



November 2022

Dear ACSC Sugarbeet Grower:

The 2022 official coded variety performance trials and disease nurseries were planted at 18 sites by American Crystal Sugar Company (ACSC) including 13 yield trial sites and five disease nurseries. Seven additional disease/insect nurseries were planted by third party cooperators. Thanks are extended to the dedicated Technical Services staff involved in the official trial plot care, harvest, and data analysis.

Results

Results from the Official Variety Trial sites were good overall. Planting dates were two weeks later than typical but stands in the trials were good at most locations. Nine sites were used for variety approval calculations. One site (East Grand Forks) was lost from wind damage that occurred in mid-June. Buxton and Climax sites were very dry for much of the growing season including at harvest. Beets were small and data at these sites were compromised by excess harvest loss. The Perley site had severe Aphanomyces and high variability. Rhizoctonia crown and root rot was minimal in 2022. Revenue calculations in 2022 are based on a hypothetical \$46.80 payment (5-year rolling average) at 17.5% sugar and 1.5% SLM not considering hauling or production costs.

Fusarium ratings are from sites at Moorhead and Sabin, MN. Rhizoctonia crown and root rot ratings are from nurseries at Crookston and Moorhead, MN and Saginaw, MI (BSDF). Aphanomyces root rot ratings are from naturally infested nurseries at Perley, Glyndon (Magno Seed), and Shakopee (KWS), MN. The Climax Aphanomyces site had no Aphanomyces disease pressure. Although the Perley site had high levels of Aphanomyces root rot, non-uniformity across the commercial trial resulted in high variability, so there are no yield results under Aphanomyces conditions for 2022. Cercospora leafspot ratings are from inoculated nurseries at Foxhome and Randolph (KWS), MN and Saginaw, MI (BSDF). Data from all three sites was highly correlated with ratings from a non-inoculated leafspot nursery at Averill, MN. Root aphid ratings are from a greenhouse assay at Shakopee, MN (KWS) and ratings are expected at a later date from a field trial at Longmont, CO (Magno Seed).

2022 harvest conditions were good overall, and beets dug well at most locations. Soil moisture levels varied from dry to wet depending on the location. Dry conditions along with small beets at Buxton and Climax resulted in excess harvest loss leading to high variability. The Alvarado site was challenging and slow-going due to wet, heavy soil.

The 2022 data have been combined with previous years' data and results are enclosed. Bolter data is presented as the number of bolters observed at a location for each variety. Results for the yield trials from individual sites are available on the internet.

Conventional trials were not planted in the 2022 OVT trials. Conventional varieties that were approved for 2020-2022 sales are permitted to continue in 2023 sales.

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 available later in the Sugarbeet Research and Extension Reports (www.sbreb.org). Additional data including individual yield trial results and agronomic procedures are also on the ACSC web site.

Attached are the following pages of information:

1. List of varieties approved for sale to ACSC growers
2. Multi-year performance of RR varieties from all sites
3. Performance of RR varieties under Aphanomyces conditions (data only from 2020)
4. Performance of conventional varieties from three sites (2017-2019)
5. Disease ratings for all nurseries (varieties tested in 2022)
6. Root Aphid rating/evaluation
7. Trial sites, disease observations and agronomic information from all trial locations
8. Seed treatments applied to seed used in the official coded variety trials

Plot Procedures

Yield trials were planted to stand at 4.5 inches. Starter fertilizer (10-34-0) was applied in-furrow (3 GPA in 6 GPA total volume) in all yield trials. Plots were planted crosswise (90°) to the cooperators' normal farming operations, where possible. Plot row lengths for all official trials were maintained at 46 feet with about 40 feet harvested. Planting was performed with a 12-row SRES vacuum planter. The GPS controlled planter gave good single seed spacing which facilitated emergence counting. Seed companies had the option of treating seed with an Aphanomyces seed treatment, insecticide and a Rhizoctonia seed treatment fungicide. Emergence counts were taken on 24 feet of each plot. Multiple seedlings were counted as a single plant if they emerged less than one inch apart. The stands in all yield trials were refined by removing doubles (multiple seedlings less than 1.5 inch apart) by hand but were not further reduced.

Roundup Powermax 3 with Event (surfactant) and full rates of fungicides were applied using a pickup sprayer driven down the alleys. Two applications of Roundup (26 oz) were made at the 4-6 and 8-12 leaf stages. Hand weeding was used where necessary. All yield trials were treated with AZteroid in-furrow at planting (5.7 oz) and Quadris in a band during the 6-10 leaf stage (14 oz) for Rhizoctonia control. Treatments used for Cercospora control in 2022 included Inspire XT/Manzate, Agri Tin/Incognito, Proline/Manzate, and Priaxor/Agri Tin. Ground spraying was conducted by ACSC technical staff using 20 GPA and 75-80 psi.

Roundup Ready varieties with commercial seed were planted in four-row plots with six replicates. The RR experimental entries were planted in two-row plots with four replicates.

All plot rows were measured for total length after approximately 3.5 feet at each end were removed at the end of August, with skips greater than 60 inches being measured for adjustment purposes. Harvest was performed with one custom six-row harvester (Big Red) with increased cleaning capacity. All harvested beets of each plot were used for yield determination while one sample (approximately 25 lbs) was obtained from each plot for sugar and impurity analysis. Quality analysis was performed at the ACSC Technical Services quality lab in Moorhead.

Varieties were planted in nurseries in Minnesota, Michigan, and Colorado to evaluate varieties for disease and insect susceptibility. ACSC adjusts the Cercospora, Aphanomyces, Rhizoctonia and Fusarium nursery data each year to provide a consistent target for variety approval criteria.

*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 beets of a non-approved variety. If you have questions, please contact the ACSC Technical Services Center or your ACSC Agriculture Department.*

Sincerely,



Deborah L Moomjian
Beet Seed Analyst



Jason Brantner
Official Trial Manager



Jonathan Hickel
Official Trial Supervisor



Dan Walters
Official Trial Coordinator

Attachments

Table 1.
Varieties Meeting ACSC Approval Criteria for the 2023 Sugarbeet Crop +++

Roundup Ready®	Full Market	Aph Spec	Rhc Spec	High Rzm	2019 Conventional	Full Market	High Rzm
BTS 8629	Yes	Yes		Hi Rzm	Crystal R761	Yes	Hi Rzm
BTS 8927	Yes	Yes		Hi Rzm	Crystal 620	Yes	Hi Rzm
BTS 8961	Yes	Yes	New	Hi Rzm	Crystal 840	Yes	Hi Rzm
BTS 8018	Yes	Yes		Hi Rzm	Crystal 950	Yes	Hi Rzm
BTS 8034	Yes	Yes		Hi Rzm	Hilleshög HM3035Rz	Yes	Rzm
BTS 8073	Yes	Yes		Hi Rzm	SX 8869 Cnv	Yes	Hi Rzm
BTS 8092	Yes	Yes	Yes	Hi Rzm	SV 48777	Yes	Hi Rzm
BTS 8100	New	New	New	Hi Rzm			
BTS 8133	No	New	New	Hi Rzm			
BTS 8156	New	New		Hi Rzm			
Crystal 572	Yes	Yes		Hi Rzm			
Crystal 684	Yes	Yes		Hi Rzm			
Crystal 793	Yes	Yes		Hi Rzm			
Crystal 912	Yes	Yes	Yes	Hi Rzm			
Crystal 913	Yes	Yes		Hi Rzm			
Crystal 021	Yes	Yes	Yes	Hi Rzm			
Crystal 022	Yes	Yes	Yes	Hi Rzm			
Crystal 026	Yes	Yes	Yes	Hi Rzm			
Crystal 130	New	New		Hi Rzm			
Crystal 134	New	New	New	Hi Rzm			
Crystal 137	New	New		Hi Rzm			
Crystal 138	New	New	New	Hi Rzm			
Hilleshög HM9528	Yes	Yes		Hi Rzm			
Hilleshög HIL9708	Yes	Yes++	Yes	Rzm			
Hilleshög HIL9920	Yes	Yes		Hi Rzm			
Hilleshög HIL2317	Yes	Yes		Hi Rzm			
Hilleshög HIL2320	Yes	Yes		Hi Rzm			
Hilleshög HIL2366	Yes			Hi Rzm			
Hilleshög HIL2367	Yes	Yes		Hi Rzm			
Hilleshög HIL2368	Yes		Yes	Hi Rzm			
Hilleshög HIL2386	New			Hi Rzm			
Hilleshög HIL2389	New	New		Hi Rzm			
Maribo MA717	Yes	Yes++		Hi Rzm			
Maribo MA902	Yes		New	Hi Rzm			
Maribo MA932	New			Hi Rzm			
SV 265	Yes			Hi Rzm			
SV 285	Yes	Yes		Hi Rzm			
SV 203	Yes	Yes		Hi Rzm			
SX 1898	Yes	Yes		Hi Rzm			
SX 1815	New			Hi Rzm			
SX 1818	New			Hi Rzm			

Aph Spec = variety meets Aphanomyces specialty requirements
Rhc Spec = variety meets Rhizoctonia specialty requirements
Hi Rzm = may perform better under severe Rhizomania.
New = newly approved

+++ Roundup Ready sugarbeets are subject to the ACSC RRSB Bolter Destruction Policy

Created 11/8/2022

++ 2nd Year of not meeting Specialty Approval of previously approved Specialty variety. According to Approval Policy, may be sold as Specialty in 2023

+ 1st Year of not meeting Specialty Approval of previously approved Specialty variety. According to Approval Policy, may be sold as Specialty in 2023

Roundup Ready® is a registered trademark of Monsanto Company.

Table 2. Performance Data of RR Varieties During 2021 & 2022 Growing Seasons (All Locations Combined) Approved for Sale to ACSC Growers in 2023 +++

Variety	Yrs com	Rev/Ton ++			Rev/Acre ++			Rec/Ton		Rec/Acre		Yield		Sugar		Molasses		Emerg		Bolters *		CR +		Aph Root+		Rhizoc.+		Fusarium+		Rzm+
		22	2 Yr	2Y%	22	2 Yr	2Y%	22	2 Yr	22	2 Yr	22	2 Yr	22	2 Yr	22	2 Yr	22	2 Yr	22	2 Yr	22	2 Yr	22	2 Yr	22	2 Yr	22	2 Yr	
Previous Approved # locations		9	20		9	20		9	20	9	20	9	20	9	20	9	20	9	20	9	20	3	5	3	4	3	5	2	3	
BTS 8018	1	49.38	50.16	102	1447	1534	113	329	333	9656	10236	29.5	30.8	17.54	17.76	1.11	1.09	76	80	0	0	2.0	2.2	4.0	4.3	3.9	3.9	3.0	3.1	Hi
BTS 8034	1	45.34	45.96	94	1362	1475	108	315	319	9469	10255	30.0	32.2	17.02	17.18	1.27	1.22	77	80	0	0	2.3	2.4	3.9	3.6	4.5	4.2	2.2	2.4	Hi
BTS 8073	1	48.88	49.09	100	1461	1497	110	327	330	9787	10090	30.0	32.7	17.50	17.63	1.15	1.14	73	76	0	0	4.6	4.6	4.0	4.2	4.2	3.9	3.1	3.3	Hi
BTS 8092	1	46.04	47.63	97	1406	1509	111	318	325	9722	10318	30.7	31.9	17.01	17.34	1.14	1.10	74	77	0	0	4.3	4.4	3.9	4.0	3.6	3.7	3.9	4.0	Hi
BTS 8629	5	44.85	45.67	93	1385	1488	109	314	318	9687	10382	30.9	32.6	16.85	17.07	1.18	1.16	78	79	0	0	4.5	4.7	4.5	4.4	3.7	4.0	4.0	4.1	Hi
BTS 8927	2	52.46	52.47	107	1452	1512	111	339	341	9399	9856	27.8	29.0	17.97	18.09	1.03	1.04	79	75	0	0	4.4	4.4	4.0	4.3	4.1	3.9	3.1	3.6	Hi
BTS 8961	2	45.73	46.94	96	1369	1463	107	316	322	9478	10065	30.0	31.2	17.02	17.31	1.20	1.19	77	77	0	0	4.5	4.5	4.5	4.6	3.7	3.7	2.9	3.1	Hi
Crystal 021	NC	46.11	47.35	97	1390	1505	110	318	324	9577	10310	30.1	31.9	17.06	17.35	1.18	1.16	71	74	0	0	2.1	2.2	3.7	4.0	3.6	3.5	3.4	3.8	Hi
Crystal 022	1	52.56	52.15	107	1449	1496	110	339	340	9376	9799	27.7	28.9	18.04	18.08	1.08	1.08	73	76	1	1	4.6	4.8	4.0	4.4	4.1	3.8	3.2	3.4	Hi
Crystal 026	NC	47.52	47.74	98	1430	1516	111	322	325	9691	10331	30.0	31.8	17.30	17.45	1.18	1.19	77	79	0	0	4.7	4.6	3.8	3.7	3.3	3.3	2.8	2.8	Hi
Crystal 572	6	51.53	51.21	105	1424	1477	108	336	337	9292	9746	27.7	29.0	17.92	17.97	1.14	1.14	78	79	1	2	4.5	4.6	4.6	4.5	4.3	4.1	2.9	3.1	Hi
Crystal 684	4	44.38	45.14	92	1411	1472	108	312	316	9945	10358	32.0	32.8	16.83	17.04	1.23	1.22	75	78	0	0	4.6	4.6	3.8	3.7	4.2	4.0	2.3	2.5	Hi
Crystal 793	4	49.98	50.64	103	1476	1551	114	331	335	9773	10289	29.6	30.8	17.61	17.83	1.08	1.08	76	78	0	0	4.1	4.1	3.8	3.8	4.7	4.5	3.0	2.9	Hi
Crystal 912	1	44.59	46.32	95	1433	1549	114	313	320	10047	10734	32.2	33.6	16.82	17.18	1.19	1.16	76	78	0	0	4.8	5.0	3.4	3.7	3.3	3.5	3.7	3.9	Hi
Crystal 913	2	49.53	50.44	103	1458	1519	111	329	334	9702	10098	29.5	30.3	17.58	17.82	1.13	1.11	75	76	0	0	3.7	3.9	3.8	4.1	4.2	4.1	3.1	3.4	Hi
Hilleshög HIL2317	2	48.84	49.36	101	1371	1411	104	327	331	9185	9468	28.1	28.7	17.40	17.62	1.06	1.09	75	75	0	0	5.1	4.8	3.9	4.5	4.7	4.7	5.7	5.9	Hi
Hilleshög HIL2320	1	47.65	47.29	97	1403	1407	103	323	324	9528	9654	29.6	29.9	17.26	17.33	1.12	1.15	77	80	0	0	5.0	4.9	4.0	4.3	3.9	3.8	4.7	4.6	Hi
Hilleshög HIL2366	1	46.59	47.78	98	1351	1416	104	319	325	9263	9648	29.0	29.7	17.08	17.38	1.12	1.12	77	81	0	0	5.0	5.0	4.3	5.1	3.9	4.0	4.8	4.7	Hi
Hilleshög HIL2367	NC	47.72	47.76	98	1356	1399	103	323	325	9226	9564	28.7	29.5	17.30	17.42	1.15	1.17	75	78	0	0	4.8	4.8	4.2	4.6	3.9	4.0	4.2	4.2	Hi
Hilleshög HIL2368	NC	49.55	50.19	103	1154	1247	91	329	333	7696	8310	23.6	25.1	17.58	17.80	1.13	1.14	54	68	0	0	4.6	4.6	4.6	4.9	3.5	3.2	4.3	4.4	Hi
Hilleshög HIL9708	5	47.55	47.61	97	1342	1372	101	323	325	9127	9387	28.4	29.0	17.23	17.34	1.11	1.11	80	80	0	0	4.9	4.8	4.4	5.4	3.8	3.8	3.8	4.3	Rzmn
Hilleshög HIL9920	4	48.16	49.17	100	1383	1440	106	325	330	9342	9692	28.8	29.4	17.34	17.63	1.12	1.13	77	76	0	0	4.9	4.8	4.3	4.5	4.6	4.6	5.7	5.6	Hi
Hilleshög HM9528RR	7	46.64	46.19	94	1368	1380	101	319	320	9374	9558	29.4	29.9	17.07	17.11	1.10	1.12	77	76	0	0	4.8	4.6	4.1	4.8	4.0	4.2	4.8	4.9	Hi
Maribo MA717	4	46.39	45.64	93	1397	1406	103	319	318	9605	9809	30.2	30.9	17.07	17.05	1.14	1.15	76	75	0	0	5.1	4.9	4.4	5.6	3.9	4.1	4.9	5.0	Hi
Maribo MA902	2	47.16	47.42	97	1310	1369	100	321	324	8954	9381	28.0	29.0	17.17	17.32	1.11	1.12	82	83	0	0	4.9	4.8	4.6	5.8	3.6	3.7	4.3	4.4	Hi
SV 203	1	47.41	49.14	100	1296	1387	102	322	330	8835	9344	27.5	28.4	17.28	17.64	1.18	1.14	63	71	0	0	4.7	4.7	4.2	4.3	4.2	4.3	5.6	5.8	Hi
SV 265	5	46.24	46.95	96	1321	1369	100	318	323	9114	9420	28.7	29.3	17.01	17.22	1.11	1.09	75	76	1	1	4.5	4.4	4.3	4.6	4.0	4.1	6.1	5.9	Hi
SV 285	2	47.58	48.93	100	1276	1400	103	323	329	8672	9442	27.0	28.7	17.31	17.61	1.18	1.15	65	74	0	0	4.7	4.7	4.3	4.4	4.5	4.4	5.5	5.9	Hi
SX 1898	2	46.94	48.58	99	1297	1388	102	320	328	8873	9403	27.8	28.8	17.19	17.55	1.17	1.15	65	71	0	0	4.7	4.7	4.2	4.6	4.1	4.2	5.4	5.5	Hi
Newly Approved																														
BTS 8100	NC	48.43	49.86	102	1363	1453	107	325	332	9207	9731	28.4	29.4	17.44	17.77	1.17	1.16	76	79	0	0	3.9	3.9	3.8	3.8	3.7	3.4	2.3	2.6	Hi
**BTS 8133	NC	44.28	45.29	93	1392	1496	110	312	317	9787	10476	31.4	33.1	16.77	17.03	1.19	1.19	80	82	0	0	2.2	2.3	3.6	3.5	3.4	3.7	3.0	3.3	Hi
BTS 8156	NC	49.07	48.86	100	1410	1480	109	327	329	9411	9998	28.7	30.5	17.57	17.62	1.20	1.17	82	84	0	0	2.4	2.5	4.2	3.9	4.2	4.0	2.3	2.5	Hi
Crystal 130	NC	50.48	50.72	104	1436	1528	112	332	335	9469	10140	28.5	30.4	17.72	17.85	1.11	1.10	74	78	0	0	2.1	2.2	3.6	3.9	4.1	3.8	3.2	3.2	Hi
Crystal 134	NC	52.96	53.36	109	1430	1502	110	340	344	9228	9715	27.2	28.3	18.07	18.23	1.04	1.03	70	73	0	0	4.5	4.5	3.7	4.0	3.6	3.5	3.4	3.7	Hi
Crystal 137	NC	48.22	48.51	99	1390	1509	111	325	328	9381	10228	28.8	31.2	17.46	17.58	1.22	1.19	74	78	0	0	2.6	2.6	4.3	3.7	4.2	3.9	2.4	2.3	Hi
Crystal 138	NC	50.57	50.56	103	1471	1516	111	332	335	9690	10069	29.2	30.2	17.71	17.83	1.08	1.10	74	76	0	0	4.9	4.8	3.9	4.0	3.8	3.7	3.2	3.5	Hi
Hilleshög HIL2386	NC	47.52	48.38	99	1424	1461	107	322	327	9682	9905	30.1	30.3	17.25	17.52	1.13	1.15	76	80	1	1	4.5	4.4	4.3	5.1	3.5	3.9	3.7	4.0	Hi
Hilleshög HIL2389	NC	48.85	49.33	101	1407	1445	106	327	330	9431	9717	28.8	29.5	17.47	17.64	1.13	1.12	76	81	0	0	4.7	4.8	3.8	3.8	3.9	4.0	4.3	4.5	Hi
Maribo MA932	NC	47.95	48.03	98	1406	1446	106	324	326	9532	9848	29.6	30.3	17.33	17.45	1.14	1.15	76	79											

Table 3. Performance Data of RR 2023 Approved Varieties Under Aphanomyces Conditions (Relative to Susceptible Checks)+++

Variety	Yrs Com	*Aph Spc	Rev/Ton++			Rev/Acre++			Rec/Ton			Rec/Acre			Sugar			Yield			CR Rating +			Aph Root +			Fusarium +		Rhizoctonia +				
			2022#	2021#	2020	%Sus	2022#	2021#	2020	%Sus	2022#	2021#	2020	2022#	2021#	2020	2022#	2021#	2020	2022#	2021#	2020	22	2Yr	3Yr	22	2 Yr	3 Yr	22	2Yr	22	2Yr	
			Previous Approved # locations			0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	3	5	8	3	4	7	2
BTS 8018	1	Yes	--	--	40.59	132	--	--	982	167	--	--	303.9	--	--	16.22	--	--	23.62	2.03	2.17	2.25	4.00	4.26	4.13	2.98	3.10	3.93	3.88				
BTS 8034	1	Yes	--	--	35.57	115	--	--	887	150	--	--	286.7	--	--	7046	--	--	15.53	--	--	24.32	2.28	2.42	2.51	3.89	3.56	3.83	2.16	2.43	4.49	4.18	
BTS 8073	1	Yes	--	--	39.92	130	--	--	935	159	--	--	301.6	--	--	6983	--	--	16.16	--	--	22.91	4.55	4.55	4.59	4.01	4.15	3.92	3.06	3.35	4.21	3.94	
BTS 8092	1	Yes	--	--	37.53	122	--	--	916	155	--	--	293.3	--	--	6977	--	--	15.76	--	--	23.32	4.26	4.44	4.38	3.86	3.98	3.94	3.87	3.97	3.58	3.70	
BTS 8629	5	Yes	--	--	32.72	106	--	--	789	134	--	--	276.5	--	--	6493	--	--	15.03	--	--	23.05	4.52	4.65	4.62	4.50	4.37	4.22	3.95	4.08	3.72	3.97	
BTS 8927	2	Yes	--	--	43.12	140	--	--	985	167	--	--	312.6	--	--	7070	--	--	16.58	--	--	22.44	4.42	4.45	4.44	4.00	4.26	4.13	3.11	3.56	4.13	3.91	
BTS 8961	2	Yes	--	--	36.54	119	--	--	835	142	--	--	290.0	--	--	6478	--	--	15.64	--	--	21.96	4.54	4.53	4.58	4.47	4.64	4.44	2.89	3.11	3.75	3.75	
Crystal 021	NC	Yes	--	--	38.07	124	--	--	935	159	--	--	295.3	--	--	7071	--	--	15.86	--	--	23.47	2.08	2.18	2.19	3.74	3.97	3.80	3.39	3.79	3.58	3.48	
Crystal 022	1	Yes	--	--	44.07	143	--	--	1047	178	--	--	315.8	--	--	7422	--	--	16.80	--	--	23.24	4.60	4.78	4.76	4.03	4.41	4.21	3.22	3.36	4.10	3.82	
Crystal 026	NC	Yes	--	--	37.63	122	--	--	913	155	--	--	293.7	--	--	7034	--	--	15.84	--	--	23.74	4.69	4.56	4.63	3.76	3.75	3.75	2.81	2.80	3.28	3.31	
Crystal 572	6	Yes	--	--	38.70	126	--	--	786	133	--	--	297.5	--	--	5929	--	--	15.99	--	--	19.61	4.50	4.63	4.57	4.60	4.54	4.45	2.88	3.11	4.28	4.08	
Crystal 684	4	Yes	--	--	32.62	106	--	--	799	136	--	--	276.2	--	--	6622	--	--	14.93	--	--	23.61	4.59	4.57	4.52	3.81	3.71	3.79	2.28	2.52	4.24	4.03	
Crystal 793	4	Yes	--	--	37.97	123	--	--	886	150	--	--	294.9	--	--	6732	--	--	15.80	--	--	22.43	4.10	4.12	4.18	3.82	3.78	3.81	3.03	2.92	4.73	4.55	
Crystal 912	1	Yes	--	--	35.21	114	--	--	886	150	--	--	285.5	--	--	7041	--	--	15.44	--	--	24.35	4.81	4.97	4.90	3.44	3.70	3.69	3.66	3.88	3.28	3.53	
Crystal 913	2	Yes	--	--	39.55	128	--	--	951	161	--	--	300.2	--	--	7129	--	--	16.06	--	--	23.53	3.73	3.92	3.99	3.79	4.09	3.98	3.13	3.40	4.23	4.08	
Hilleshög HIL2317	2	Yes	--	--	36.66	119	--	--	741	126	--	--	290.5	--	--	5836	--	--	15.50	--	--	20.04	5.13	4.85	4.92	3.91	4.46	4.26	5.65	5.86	4.71	4.73	
Hilleshög HIL2320	1	Yes	--	--	36.99	120	--	--	735	125	--	--	291.5	--	--	5721	--	--	15.58	--	--	19.48	5.01	4.90	4.97	4.00	4.33	4.07	4.73	4.62	3.88	3.84	
Hilleshög HIL2366	1	No	--	--	37.57	122	--	--	729	124	--	--	293.5	--	--	5656	--	--	15.66	--	--	19.18	5.00	5.00	4.98	4.32	5.07	4.65	4.83	4.74	3.92	3.95	
Hilleshög HIL2367	NC	Yes	--	--	37.28	121	--	--	740	125	--	--	292.5	--	--	5760	--	--	15.64	--	--	19.57	4.75	4.75	4.86	4.17	4.65	4.27	4.20	4.23	3.90	4.00	
Hilleshög HIL2368	NC	No	--	--	40.99	133	--	--	693	117	--	--	305.2	--	--	5136	--	--	16.25	--	--	16.78	4.56	4.61	4.64	4.63	4.94	4.53	4.33	4.39	3.46	3.19	
Hilleshög HIL9708	5	No	--	--	34.56	112	--	--	644	109	--	--	283.0	--	--	5192	--	--	15.19	--	--	18.11	4.86	4.76	4.83	4.45	5.39	4.91	3.83	4.29	3.78	3.78	
Hilleshög HIL9920	4	Yes	--	--	35.57	115	--	--	706	120	--	--	286.5	--	--	5606	--	--	15.37	--	--	19.33	4.92	4.84	4.83	4.33	4.49	4.21	5.66	5.56	4.58	4.64	
Hilleshög HIL9528	7	Yes	--	--	36.06	117	--	--	720	122	--	--	288.2	--	--	5703	--	--	15.42	--	--	19.63	4.76	4.64	4.71	4.07	4.79	4.43	4.80	4.85	4.01	4.24	
Maribo MA717	4	No	--	--	34.86	113	--	--	731	124	--	--	284.0	--	--	5834	--	--	15.24	--	--	20.22	5.05	4.86	4.95	4.39	5.57	4.97	4.87	4.99	3.92	4.12	
Maribo MA902	2	No	--	--	37.28	121	--	--	652	111	--	--	292.5	--	--	5126	--	--	15.61	--	--	17.57	4.95	4.79	4.85	4.59	5.78	5.19	4.30	4.40	3.57	3.69	
SV 203	1	Yes	--	--	37.75	123	--	--	829	141	--	--	294.1	--	--	6380	--	--	15.78	--	--	21.48	4.74	4.74	4.84	4.24	4.30	4.31	5.55	5.77	4.19	4.26	
SV 265	5	No	--	--	37.96	123	--	--	839	142	--	--	294.9	--	--	6388	--	--	15.77	--	--	21.30	4.46	4.38	4.44	4.30	4.63	4.41	6.08	5.87	3.96	4.06	
SV 285	2	Yes	--	--	38.37	125	--	--	822	139	--	--	296.3	--	--	6301	--	--	15.89	--	--	21.15	4.72	4.75	4.66	4.35	4.42	4.37	5.47	5.87	4.53	4.39	
SX 1898	2	Yes	--	--	37.53	122	--	--	855	145	--	--	293.4	--	--	6643	--	--	15.74	--	--	22.57	4.72	4.74	4.74	4.25	4.61	4.33	5.38	5.53	4.12	4.23	
Newly Approved																																	
BTS 8100	NC	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.87	3.94	--	3.78	3.83	--	2.32	2.56	3.73	3.41		
**BTS 8133	NC	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.23	2.26	--	3.57	3.51	--	3.02	3.32	3.44	3.65		
BTS 8156	NC	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.43	2.46	--	4.21	3.93	--	2.30	2.51	4.24	4.02		
Crystal 130	NC	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.10	2.24	--	3.57	3.90	--	3.22	3.22	4.08	3.82		
Crystal 134	NC	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.47	4.53	--	3.70	4.05	--	3.37	3.74	3.63	3.53		
Crystal 137	NC	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.57	2.55	--	4.25	3.69	--	2.35	2.30	4.18	3.86		
Crystal 138	NC	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.87	4.80	--	3.87	4.03	--	3.16	3.45	3.81	3.67		
Hilleshög HIL2386	NC	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.54	4.42	--	4.31	5.14	--	3.73	3.99	3.51	3.85		
Hilleshög HIL2389	NC	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.69	4.77	--	3.78	3.82	--	4.34	4.54	3.92	3.96		
Maribo MA932	NC	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.78	4.82	--	4.28	4.44	--	4.22	4.13	3.75	3.89		
SX 1815	NC	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.07	4.93	--	4.28	4.24	--	5.32	5.07	4.12	4.26		
SX 1818	NC	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.72	4.79	--	4.82	5.19	--	4.54	4.90	4.16	4.28		
Aph Susc Checks			30.80			590			269.8			4984			14.75			18.00															
Mean of Aph Specialty Varieties			37.66			856			293.8			6575			15.76			22.12															

%Sus=Percent of 15 susceptible checks.

Created 11/7/2022

* Yes indicates varieties that have met the current Aphanomyces Specialty requirement for 2023 with a 2yr rating ≤ 4.2 or previously met Aphanomyces Specialty requirement maintaining a 3 year rating ≤ 4.5

+++2020 Data from Climax, Perley, and Grandin

++2022 Revenue estimate based on a \$46.80 beet payment (5-yr ave) at 17.5% crop with a 1.5% loss to molasses, 2021 Revenue estimate based on a \$45.65 beet payment and 2020 Revenue estimate based on \$45.12 beet payment. Revenue does not consider hauling or production costs.

Aph ratings from Perley MN, Shakopee MN and Glyndon MN (res.<4.2, susc>4.8). CR from Randolph MN, Foxhome MN and Saginaw MI (res.<4.4, susc>5.0). Fusarium from Moorhead MN and Sabin MN (res.<3.0, susc>5.0).

+ Lack of uniform Aphanomyces pressure at any of the OVT sites prevented collection of Aphanomyces Yield Data for 2021 and 2022

** Does not meet Full Market Approval. Meets Aphanomyces Specialty Approval and Rhizoctonia Approval.

Table 4. Performance Data of Conventional Varieties During 2017, 2018, 2019 Growing Seasons (All Locations Combined)

Variety @	Yrs Com	Rev/Ton ++					Rev/Acre ++					Rec/Ton		Rec/Acre		Sugar		Yield		Molasses		Emerg		Bolter / Ac		CR +		Aph Root+		Rhizoc.+		Fusarium+		Rzm+				
		19	2 Yr	2Y%	3Yr#	3Y%	19	2 Yr	2Y%	3Yr#	3Yr%	19	2 Yr	19	2 Yr	19	2 Yr	19	2 Yr	19	2 Yr	19	2 Yr	19	2 Yr	19	2 Yr	19	2 Yr	19	2 Yr	19	2 Yr	19	2 Yr			
Previous Approved # locations		3	8		14		3	8		14		3	8		3	8		3	8		3	8		3	8		3	6		2	3		3	6		2	4	
Crystal 620	NC	41.74	47.24	97	49.48	99	1394	1631	118	1656	104	311	326	10403	11312	16.59	17.38	33.7	34.9	1.07	1.06	54	67	0	0	3.95	4.13	4.7	4.2	5.1	4.6	2.5	3.0			Hi		
Crystal R761	10	38.62	43.53	89	46.06	92	1375	1582	115	1618	101	299	313	10742	11457	16.18	16.86	36.0	36.7	1.21	1.19	61	72	0	0	4.98	4.85	4.4	4.3	4.9	4.6	3.0	3.6			Hi		
Crystal 840	NC	39.30	45.48	93	30.32	60	1288	1585	115	NA	--	302	320	9916	11173	16.23	17.10	33.1	35.1	1.15	1.10	52	65	0	0	4.18	4.25	4.0	3.9	4.7	4.4	2.7	3.1			Hi		
Hilleshög HM3035Rz	13	43.77	49.17	101	50.89	101	1294	1379	100	1405	88	318	333	9439	9422	16.91	17.65	29.9	28.5	1.02	1.00	72	71	0	0	4.42	4.32	5.1	5.2	4.4	4.2	4.1	4.3			Rzm		
Seedex 8869 Cnv	NC	40.88	45.47	93	48.33	96	1374	1617	117	1658	104	307	320	10388	11418	16.40	17.00	33.9	35.8	1.02	1.00	64	74	0	5	4.52	4.59	4.8	4.8	5.1	4.9	3.5	3.7			Hi		
SV 48777	NC	45.18	50.25	103	52.63	105	1452	1634	118	1656	104	323	337	10342	10954	17.08	17.78	31.8	32.5	0.94	0.93	63	73	0	0	4.10	4.33	4.9	5.0	5.0	4.7	4.3	4.4			Hi		
Newly Approved																																						
Crystal 950	NC	41.21	--	--	--	--	1430	--	--	--	--	309	--	10719	NA	16.49	NA	34.7	--	1.06	--	62	--	0	--	4.72	--	4.8	--	4.8	--	2.9	--			Hi		
Benchmark var. mean		44.35	48.87		50.20		1427	1381		1595		320	332	10330	10887	17.07	17.68	32.4	33.0	1.08	1.09	66	75															

Emergence is % of planted seeds producing a 4 leaf beet.

++ 2019 Revenue estimate based on a \$44.38beet payment (5-yr ave) at 17.5% sugar and 1.5% loss to molasses.

+ Aph ratings from Shakopee (res<4.4, susc>5.0). CR from Randolph MN, Foxhome MN & Michigan (res<4.5, susc>5.0). Fusarium from RRV (res<3.0, susc>5.0). Rhizoc. from Mhd, NWROC & Mich (res<3.8, susc>5). Hi may perform better under severe Rzm.

Bolters /Ac are based upon a planting base of 60,000.

+++ Sites include Casselton, Ada, Grand Forks, Scandia, St. Thomas in 2018

+++ Sites include Scandia, Bathgate, Grand Forks in 2019

Table 5. ACSC Official Trial Disease Nurseries 2020-2022 (Varieties tested in 2022)

Cercospora, Aphanomyces, Rhizoctonia & Fusarium

Code	Description	< 4.5 Cercospora > 5.0					< 4.2 Aphanomyces > 4.8					< 3.82 Rhizoctonia > 5.0					< 3.0 Fusarium > 5.0					High Rzm
		22 Mean	21 Mean	20 Mean	2 Yr Mean	3 Yr Mean	22 Mean	21 Mean	20 Mean	2 Yr Mean	3 Yr Mean	22 Mean	21 Mean	20 Mean	2 Yr Mean	3 Yr Mean	22 Mean	21 Mean	20 Mean	2 Yr Mean	3 Yr Mean	
Previously Approved																						
524	BTS 8018	2.03	2.31	2.41	2.17	2.25	4.00	4.52	3.87	4.26	4.13	3.93	3.83	4.16	3.88	3.97	2.98	3.22	2.47	3.10	2.89	Hi Rzm
567	BTS 8034	2.28	2.56	2.70	2.42	2.51	3.89	3.24	4.36	3.56	3.83	4.49	3.88	4.56	4.18	4.31	2.16	2.71	2.26	2.43	2.38	Hi Rzm
533	BTS 8073	4.55	4.56	4.68	4.55	4.59	4.01	4.30	3.45	4.15	3.92	4.21	3.67	4.11	3.94	4.00	3.06	3.63	2.58	3.35	3.09	Hi Rzm
511	BTS 8092	4.26	4.62	4.26	4.44	4.38	3.86	4.11	3.85	3.98	3.94	3.58	3.81	3.81	3.70	3.73	3.87	4.07	3.70	3.97	3.88	Hi Rzm
503	BTS 8629	4.52	4.78	4.55	4.65	4.62	4.50	4.24	3.92	4.37	4.22	3.72	4.22	4.30	3.97	4.08	3.95	4.21	3.78	4.08	3.98	Hi Rzm
510	BTS 8927	4.42	4.48	4.42	4.45	4.44	4.00	4.51	3.87	4.26	4.13	4.13	3.68	4.37	3.91	4.06	3.11	4.00	2.59	3.56	3.23	Hi Rzm
557	BTS 8961	4.54	4.53	4.69	4.53	4.58	4.47	4.80	4.04	4.64	4.44	3.75	3.75	4.11	3.75	3.87	2.89	3.33	2.19	3.11	2.80	Hi Rzm
566	Crystal 021	2.08	2.28	2.20	2.18	2.19	3.74	4.19	3.46	3.97	3.80	3.58	3.38	3.88	3.48	3.61	3.39	4.18	2.85	3.79	3.47	Hi Rzm
559	Crystal 022	4.60	4.97	4.71	4.78	4.76	4.03	4.79	3.81	4.41	4.21	4.10	3.53	3.49	3.82	3.71	3.22	3.50	2.60	3.36	3.11	Hi Rzm
563	Crystal 026	4.69	4.43	4.76	4.56	4.63	3.76	3.74	3.75	3.75	3.75	3.28	3.34	3.57	3.31	3.40	2.81	2.79	2.31	2.80	2.64	Hi Rzm
516	Crystal 572	4.50	4.75	4.46	4.63	4.57	4.60	4.47	4.28	4.54	4.45	4.28	3.88	4.21	4.08	4.13	2.88	3.34	2.36	3.11	2.86	Hi Rzm
539	Crystal 684	4.59	4.54	4.44	4.57	4.52	3.81	3.60	3.97	3.71	3.79	4.24	3.82	4.15	4.03	4.07	2.28	2.76	2.32	2.52	2.45	Hi Rzm
558	Crystal 793	4.10	4.13	4.31	4.12	4.18	3.82	3.74	3.87	3.78	3.81	4.73	4.36	4.84	4.55	4.64	3.03	2.80	2.61	2.92	2.82	Hi Rzm
530	Crystal 912	4.81	5.13	4.75	4.97	4.90	3.44	3.95	3.67	3.70	3.69	3.28	3.77	3.54	3.53	3.53	3.66	4.11	3.61	3.88	3.79	Hi Rzm
564	Crystal 913	3.73	4.10	4.13	3.92	3.99	3.79	4.39	3.75	4.09	3.98	4.23	3.94	4.58	4.08	4.25	3.13	3.68	2.59	3.40	3.13	Hi Rzm
541	Hilleshög HIL2317	5.13	4.57	5.05	4.85	4.92	3.91	5.01	3.86	4.46	4.26	4.71	4.76	4.95	4.73	4.81	5.65	6.06	5.97	5.86	5.89	Hi Rzm
517	Hilleshög HIL2320	5.01	4.78	5.11	4.90	4.97	4.00	4.66	3.55	4.33	4.07	3.88	3.80	4.64	3.84	4.11	4.73	4.50	4.56	4.62	4.60	Hi Rzm
521	Hilleshög HIL2366	5.00	5.01	4.94	5.00	4.98	4.32	5.81	3.81	5.07	4.65	3.92	3.98	4.24	3.95	4.05	4.83	4.65	4.55	4.74	4.68	Hi Rzm
545	Hilleshög HIL2367	4.75	4.75	5.08	4.75	4.86	4.17	5.13	3.51	4.65	4.27	3.90	4.10	4.26	4.00	4.09	4.20	4.27	4.44	4.23	4.30	Hi Rzm
560	Hilleshög HIL2368	4.56	4.66	4.69	4.61	4.64	4.63	5.25	3.70	4.94	4.53	3.46	2.92	3.52	3.19	3.30	4.33	4.44	3.86	4.39	4.21	Hi Rzm
504	Hilleshög HIL9708	4.86	4.65	4.97	4.76	4.83	4.45	6.34	3.96	5.39	4.91	3.78	3.78	3.83	3.78	3.80	3.83	4.76	3.64	4.29	4.08	Rzm
519	Hilleshög HIL9920	4.92	4.75	4.82	4.84	4.83	4.33	4.65	3.65	4.49	4.21	4.58	4.70	5.12	4.64	4.80	5.66	5.45	6.28	5.56	5.80	Hi Rzm
535	Hilleshög HM9528RR	4.76	4.52	4.84	4.64	4.71	4.07	5.51	3.72	4.79	4.43	4.01	4.47	4.57	4.24	4.35	4.80	4.91	4.68	4.85	4.80	Hi Rzm
536	Maribo MA717	5.05	4.68	5.11	4.86	4.95	4.39	6.75	3.77	5.57	4.97	3.92	4.31	4.61	4.12	4.28	4.87	5.11	4.62	4.99	4.87	Hi Rzm
531	Maribo MA902	4.95	4.63	4.96	4.79	4.85	4.59	6.96	4.01	5.78	5.19	3.57	3.80	3.93	3.69	3.77	4.30	4.50	4.01	4.40	4.27	Hi Rzm
554	SV 203	4.74	4.75	5.03	4.74	4.84	4.24	4.35	4.34	4.30	4.31	4.19	4.34	4.29	4.26	4.27	5.55	5.99	5.26	5.77	5.60	Hi Rzm
513	SV 265	4.46	4.30	4.55	4.38	4.44	4.30	4.95	3.98	4.63	4.41	3.96	4.17	4.21	4.06	4.11	6.08	5.65	5.70	5.87	5.81	Hi Rzm
532	SV 285	4.72	4.78	4.50	4.75	4.66	4.35	4.48	4.28	4.42	4.37	4.53	4.26	4.03	4.39	4.27	5.47	6.26	5.40	5.87	5.71	Hi Rzm
506	SX 1898	4.72	4.76	4.73	4.74	4.74	4.25	4.97	3.76	4.61	4.33	4.12	4.34	4.16	4.23	4.21	5.38	5.67	5.41	5.53	5.49	Hi Rzm
Newly Approved																						
527	BTS 8100	3.87	4.01	--	3.94	--	3.78	3.89	--	3.83	--	3.73	3.09	--	3.41	--	2.32	2.80	--	2.56	--	Hi Rzm
526	BTS 8133	2.23	2.30	--	2.26	--	3.57	3.46	--	3.51	--	3.44	3.87	--	3.65	--	3.02	3.62	--	3.32	--	Hi Rzm
555	BTS 8156	2.43	2.48	--	2.46	--	4.21	3.64	--	3.93	--	4.24	3.81	--	4.02	--	2.30	2.72	--	2.51	--	Hi Rzm
528	Crystal 130	2.10	2.38	--	2.24	--	3.57	4.23	--	3.90	--	4.08	3.57	--	3.82	--	3.22	3.22	--	3.22	--	Hi Rzm
543	Crystal 134	4.47	4.59	--	4.53	--	3.70	4.39	--	4.05	--	3.63	3.44	--	3.53	--	3.37	4.11	--	3.74	--	Hi Rzm
515	Crystal 137	2.57	2.53	--	2.55	--	4.25	3.13	--	3.69	--	4.18	3.53	--	3.86	--	2.35	2.25	--	2.30	--	Hi Rzm
565	Crystal 138	4.87	4.74	--	4.80	--	3.87	4.19	--	4.03	--	3.81	3.52	--	3.67	--	3.16	3.75	--	3.45	--	Hi Rzm
547	Hilleshög HIL2386	4.54	4.30	--	4.42	--	4.31	5.98	--	5.14	--	3.51	4.20	--	3.85	--	3.73	4.26	--	3.99	--	Hi Rzm
512	Hilleshög HIL2389	4.69	4.85	--	4.77	--	3.78	3.86	--	3.82	--	3.92	3.99	--	3.96	--	4.34	4.75	--	4.54	--	Hi Rzm
523	Maribo MA932	4.78	4.85	--	4.82	--	4.28	4.60	--	4.44	--	3.75	4.03	--	3.89	--	4.22	4.05	--	4.13	--	Hi Rzm
529	SX 1815	5.07	4.78	--	4.93	--	4.28	4.19	--	4.24	--	4.12	4.40	--	4.26	--	5.32	4.82	--	5.07	--	Hi Rzm
562	SX 1818	4.72	4.86	--	4.79	--	4.82	5.56	--	5.19	--	4.16	4.41	--	4.28	--	4.54	5.26	--	4.90	--	Hi Rzm

Created 11/08/2022

Green highlighted ratings indicate specialty or good resistance.
 Red highlighted ratings indicate level of concern for some fields.
 -- indicates data not available

Table 6
 Root Aphid Ratings
 American Crystal Sugar, KWS and Magno Seed from 2020 - 2022

Variety	Moorhead, MN ^X (1=Exc - 4=Poor)					Shakopee, MN ^Y (1=Exc - 4=Poor)					Longmont, CO ^Z (% Infested Plants)				
	2020*	2021*	2022*	2 Yr	3 Yr	2020*	2021	2022	2 Yr	3 Yr	2020	2021	2022**	2 Yr	3 Yr
				Mean	Mean				Mean	Mean				Mean	Mean
BTS 8018	--	--	--	--	--	--	1.00	1.00	1.00	--	--	67.94			
BTS 8034	--	--	--	--	--	--	1.32	1.00	1.16	--	--	68.72			
BTS 8073	--	--	--	--	--	--	1.19	1.00	1.10	--	--	80.81			
BTS 8092	--	--	--	--	--	--	1.21	1.04	1.13	--	--	61.48			
BTS 8100	--	--	--	--	--	--	--	1.08	--	--	--	--			
BTS 8133	--	--	--	--	--	--	--	1.00	--	--	--	--			
BTS 8156	--	--	--	--	--	--	--	1.00	--	--	--	--			
BTS 8629	--	--	--	--	--	--	1.46	1.08	1.27	--	10.20	82.76			
BTS 8927	--	--	--	--	--	--	1.16	1.04	1.10	--	7.90	76.97			
BTS 8961	--	--	--	--	--	--	1.00	1.04	1.02	--	9.20	51.05			
Crystal 021	--	--	--	--	--	--	1.22	1.04	1.13	--	--	69.71			
Crystal 022	--	--	--	--	--	--	1.00	1.00	1.00	--	--	68.23			
Crystal 026	--	--	--	--	--	--	1.00	1.00	1.00	--	--	62.89			
Crystal 130	--	--	--	--	--	--	--	1.13	--	--	--	--			
Crystal 134	--	--	--	--	--	--	--	1.00	--	--	--	--			
Crystal 137	--	--	--	--	--	--	--	1.12	--	--	--	--			
Crystal 138	--	--	--	--	--	--	--	1.00	--	--	--	--			
Crystal 572	--	--	--	--	--	--	1.08	1.08	1.08	--	9.60	61.07			
Crystal 684	--	--	--	--	--	--	1.28	1.00	1.14	--	14.40	67.74			
Crystal 793	--	--	--	--	--	--	1.08	1.04	1.06	--	8.60	84.86			
Crystal 912	--	--	--	--	--	--	1.24	1.00	1.12	--	3.30	64.72			
Crystal 913	--	--	--	--	--	--	1.12	1.04	1.08	--	1.40	62.18			
Hilleshög HIL2317	--	--	--	--	--	--	3.41	3.48	3.45	--	34.40	76.15			
Hilleshög HIL2320	--	--	--	--	--	--	3.33	3.48	3.41	--	49.20	80.33			
Hilleshög HIL2366	--	--	--	--	--	--	3.72	3.36	3.54	--	--	73.41			
Hilleshög HIL2367	--	--	--	--	--	--	3.60	3.44	3.52	--	--	77.92			
Hilleshög HIL2368	--	--	--	--	--	--	3.54	3.44	3.49	--	--	73.23			
Hilleshög HIL2386	--	--	--	--	--	--	--	3.32	--	--	--	--			
Hilleshög HIL2389	--	--	--	--	--	--	--	2.00	--	--	--	--			
Hilleshög HM9528RR	--	--	--	--	--	--	3.35	3.68	3.52	--	68.20	68.62			
Hilleshög HIL9708	--	--	--	--	--	--	3.38	3.72	3.55	--	71.10	72.26			
Hilleshög HIL9920	--	--	--	--	--	--	3.58	3.48	3.53	--	44.40	74.56			
Maribo MA717	--	--	--	--	--	--	3.68	3.56	3.62	--	71.60	68.33			
Maribo MA902	--	--	--	--	--	--	3.75	3.36	3.56	--	62.50	73.70			
Maribo MA932	--	--	--	--	--	--	--	3.52	--	--	--	--			
SV 203	--	--	--	--	--	--	2.32	2.00	2.16	--	--	70.81			
SV 215	--	--	--	--	--	--	--	2.76	--	--	--	--			
SV 265	--	--	--	--	--	--	3.65	3.36	3.51	--	83.10	70.81			
SV 285	--	--	--	--	--	--	2.28	2.24	2.26	--	28.20	66.81			
SX 1815	--	--	--	--	--	--	--	2.40	--	--	--	--			
SX 1816	--	--	--	--	--	--	--	2.24	--	--	--	--			
SX 1818	--	--	--	--	--	--	--	2.00	--	--	--	--			
SX 1898	--	--	--	--	--	--	2.21	2.32	2.27	--	43.20	54.21			
Root Aphid Res CK#2	--	--	--	--	--	--	1.13	1.16	1.15	--	19.80	80.06			
Root Aphid Res CK#3	--	--	--	--	--	--	1.36	1.00	1.18	--	9.60	70.65			
Root Aphid Susc CK#4	--	--	--	--	--	--	3.48	3.48	3.48	--	64.30	71.31			
Root Aphid Susc CK#5	--	--	--	--	--	--	3.60	3.36	3.48	--	68.20	76.10			
Root Aphid Susc CK#6	--	--	--	--	--	--	--	3.48	--	--	--	--			

Created 11/07/2022

X Growth chamber assay based on a 1-4 rating scale (1 = no aphids, 4 = very susceptible), Moorhead, MN, American Crystal Sugar Company

Y Greenhouse assay based on a 1-4 rating scale (1 = no aphids, 4 = very susceptible), Shakopee, MN, KWS

Z Field trial based on incidence (% infested plants), Longmont, CO, Magno Seed, LLC

* No data available due to low levels of root aphid development and infestation

** Waiting on data

Table 7. Planting & Harvest Dates, Previous Crop and Disease Levels for 2022 ACSC Official Trial Sites *

Yield Trials Location	District / Trial Type	Cooperator	Planting Date	Harvest Date	Preceding Crop	Soil Type	Diseases Present @						Comments
							Aph	Rhc	Rzm	Fus	Maggot	Rt Aphid	
Casselton ND	Mhd/Hlb	Todd Weber Farms	5/20	9/12	Wheat	Medium/Light	N	L	N	N	N	N	
Averill MN	Mhd/Hlb	Tang Farms	5/23	9/9	Wheat	Medium/Light	N	L	N	N	N	N	Moderate Cercospora leafspot at harvest
Perley MN	Mhd/Hlb	TD Hoff Partnership	6/4	9/8	Corn	Heavy	M-V	L	N	N	N	N	Yield under Aphanomyces pressure
Ada MN	Mhd/Hlb	Ruebke Bros.	5/28	10/5	Wheat	Light	N	N	N	N	L	N	Gappy stands
Buxton ND	Mhd/Hlb	Hong Farms	5/24	9/13	Wheat	Medium/Light	N	N	N	N	L	N	Moisture stress (dry)
Climax MN	EGF/Crk	Todd Evenson	5/24	10/4	Wheat	Medium/Light	N	M	N	N	N	N	Moisture stress (dry)
Grand Forks ND	EGF/Crk	Drees Farming Association	5/19	9/14	Wheat	Medium/Light	N	L	M	N	L	N	Rhizomania symptoms in indicator; some non-Cercospora leafspot/necrosis
Scandia MN	EGF/Crk	Deboer Farms	5/25	10/1	Wheat	Medium	N	L	N	N	N	N	
East Grand Forks MN	EGF/Crk	Mark Holy	5/27	Abandon	Wheat	Medium	NA	NA	NA	NA	NA	NA	Trial lost to severe wind damage
Alvarado MN	Dtn	Brent Riopelle	5/27	9/22	Wheat	Medium/Heavy	N	N	N	N	N	N	Harvested 9/22 (Comm OVT) and 9/23 (Exp OVT)
St Thomas ND	Dtn	Baldwin Farms	5/17	9/19	Wheat	Medium/Light	N	N	N	N	L-M	N	Verticillium Yellows may have affected yield
Hallock MN	Dtn	Prosser/Kuznia Beets	5/26	9/29	Wheat	Heavy	N	N	N	N	N	N	
Bathgate ND	Dtn	Shady Bend Farms	5/26	9/27	Wheat	Medium	N	N	N	N	L	N	

Disease Trials Location	District / Trial Type	Cooperator	Planting Date	Rating Date	Preceding Crop	Soil Type	Diseases Present @						Comments
							Aph	Rhc	Rzm	Fus	Maggot	Rt Aphid	
Moorhead Fus-N MN	Fus Nurs	Nelson Farms	5/23	Multiple	Wheat	Medium/Heavy	N	N	N	V	N	N	Severe Fusarium pressure
Sabin Fus-S MN	Fus Nurs	Krabbenhoft & Sons Farm	6/6	Multiple	Wheat	Medium	N	N	N	M-V	L	N	Rep 5 not used due to water damage in range 14
Mhd Rhc-E MN	Rhc Nurs	Jon Hickel	7/7	10/6	Sugar Beet	Heavy	N	M	N	L	N	N	Replanted due to poor stand
Mhd Rhc-W MN	Rhc Nurs	Jon Hickel	6/3	Abandon	Sugar Beet	Heavy	NA	NA	NA	NA	NA	NA	Abandoned due to very poor stand
NWROC MN	Rhc Nurs	Maureen Aubol	5/28	8/9	Wheat	Medium	N	M	N	N	N	N	Nice range of Rhizoctonia symptoms
East Lansing MI	Rhc Nurs	Linda Hanson	--	8/23-25	--	--	--	--	--	--	--	--	
Shakopee MN	Aphanomyces	Patrick O'Boyle	5/16	8/24	--	--	M-V	L	N	N	N	N	Nice range of Aphanomyces symptoms
Glyndon MN	Aphanomyces	Dennis Simmons	5/25	8/31	--	Light	L-M	N	N	NA	NA	NA	Disease pressure higher early in season
Perley MN	Aphanomyces	TD Hoff Partnership	6/4	9/7	Corn	Heavy	M-V	L	N	N	N	N	Nice range of Aphanomyces symptoms
Climax MN	Aphanomyces	Evenson Farms	5/24	Abandon	Wheat	Medium/Light	N	L-M	N	N	N	N	Very dry conditions and soil assay showed no Aphanomyces
Longmont CO	Root Aphids	Kara Guffey	--	--	--	--	--	--	--	--	--	--	
Foxhome MN	Cercospora	NDSU/Kevin Etzler	6/6	Multiple	Wheat	Medium	N	L	N	N	N	N	Late developing but nice symptoms
East Lansing MI	Cercospora	Linda Hanson	--	Multiple	--	--	--	--	--	--	--	--	
Randolph MN	Cercospora	Patrick O'Boyle	6/14	Multiple	--	--	N	N	N	N	N	N	Replanted mid-June but severe disease pressure by late August
Averill MN	Cercospora	Tang Farms	5/23	Multiple	Wheat	Medium/Light	N	L	N	N	N	N	Non-inoculated trial, not used for approval numbers

* Fertilizer applied in accordance with cooperative recommendations.

@ Disease notes for Aphanomyces, Rhizoctonia, Rhizomania, Fusarium, Root Maggot and Root Aphids were based upon visual evaluations (N=none, L=light, M=moderate, V=severe, NA=not observed)

Created 9/9/2022

Table 8. Seed Treatments Used on Varieties in Official Variety Trials in 2022

Description	Years in Trial	Years ** Comm.	Fungicide Seed Treatment			Insecticide (Springtails & Maggots)	Priming (Emergence)
			(Damping Off)	(Rhizoctonia)	(Aphanomyces)		
ACSC Commercial							
BTS 8018	3	1	Allegiance Thiram	Kabina	Tach 35	Poncho Beta	Ultipro
BTS 8034	3	1	Allegiance Thiram	Kabina	Tach 35	Poncho Beta	Ultipro
BTS 8073	3	1	Allegiance Thiram	Kabina	Tach 35	Poncho Beta	Ultipro
BTS 8092	3	1	Allegiance Thiram	Kabina	Tach 35	Poncho Beta	Ultipro
BTS 8629	7	5	Allegiance Thiram	Vibrance	Tach 35	Poncho Beta	Ultipro
BTS 8927	4	2	Allegiance Thiram	Vibrance	Tach 35	Poncho Beta	Ultipro
BTS 8961	4	2	Allegiance Thiram	Vibrance	Tach 35	Poncho Beta	Ultipro
Crystal 022	3	1	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
Crystal 572	8	6	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
Crystal 684	7	4	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
Crystal 793	6	4	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
Crystal 912	4	1	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
Crystal 913	4	2	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
Hilleshög HIL2317	4	2	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEEET
Hilleshög HIL2320	4	1	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEEET
Hilleshög HIL2366	3	1	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEEET
Hilleshög HIL9708	8	5	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEEET
Hilleshög HIL9920	6	4	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEEET
Hilleshög HM9528RR	9	7	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEEET
Maribo MA717	6	4	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEEET
Maribo MA902	4	2	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEEET
SV 203	3	1	Apron XL Maxim	Metlock/Rizolex/Zeltera	Int Sol	NipsIt	XBEEET
SV 265	7	5	Apron XL Maxim	Metlock/Rizolex/Zeltera	Int Sol	NipsIt	XBEEET
SV 285	5	2	Apron XL Maxim	Metlock/Rizolex/Zeltera	Int Sol	NipsIt	XBEEET
SX 1898	4	2	Apron XL Maxim	Zeltera	Int Sol	NipsIt	XBEEET
BTS 8572 (Check)	8	6	Allegiance Thiram	Systiva	Tach 35	Poncho Beta	Ultipro
BTS 8337 (Check)	10	8	Allegiance Thiram	Systiva	Tach 35	Poncho Beta	Ultipro
Crystal 578RR (Check)	8	5	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
BTS 8815 (Check)	5	3	Allegiance Thiram	Systiva	Tach 35	Poncho Beta	Ultipro
Crystal 803 (Check)	5	2	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
AP CK#55 CRY247	11	9	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
AP CK#59 BTS8606	7	5	Allegiance Thiram	Systiva	Tach 35	Poncho Beta	Ultipro
ACSC Experimental							
BTS 8100	2	NC	Allegiance Thiram	Kabina	Tach 35	Poncho Beta	Ultipro
BTS 8133	2	NC	Allegiance Thiram	Kabina	Tach 35	Poncho Beta	Ultipro
BTS 8156	2	NC	Allegiance Thiram	Kabina	Tach 35	Poncho Beta	Ultipro
BTS 8205	1	NC	Allegiance Thiram	Kabina	Tach 35	Poncho Beta	Ultipro
BTS 8217	1	NC	Allegiance Thiram	Kabina	Tach 35	Poncho Beta	Ultipro
BTS 8226	1	NC	Allegiance Thiram	Kabina	Tach 35	Poncho Beta	Ultipro
BTS 8242	1	NC	Allegiance Thiram	Kabina	Tach 35	Poncho Beta	Ultipro
BTS 8248	1	NC	Allegiance Thiram	Kabina	Tach 35	Poncho Beta	Ultipro
BTS 8270	1	NC	Allegiance Thiram	Kabina	Tach 35	Poncho Beta	Ultipro
BTS 8299	1	NC	Allegiance Thiram	Kabina	Tach 35	Poncho Beta	Ultipro
Crystal 021	3	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
Crystal 026	3	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
Crystal 130	2	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
Crystal 134	2	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
Crystal 137	2	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
Crystal 138	2	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
Crystal 260	1	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
Crystal 262	1	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
Crystal 263	1	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
Crystal 265	1	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
Crystal 267	1	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
Crystal 269	1	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
Hilleshög HIL2367	3	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEEET
Hilleshög HIL2368	3	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEEET
Hilleshög HIL2386	2	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEEET
Hilleshög HIL2389	2	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEEET
Hilleshög HIL2440	1	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEEET
Hilleshög HIL2441	1	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEEET
Hilleshög HIL2442	1	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEEET
Hilleshög HIL2443	1	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEEET
Maribo MA932	2	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEEET
Maribo MA942	1	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEEET
Maribo MA943	1	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEEET
Maribo MA944	1	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEEET
SV 215	2	NC	Apron XL Maxim	Metlock/Rizolex/Zeltera	Int Sol	NipsIt	XBEEET
SV 321	1	NC	Apron XL Maxim	Metlock/Rizolex/Zeltera	Int Sol	NipsIt	XBEEET
SV 322	1	NC	Apron XL Maxim	Metlock/Rizolex/Zeltera	Int Sol	NipsIt	XBEEET
SV 324	1	NC	Apron XL Maxim	Metlock/Rizolex/Zeltera	Int Sol	NipsIt	XBEEET
SX 1815	2	NC	Apron XL Maxim	Zeltera	Int Sol	NipsIt	XBEEET
SX 1816	2	NC	Apron XL Maxim	Zeltera	Int Sol	NipsIt	XBEEET
SX 1818	2	NC	Apron XL Maxim	Zeltera	Int Sol	NipsIt	XBEEET
SX 1829	1	NC	Apron XL Maxim	Zeltera	Int Sol	NipsIt	XBEEET
BTS 8572 (Check)	8	6	Allegiance Thiram	Systiva	Tach 35	Poncho Beta	Ultipro
BTS 8337 (Check)	10	8	Allegiance Thiram	Systiva	Tach 35	Poncho Beta	Ultipro
Crystal 578RR (Check)	8	5	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
BTS 8815 (Check)	5	3	Allegiance Thiram	Systiva	Tach 35	Poncho Beta	Ultipro
Crystal 803 (Check)	5	2	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET
AP CK#55 CRY247	11	9	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEEET