		4.5		7.5	5.9	2.4	3.7	
Conventional																									
Beta 1100R	2N	NC	38.36	39.75	99	1130	1165	110	303.2	309.8	8927	9084	16.18	16.53	29.44	29.34	6.0		4.8		4.9			2.0	
Beta 1140R	2N	NC	42.15	43.78	109	1119	1154	109	319.1	326.9	8457	8621	16.97	17.36	26.47	26.42	5.3		4.4		5.9			3.3	
Beta 1301R	2N	4	34.82	36.95	92	999	1019	97	288.4	298.0	8265	8240	15.70	16.19	28.62	27.70	4.0	4.0	4.4	4.5	6.0	5.8	1.3	2.6	
Beta 1305R	2N	4	37.28	39.15	98	1002	1034	98	298.7	307.3	8011	8121	16.16	16.60	26.77	26.45	4.8	4.5	5.2	5.3	5.8	5.6		2.3	
Crystal R308	3N	4	40.67	42.55	106	1043	1063	101	312.9	321.7	8015	8041	16.79	17.25	25.59	25.04	4.5	4.3	4.5	4.6	2.9	3.4		na	
Crystal R431	2N	3	38.79	40.88	102	1027	1060	100	305.0	314.7	8067	8168	16.46	16.94	26.42	26.01	4.4	4.6	4.7	5.0	3.3	3.5		na	
Crystal R434	2N	3	37.78	39.02	98	1042	1070	101	300.8	306.8	8301	8418	16.31	16.66	27.60	27.48	4.1	4.1	5.0	5.1	2.8	3.3		2.8	
Crystal R760	2N	NC	38.54	39.58	99	1151	1157	110	304.0	309.1	9060	9036	16.31	16.59	29.74	29.25	4.9		5.2		na			3.7	
Crystal R761	2N	NC	37.17	38.90	97	1099	1142	108	298.2	306.2	8804	8999	16.20	16.64	29.49	29.42	4.3		4.4		2.3			2.8	
Hilleshög 3035Rz	2N	2	40.55	42.33	106	1089	1112	105	312.4	320.8	8387	8432	16.72	17.14	26.85	26.35	4.4	4.7	4.0	4.1	4.6	4.2	1.0	1.9	
Hilleshög 3052Rz(7252)	2N	1	38.79	41.10	103	1105	1145	108	305.0	315.6	8683	8800	16.34	16.87	28.45	27.94	4.8	4.9	4.6	4.8	5.0	4.7	2.5	3.3	
Holly 317	2N	4	37.38	39.79	99	928	975	92	299.1	310.1	7415	7608	16.03	16.60	24.76	24.57	5.2	5.0	4.5	4.5	4.2			2.4	
Holly 701(07HX701)	2N	NC	38.10	42.07	105	1031	1113	105	302.1	319.8	8185	8474	16.13	17.02	27.12	26.57	5.2		4.8		4.4			3.1	
Seedex Vault(SX0842)	2N	NC	38.12	39.96	100	1026	1100	104	302.2	310.7	8154	8575	16.13	16.59	27.04	27.67	5.3		4.9		4.5			2.6	
Seedex Sonic	2N	2	38.88	40.10	100	1083	1136	108	305.4	311.3	8519	8843	16.33	16.65	27.94	28.49	5.5	5.5	4.8	4.8	5.0			2.9	
Seedex Triton(SX0835)	2N	1	38.71	40.31	101	983	1077	102	304.7	312.2	7727	8338	16.22	16.66	25.32	26.68	4.9	4.9	4.1	4.3	5.3			1.9	
SESVanderhave H46519	2N	4	38.17	38.98	97	1081	1101	104	302.4	306.6	8557	8672	16.15	16.41	28.28	28.35	5.0	5.0	4.4	4.5	4.7			2.2	
SESVanderhave H46531	2N	3	38.44	40.23	101	1051	1125	107	303.6	311.9	8309	8734	16.25	16.69	27.40	28.06	5.2	5.0	4.8	4.9	4.5			2.0	
SESVanderhave H46711	2N	NC	40.55	42.99	107	1096	1154	109	312.4	323.6	8455	8698	16.62	17.19	27.09	26.93	5.0		4.3		4.2			3.2	
SESVanderhave H46714	2N	NC	36.74	38.64	97	1034	1091	103	296.5	305.2	8351	8631	15.84	16.30	28.20	28.35	4.7		4.8		4.8			1.7	2.4
SESVanderhave H48607(46907)	2N	1	35.82	38.62	97	1115	1128	107	292.6	305.2	9107	8940	15.71	16.32	31.11	29.41	5.5	5.4	5.2	5.2	6.0			2.3	
SESVanderhave H48716TT	2N	NC	38.86	41.39	103	1026	1079	102	305.3	316.8	8058	8253	16.28	16.87	26.40	26.06	5.4		5.1		5.4			2.1	
SESVanderhave H48717TT	2N	NC	39.11	41.29	103	1063	1114	106	306.3	316.4	8317	8533	16.37	16.89	27.12	26.98	5.3		4.9		4.6			2.7	
Mean of Several Susceptible Varieties			42.61	44.15	110	988	1015	96	321.0	328.4	7440	7551	17.13	17.55	23.16	23.00									
Mean of benchmark varieties.			38.47	40.00	100	1017	1055	100	303.7	310.9	8027	8212	16.30	16.70	26.45	26.47									

2nd column for each trait is mean of 2007 & 2008 data. 3rd column is 2-year mean as % of 5 benchmark varieties.

** Light Rzm sites include Casselton, Crookston, Grand Forks, Grafton, Argyle & Hallock in 2007.

+++ Categorization of Rzm infection based upon performance ratios of tolerant vs susceptible varieties.

** Light Rzm sites include Ada, Hillsboro, Crookston, Grand Forks & Hamilton in 2008.

Created 11-13-2008.

++ 2008 Revenue estimates based on a \$42.38 beet payment at 17.5 % sugar and 1.5 % loss to molasses. Revenue does not consider hauling costs.

++ Aph Ratings are from Shakopee & RRV (1=healthy, 9=dead). CR ratings from Rosemount & Michigan (1=healthy, 9=dead). Fusarium from 2 MN sites (mod resist=4.5, mod susc=5.7).

+ Rhizoctonia ratings from Ft Collins and Mhd (mod res=3, susc=5+).

^%Bnch = Five benchmark varieties: Beta 1305R, Crystal R434, Hilleshög 2417, Seedex Rezult, SESVanderhave H46519.

Table 3. Performance Data of Conventional and Biotech Varieties Approved for Sale to ACSC Growers in 2009
Under Moderate to Severe Rhizomania Conditions During 2007 & 2008 Growing Seasons +++

Description	Years		Rev/Ton ++			Rev/Acre ++			Rec/Ton		Rec/Acre		Sugar		Yield		Aph Root+		CR +		Fusarium +		Rhizoctonia +	
	Ploidy	Comm	2008	2 Yr	%Bnch	2008	2 Yr	%Bnch	2008	2 Yr	2008	2 Yr	2008	2 Yr	2008	2 Yr	2 Yr	3Yr	2 Yr	3 Yr	2008	2 Yr	2008	2 Yr
Roundup Ready	# of Locations	→	1	5		1	5		1	5	1	5	1	5	1	5	3	4	4	5	2	4	1	3
Beta 85RR02	2N	1	43.36	44.35	101	932	1106	98	324.1	329.2	6973	8200	17.23	17.56	21.52	24.84	4.2	4.2	4.6	4.6	2.8	2.8	3.9	3.9
Beta 86RR44	2N	1	42.64	43.17	99	940	1080	96	321.1	324.1	7069	8093	17.07	17.31	21.97	24.90	4.6	4.6	5.0	5.1	5.6		3.1	
Beta 86RR66	2N	1	43.00	43.79	100	1024	1164	104	322.6	326.8	7697	8679	17.17	17.46	23.91	26.51	4.8	4.8	5.0	5.0	5.8		2.7	
Beta 86RR88(B6808RR)	2N	1	43.55	44.55	102	910	1022	91	324.9	330.1	6792	7564	17.29	17.62	20.91	22.88	4.8	4.8	4.6	4.6	4.2	3.7	3.4	
Beta 87RR38	2N	NC	41.03	42.69	97	1083	1197	107	314.4	322.2	8302	9023	16.74	17.17	26.42	27.94	5.2		4.1		4.8	4.1	2.7	
Beta 87RR58	2N	NC	43.25	44.08	101	1234	1256	112	323.6	328.0	9221	9337	17.25	17.52	28.46	28.42	5.4		4.8		5.3	4.8	3.3	
Beta 87RR68	2N	NC	45.61	47.21	108	1201	1297	115	333.5	341.5	8786	9372	17.60	18.09	26.36	27.41	7.3		4.5		4.0	4.4	4.3	
Crystal 539RR	2N	1	43.05	44.47	102	1022	1107	98	322.8	329.7	7706	8220	17.13	17.54	24.02	24.97	4.4	4.2	5.0	5.0	2.3	2.6	4.3	
Crystal 658RR	2N	1	42.28	42.24	96	958	1126	100	319.6	320.1	7235	8530	16.81	16.93	22.62	26.61	5.3	4.8	4.1	4.3	2.4	2.6	1.8	
Crystal 765RR	2N	NC	45.78	47.43	108	1129	1250	111	334.2	342.4	8265	9024	17.61	18.08	24.83	26.34	6.9		4.4		4.1		4.3	
Crystal 767RR	2N	NC	44.60	44.11	101	1152	1248	111	329.3	328.0	8495	9265	17.44	17.46	25.76	28.18	5.9		4.4		4.4		2.8	
Crystal 768RR	2N	NC	41.17	43.02	98	1123	1232	110	315.0	323.6	8594	9254	16.86	17.31	27.29	28.52	5.5		4.6		5.2		3.5	
Crystal 770RR	2N	NC	39.65	40.49	92	815	1040	93	308.6	312.7	6314	7994	16.37	16.66	20.34	25.39	4.5		4.4		1.7		1.3	2.0
Hilleshög 4010RR	2N	1	44.91	45.55	104	965	1060	94	330.6	334.3	7149	7799	17.49	17.78	21.80	23.38	5.1	5.3	4.9	5.0	6.9		2.7	
Hilleshög 4012RR	2N	1	42.73	44.11	101	1053	1174	104	321.5	328.2	7901	8709	17.03	17.47	24.47	26.42	4.8	5.0	5.0	5.0	6.4		3.2	
Hilleshög 4000RR(9035RR)	2N	NC	42.73	45.30	103	820	1004	89	321.5	333.4	6149	7354	17.08	17.71	19.08	21.91	5.3		4.6		7.6		3.0	
Hilleshög 4043RR(9043RR)	2N	NC	44.26	45.03	103	1078	1142	102	327.9	332.1	7988	8418	17.26	17.55	24.37	25.32	5.2		4.4		7.3		3.2	
Hilleshög 4053RR(9053RR)	2N	NC	45.32	45.85	105	932	1046	93	332.3	335.6	6893	7676	17.47	17.77	21.00	22.96	5.4		4.2		7.3		2.7	
SESVanderhave H36711RR	2N	NC	42.21	45.36	104	910	1083	96	319.3	333.7	6874	7942	16.93	17.69	21.50	23.66	5.3		4.5		7.5	5.9	2.4	3.7
Conventional																								
Beta 1100R	2N	NC	43.91	44.24	101	1272	1343	119	326.4	328.8	9454	9982	17.17	17.35	28.96	30.36	6.0		4.8		4.9		2.0	
Beta 1140R	2N	NC	45.04	46.93	107	1222	1278	114	331.1	340.2	8972	9249	17.49	17.96	27.05	27.15	5.3		4.4		5.9		3.3	
Beta 1301R	2N	3	39.02	40.51	92	1089	1114	99	306.0	313.1	8523	8604	16.48	16.86	27.77	27.46	4.0	4.0	4.4	4.5	6.0	5.8	1.3	2.6
Beta 1305R	2N	3	41.86	43.70	100	1020	1133	101	317.8	326.5	7747	8462	17.03	17.49	24.40	25.90	4.8	4.5	5.2	5.3	5.8	5.6	2.3	
Crystal R308	3N	3	46.61	46.53	106	1046	1095	97	337.7	338.4	7575	7958	17.87	17.95	22.41	23.50	4.5	4.3	4.5	4.6	2.9	3.4	na	
Crystal R431	2N	2	44.40	45.28	103	1123	1170	104	328.5	333.2	8313	8613	17.48	17.83	25.33	25.87	4.4	4.6	4.7	5.0	3.3	3.5	na	
Crystal R434	2N	2	41.60	42.97	98	1093	1160	103	316.8	323.5	8347	8734	16.91	17.36	26.43	27.02	4.1	4.1	5.0	5.1	2.8	3.3	2.8	
Crystal R760	2N	NC	44.61	45.32	103	1262	1333	119	329.3	333.3	9297	9793	17.38	17.67	28.15	29.33	4.9		5.2		na		3.7	
Crystal R761	2N	NC	43.61	43.54	99	1225	1263	112	325.2	325.8	9154	9460	17.34	17.49	28.24	29.10	4.3		4.4		2.3		2.8	
Hilleshög 3035Rz	2N	1	42.33	44.76	102	1045	1142	102	319.8	331.1	7882	8440	16.91	17.57	24.61	25.48	4.4	4.7	4.0	4.1	4.6	4.2	1.0	1.9
Hilleshög 3052Rz(7252)	2N	NC	43.11	44.56	102	1103	1218	108	323.1	330.2	8290	9023	17.07	17.52	25.76	27.33	4.8	4.9	4.6	4.8	5.0	4.7	2.5	3.3
Holly 317	2N	3	43.39	44.59	102	971	1050	93	324.2	330.2	7278	7785	17.10	17.48	22.52	23.60	5.2	5.0	4.5	4.5	4.2		2.4	
Holly 701(07HX701)	2N	NC	42.76	45.88	105	1075	1186	106	321.6	335.8	8093	8674	17.05	17.79	25.18	25.80	5.2		4.8		4.4		3.1	
Seedex Vault(SX0842)	2N	NC	41.78	43.76	100	1038	1195	106	317.5	326.8	7901	8919	16.77	17.32	24.93	27.26	5.3		4.9		4.5		2.6	
Seedex Sonic	2N	1	44.03	44.36	101	1112	1228	109	326.9	329.3	8280	9125	17.20	17.44	25.43	27.75	5.5	5.5	4.8	4.8	5.0		2.9	
Seedex Triton(SX0835)	2N	NC	41.49	43.18	99	1013	1159	103	316.3	324.4	7714	8682	16.74	17.21	24.35	26.68	4.9	4.9	4.1	4.3	5.3		1.9	
SESVanderhave H46519	2N	3	42.09	43.34	99	1054	1176	105	318.8	325.0	8011	8822	16.83	17.24	25.23	27.16	5.0	5.0	4.4	4.5	4.7		2.2	
SESVanderhave H46531	2N	2	41.54	42.99	98	1110	1210	108	316.5	323.5	8454	9097	16.76	17.20	26.69	28.08	5.2	5.0	4.8	4.9	4.5		2.0	
SESVanderhave H46711	2N	NC	43.72	45.86	105	1105	1213	108	325.6	335.7	8232	8873	17.13	17.71	25.28	26.40	5.0		4.3		4.2		3.2	
SESVanderhave H46714	2N	NC	41.17	42.66	97	966	1135	101	314.9	322.1	7416	8568	16.60	17.06	23.64	26.59	4.7		4.8		4.8		1.7	2.4
SESVanderhave H48607(46907)	2N	NC	41.78	43.47	99	1209	1251	111	317.5	325.6	9199	9370	16.77	17.24	29.01	28.80	5.5	5.4	5.2	5.2	6.0		2.3	
SESVanderhave H48716TT	2N	NC	42.74	45.11	103	1152	1211	108	321.5	332.5	8674	8934	17.03	17.60	27.03	26.90	5.4		5.1		5.4		2.1	
SESVanderhave H48717TT	2N	NC	42.20	44.54	102	1108	1202	107	319.3	330.1	8369	8893	16.93	17.53	26.19	26.89	5.3		4.9		4.6		2.7	
Mean of Several Susceptible Varieties			45.65	45.44	104	981	947	84	333.7	333.8	7042	6865	17.66	17.70	21.46	20.80								
Mean of benchmark varieties.			41.81	43.80	100	1010	1124	100	317.6	327.0	7683	8389	16.88	17.41	24.24	25.65								

2nd column for each trait is mean of 2007 and 2008 data. % Bnch column is 2-year mean as a % of 5 benchmark varieties.

** Moderate to Severe Rzm sites included Averill, Halstad, Climax & Scandia in 2007.

+++ Categorization of Rzm infection based upon performance ratios of tolerant vs susceptible varieties.

** Moderate to Severe Rzm sites included St Thomas in 2008.

Created 11-13-2008.

++ 2008 Revenue estimates based on a \$42.38 beet payment at 17.5% sugar and 1.5% loss to molasses. 2007 Revenue based on \$41.97. Revenue does not consider hauling costs.

+ Aph ratings from Shakopee & RRV (1=healthy, 9=dead). CR ratings from Rosemount & Michigan (1=healthy, 9=dead). Fusarium from 2 MN sites (mod resist=4.5, mod susc=5.7).

+ Rhizoctonia ratings from Ft Collins & Mhd (mod res=3, susc=5+).

^ %Bnch = Five benchmark varieties: Beta 1305R, Crystal R434, Hilleshög 2417, Seedex Rezult, SESVanderhave H46519.

Table 4. Performance Data of Conventional and Biotech Varieties Approved for Sale to ACSC Growers in 2009
During 2007 & 2008 Growing Seasons (All Locations Combined) +++

Description	Ploidy	Years Seed	Rev/Ton			Rev/Acre			Rec/Ton		Rec/Acre		Sugar		Yield		Loss Molass		Emergence %		Aph Root+		CR +		Fusarium +		Rhizoctonia ++				
			2008	2 Yr	%Bnch	2008	2 Yr	%Bnch	2008	2 Yr	2008	2 Yr	2008	2 Yr	2008	2 Yr	2008	2 Yr	2008	2 Yr	2008	2 Yr	2008	2 Yr	2008	2 Yr	2008	2 Yr			
Roundup Ready	# of Locations	→	6	13		6	13		6	13		6	13		6	13		6	13		3	4		5	6		2	4		1	3
Beta 85RR02	2N	1	41.67	42.63	104	1061	1143	106	317.0	322.0	8079	8637	17.00	17.28	25.53	26.84	1.15	1.19	55.4	58.9	4.2	4.2	4.6	4.6	2.8	--	3.9	--			
Beta 86RR44	2N	1	40.80	41.29	100	1063	1107	102	313.4	316.2	8157	8474	16.83	17.01	26.01	26.76	1.17	1.20	43.3	50.2	4.6	4.6	5.0	5.1	5.6	--	3.1	--			
Beta 86RR66	2N	1	40.36	41.56	101	1068	1118	103	311.6	317.4	8249	8535	16.76	17.07	26.50	26.86	1.18	1.20	42.9	49.5	4.8	4.8	5.0	5.0	5.8	--	2.7	--			
Beta 86RR88(B6808RR)	2N	1	42.10	43.21	105	1044	1078	100	318.8	324.4	7920	8111	17.08	17.38	24.88	25.06	1.14	1.16	46.3	48.4	4.8	4.8	4.6	4.6	4.2	3.7	3.4	--			
Beta 87RR38	2N	NC	39.69	41.12	100	1151	1188	110	308.8	315.6	8973	9125	16.61	16.93	29.11	28.94	1.17	1.15	70.4	65.9	5.2		4.1		4.8	4.1	2.7	--			
Beta 87RR58	2N	NC	40.13	41.76	102	1167	1182	109	310.6	318.3	9034	9012	16.70	17.09	29.08	28.33	1.18	1.18	68.5	65.4	5.4		4.8		5.3	4.8	3.3	--			
Beta 87RR68	2N	NC	44.90	45.64	111	1294	1277	118	330.5	334.7	9522	9367	17.58	17.83	28.79	27.98	1.06	1.09	69.1	66.9	7.3		4.5		4.0	4.4	4.3	--			
Crystal 539RR	2N	1	41.69	42.92	104	1073	1115	103	317.1	323.2	8157	8398	16.99	17.30	25.73	26.00	1.13	1.14	69.3	68.0	4.4	4.2	5.0	5.0	2.3	2.6	4.3	--			
Crystal 658RR	2N	1	38.81	39.50	96	1073	1123	104	305.1	308.6	8445	8776	16.24	16.46	27.72	28.45	0.98	1.03	63.5	65.3	5.3	4.8	4.1	4.3	2.4	2.6	1.8	--			
Crystal 765RR	2N	NC	44.19	45.77	111	1247	1257	116	327.6	335.3	9240	9211	17.42	17.81	28.19	27.47	1.05	1.04	74.0	70.5	6.9		4.4		4.1	--	4.3	--			
Crystal 767RR	2N	NC	41.28	41.30	100	1166	1192	110	315.4	316.2	8909	9123	16.93	16.99	28.26	28.82	1.16	1.17	68.9	67.0	5.9		4.4		4.4	--	2.8	--			
Crystal 768RR	2N	NC	39.73	41.33	101	1168	1209	112	309.0	316.5	9084	9256	16.63	17.00	29.40	29.25	1.18	1.18	74.9	72.4	5.5		4.6		5.2	--	3.5	--			
Crystal 770RR	2N	NC	36.23	38.16	93	1030	1087	100	294.3	303.1	8405	8651	15.83	16.26	28.66	28.60	1.12	1.11	52.7	56.9	4.5		4.4		1.7	--	1.3	2.0			
Hilleshög 4010RR	2N	1	42.80	43.58	106	1094	1112	103	321.8	326.0	8238	8334	17.16	17.42	25.67	25.64	1.07	1.12	62.4	57.7	5.1	5.3	4.9	5.0	6.9	--	2.7	--			
Hilleshög 4012RR	2N	1	40.52	41.70	101	1148	1168	108	312.2	318.0	8848	8915	16.69	17.03	28.35	28.07	1.08	1.13	68.8	60.7	4.8	5.0	5.0	5.0	6.4	--	3.2	--			
Hilleshög 4000RR(9035RR)	2N	NC	39.59	42.82	104	991	1066	98	308.4	323.0	7761	8062	16.58	17.27	25.32	25.06	1.17	1.13	58.4	57.9	5.3		4.6		7.6	--	3.0	--			
Hilleshög 4043RR(9043RR)	2N	NC	42.03	43.23	105	1174	1172	108	318.6	324.5	8893	8801	16.91	17.24	27.91	27.13	0.98	1.00	65.9	59.1	5.2		4.4		7.3	--	3.2	--			
Hilleshög 4053RR(9053RR)	2N	NC	42.28	43.42	106	1030	1075	99	319.6	325.3	7789	8052	17.03	17.36	24.40	24.76	1.05	1.09	59.9	55.8	5.4		4.2		7.3	--	2.7	--			
SESVanderhave H36711RR	2N	NC	39.72	42.88	104	1051	1135	105	308.9	323.2	8190	8571	16.55	17.25	26.58	26.57	1.10	1.08	65.8	68.1	5.3		4.5		7.5	5.9	2.4	3.7			
Conventional																															
Beta 1100R	2N	NC	39.28	40.90	99	1153	1219	113	307.1	314.7	9012	9380	16.35	16.74	29.35	29.80	0.99	1.01	72.2	71.6	6.0		4.8		4.9	--	2.0	--			
Beta 1140R	2N	NC	42.63	44.70	109	1136	1191	110	321.1	330.7	8546	8813	17.06	17.54	26.59	26.65	1.00	1.00	75.4	73.7	5.3		4.4		5.9	--	3.3	--			
Beta 1301R	2N	4	35.53	37.89	92	1013	1047	97	291.4	302.1	8304	8355	15.83	16.37	28.47	27.70	1.26	1.26	72.0	67.2	4.0	4.0	4.4	4.5	6.0	5.8	1.3	2.6			
Beta 1305R	2N	4	38.02	40.44	98	1005	1072	99	301.8	312.8	7969	8293	16.30	16.86	26.38	26.52	1.21	1.22	54.6	56.3	4.8	4.5	5.2	5.3	5.8	5.6	2.3	--			
Crystal R308	3N	4	41.68	43.47	106	1043	1075	99	317.1	325.5	7940	8062	16.97	17.40	25.06	24.80	1.11	1.12	65.4	64.7	4.5	4.3	4.5	4.6	2.9	3.4	--				
Crystal R431	2N	3	39.71	42.00	102	1044	1093	101	308.9	319.4	8112	8321	16.63	17.19	26.25	26.10	1.18	1.21	71.8	68.6	4.4	4.6	4.7	5.0	3.3	3.5	--				
Crystal R434	2N	3	38.41	40.15	98	1050	1100	101	303.4	311.5	8305	8539	16.41	16.87	27.39	27.43	1.24	1.29	73.1	70.5	4.1	4.1	5.0	5.1	2.8	3.3	2.8	--			
Crystal R760	2N	NC	39.57	41.18	100	1170	1215	112	308.3	315.9	9102	9313	16.49	16.90	29.48	29.47	1.08	1.11	73.8	72.8	4.9		5.2		--	--	3.7	--			
Crystal R761	2N	NC	38.22	39.98	97	1119	1174	108	302.6	310.8	8856	9135	16.39	16.84	29.26	29.42	1.25	1.30	72.0	71.6	4.3		4.4		2.3	--	2.8	--			
Hilleshög 3035Rz	2N	2	40.85	43.08	105	1083	1129	104	313.6	323.9	8309	8497	16.75	17.28	26.49	26.27	1.07	1.09	66.9	64.1	4.4	4.7	4.0	4.1	4.6	4.2	1.0	1.9			
Hilleshög 3052Rz(7252)	2N	1	39.49	41.97	102	1104	1174	108	307.9	319.3	8615	8934	16.46	17.04	27.98	28.00	1.07	1.08	70.7	69.0	4.8	4.9	4.6	4.8	5.0	4.7	2.5	3.3			
Holly 317	2N	4	38.39	41.05	100	935	1001	92	303.4	315.3	7386	7695	16.21	16.84	24.36	24.43	1.04	1.07	73.0	72.4	5.2	5.0	4.5	4.5	4.2	--	2.4	--			
Holly 701(07HX701)	2N	NC	38.86	43.04	105	1037	1136	105	305.3	323.9	8162	8561	16.28	17.22	26.79	26.49	1.02	1.03	74.2	72.8	5.2		4.8		4.4	--	3.1	--			
Seedex Vault(SX0842)	2N	NC	38.72	41.04	100	1028	1136	105	304.7	315.3	8107	8739	16.23	16.80	26.67	27.74	0.99	1.04	79.0	78.4	5.3		4.9		4.5	--	2.6	--			
Seedex Sonic	2N	2	39.74	41.20	100	1087	1169	108	309.0	316.0	8473	8978	16.48	16.87	27.50	28.47	1.03	1.07	72.0	70.8	5.5	5.5	4.8	4.8	5.0	--	2.9	--			
Seedex Triton(SX0835)	2N	1	39.18	41.11	100	988	1105	102	306.7	315.6	7725	8471	16.31	16.82	25.15	26.78	0.98	1.04	70.0	73.0	4.9	4.9	4.1	4.3	5.3	--	1.9	--			
SESVanderhave H46519	2N	4	38.81	40.25	98	1076	1133	105	305.1	312.0	8464	8791	16.27	16.67	27.77	28.22	1.01	1.07	70.5	67.1	5.0	5.0	4.4	4.5	4.7	--	2.2	--			
SESVanderhave H46531	2N	3	38.97	40.98	100	1061	1151	106	305.8	315.0	8333	8860	16.34	16.84	27.28	28.15	1.05	1.08	69.9	68.3	5.2	5.0	4.8	4.9	4.5	--	2.0	--			
SESVanderhave H46711	2N	NC	41.10	43.78	106	1099	1178	109	314.7	326.9	8426	8801	16.70	17.34	26.80	26.94	0.97	0.99	77.2	74.5	5.0		4.3		4.2	--	3.2	--			
SESVanderhave H46714	2N	NC	37.47	39.75	97	1022	1116	103	299.5	309.9	8188	8714	15.97	16.52	27.42	28.17	0.99	1.03	76.6	73.4	4.7		4.8		4.8	--	1.7	2.4			
SESVanderhave H48607(46907)	2N	1	36.81	39.88	97	1131	1167	108	296.8	310.4	9120	9104	15.89	16.57	30.75	29.42	1.05	1.05	76.0	75.7	5.5	5.4	5.2	5.2	6.0	--	2.3	--			

Table 5. Performance Data of Conventional & Biotech Aphanomyces Specialty Varieties Approved for Sale to ACSC Growers in 2009
Aphanomyces Conditions (2-year data for Conventional & 1-year data for Biotech)

Description **	Years		Rev/Ton		Rev/Acre		Rec/Ton		Rec/Acre		Sugar		Yield		CR Rating +		Aph Root +		Fusarium +		Rhizoctonia +	
	Ploidy	Comm	2008	2 Yr	2008	2 Yr	2008	2 Yr	2008	2 Yr	2008	2 Yr	2008	2 Yr	2 Yr	3 Yr	2 Yr	3 Yr	2008	2 Yr	2008	2 Yr
	# of Locations	→	1	3	1	3	1	3	1	3	1	3	1	3	5	6	3	4	2	4	1	3
Roundup Ready																						
Beta 85RR02	2N	1	35.10	NA	1029	NA	289.6	NA	8496	NA	15.84	NA	29.40	NA	4.64	4.63	4.2	4.2	2.8		3.9	
Beta 86RR44	2N	1	32.78	NA	742	NA	279.9	NA	6369	NA	15.42	NA	22.78	NA	5.00	5.07	4.6	4.6	5.6		3.1	
Beta 86RR66	2N	1	31.90	NA	792	NA	276.2	NA	6862	NA	15.28	NA	24.89	NA	5.03	5.01	4.8	4.8	5.8		2.7	
Beta 86RR88(B6808RR)	2N	1	35.46	NA	1082	NA	291.1	NA	8902	NA	15.86	NA	30.67	NA	4.65	4.59	4.8	4.8	4.2	3.7	3.4	
Crystal 539RR	2N	1	34.65	NA	1032	NA	287.8	NA	8557	NA	15.67	NA	29.76	NA	4.96	5.04	4.4	4.2	2.3	2.6	4.3	
Crystal 658RR	2N	1	31.57	NA	996	NA	274.9	NA	8678	NA	14.89	NA	31.56	NA	4.10	4.33	5.3	4.8	2.4	2.6	1.8	
Crystal 770RR	2N	1	29.37	NA	961	NA	265.7	NA	8712	NA	14.48	NA	32.91	NA	4.44		4.5		1.7		1.3	2.0
Hilleshög 4012RR	2N	1	33.81	NA	1111	NA	284.2	NA	9346	NA	15.43	NA	32.86	NA	4.98	5.03	4.8	5.0	6.4		3.2	
Conventional																						
Beta 1301R	2N	3	31.27	35.11	908	824	273.6	290.4	7931	6896	14.93	15.77	29.01	24.10	4.39	4.50	4.0	4.0	6.0	5.8	1.3	2.6
Beta 1305R	2N	5	34.51	37.56	1006	888	287.1	300.6	8376	7154	15.56	16.26	29.17	23.97	5.22	5.32	4.8	4.5	5.8	5.6	2.3	
Crystal R761	2N	2	33.02	34.64	1029	847	280.9	288.3	8731	7066	15.37	15.85	30.95	24.58	4.41		4.3		2.3		2.8	
Hilleshög 3035Rz	2N	4	38.59	40.13	858	783	304.2	311.5	6772	6093	16.31	16.69	22.30	19.67	3.96	4.14	4.4	4.7	4.6	4.2	1.0	1.9
Hilleshög 3052Rz(7252)	2N	2	33.26	36.46	912	816	281.9	296.0	7745	6682	15.30	16.01	27.52	22.78	4.62	4.76	4.8	4.9	5.0	4.7	2.5	3.3
Aph Susc Checks			35.61	37.71	853	730	291.8	301.3	6987	5851	15.80	16.36	23.94	19.51								
Mean of Aph Specialty Varieties			33.48	36.78	958	832	282.9	297.3	8114	6778	15.41	16.11	28.75	23.02								

2007 Sites include Perley & Kindred. 2008 site was Perley.

+ Aph ratings are from Shakopee & Kindred. CR ratings are from Rosemount & Michigan (1=healthy, 9=dead).

+ Fusarium ratings from Mhd (1=healthy, 9=dead). Rhizoctonia ratings from Ft Collins and Mhd (1=healthy, 7=dead).

Created 11-12-2008.

Table 6. Planting & Harvest Dates, Previous Crop and Disease Levels for 2008 ACSC Official Trial Sites *

Location	District / Trial Type	Cooperator	Planting Date	Harvest Date	Preceding Crop	Soil Type	Diseases Present @		
							Aph	Rzm	Maggot
Hickson	Mhd/Hlb	Nipstad Farms	5/13	Abandon	Wheat	Medium Light	M	M	N
Averill	Mhd/Hlb	Oberg Farms	5/9	Abandon	Wheat	Light	M	M-V	N
Ada	Mhd/Hlb	Glen & Danny Brandt	5/8	9/29	Wheat	Medium	L	L	N
Hillsboro	Mhd/Hlb	Mark Steenson	5/6	9/27	Barley	Light	L	L	N
Scandia	EGF/Crk	Christian Kiel	5/5	Abandon	Wheat	Medium	NA	NA	NA
Crookston	EGF/Crk	Bruce Erdmann	5/7	9/23	Wheat	Medium	M	L	N
Grand Forks	EGF/Crk	Drees Farming Assc.	5/3	9/20	Wheat	Medium	L	L	N
Angus	EGF/Crk	Kasprick Farms	5/3	Abandon	Wheat	Medium	NA	NA	NA
Stephen	EGF/Crk	Field Brothers Farms	4/30	Abandon	Wheat	Medium	NA	NA	NA
St Thomas	Dtn	Kenely Farms	5/4	10/16	Wheat	Medium Light	L	L	L-M
Hamilton	Dtn	Vivatson Farms	5/5	10/17	Wheat	Heavy	L	L	L
Kindred Aph	Specialty Aph	Craig & John Hertsgaard	5/14	Abandon	Wheat	Medium	NA	NA	NA
Perley Aph	Specialty Aph	Mark Hoff	5/6	9/30	Wheat	Medium Heavy	M	L-M	N
S. Moorhead Fsm	Fusarium	Dan Rosenfeldt	5/15	NA	Soybeans	Medium	M	L	N
Moorhead Fsm	Fusarium	Nelson Farms	5/9	NA	Wheat	Medium	M	L	N
Glyndon Aph	Aph Nursery	Oberg Farms	5/16	Abandon	Corn	Medium Light	L	V	N
Rhizoctonia	Specialty Rhc	ACSC Tech Services Ctr	5/17	NA	Fallow	Heavy	M	M	N

* Fertilizer applied in accordance to ACSC recommendations.

Created 10-30-2008

@ Disease notes were based upon visual evaluations (N=none, L=light, M=moderate, V=severe, NA=not observed)

Rhizomania severity also is estimated by calculating the relative performance of susceptible varieties in the trials.

The St Thomas site varied from light to moderate Rzm severity using the two methods.