American Crystal Sugar Company

November 2021

Dear ACSC Sugarbeet Grower:

The 2021 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 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. Stands in the trials were generally very good this year despite adverse conditions for emergence. Eleven sites were used for variety approval calculations. Two sites were abandoned due to erratic emergence (St. Thomas and Caledonia). Rhizoctonia crown and root rot was minimal in 2021. AZteroid in-furrow, seed treatments, and one application of Quadris were used to control Rhizoctonia. Revenue calculations in 2021 are based on a hypothetical $45.65 payment (5-year rolling average) at 17.5% sugar and 1.5% SLM not considering hauling or production costs.

Fusarium ratings are from one Moorhead site. Rhizoctonia crown and root rot ratings are from two RRV nurseries. Aphanomyces root rot ratings are from the Shakopee nursery. The dry growing season was not conducive for Aphanomyces development, so there are no yield results under Aphanomyces conditions or Aphanomyces ratings from the Red River Valley for 2021. Cercospora leafspot ratings are from Foxhome and Randolph, MN. Root aphid ratings are from a greenhouse assay at Shakopee, MN and a field trial at Longmont, CO. Another set of ratings from a growth chamber assay at Moorhead may be added at a later date.

2021 harvest conditions were excellent. Soil moisture levels remained average to dry throughout the months of August and September creating good harvest conditions in all five Factory Districts.

The 2021 data has been combined with previous years' data and results are enclosed. Bolter data is presented in plants per acre based on 60,000 seeds per acre. Results for the yield trials from individual sites are available on the internet.

Conventional trials were not planted in the 2021 OVT trials. Conventional varieties that were approved for 2020 and 2021 sales are permitted to continue in 2022 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
4. Performance of conventional varieties from three sites (2017-2019)
5. Disease ratings for all nurseries (varieties tested in 2021)
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. 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 39 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 with Event (surfactant) and full rates of fungicides were applied using a pickup sprayer driven down the alleys. Two applications of Roundup were made in the 4-6 (32 oz) and 8-12 (22 oz) leaf stages. Hand weeding was used where necessary. All yield trials were treated with Quadris in a band during the 6-10 leaf stage (14 oz) for Rhizoctonia control. Treatments used for Cercospora control in 2021 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 customized six-row harvester (Big Red, new in 2019) with increased cleaning capacity. All harvested beets of each plot were used for yield determination while one sample (approximately 25 lbs) for sugar and impurity analysis was obtained from each plot. Quality analysis was performed at the ACSC Technical Services quality lab in Moorhead.

Varieties were planted in nurseries in North Dakota, 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

Attachments

Table 1.
Varieties Meeting ACSC Approval Criteria for the 2022 Sugarbeet Crop ++

Roundup Ready ®	Full Market	Aph Spec	Rhc Spec	High Rzm
BTS 8629	Yes	Yes		Hi Rzm
BTS 8882	Yes	New		Hi Rzm
BTS 8927	Yes	Yes		Hi Rzm
BTS 8938	Yes	Yes	Yes	Hi Rzm
BTS 8961	Yes	Yes		Hi Rzm
BTS 8018	New	New		Hi Rzm
BTS 8034	New	New		Hi Rzm
BTS 8073	New	New		Hi Rzm
BTS 8092	New	New	New	Hi Rzm
Crystal 572	Yes	New		Hi Rzm
Crystal 684	Yes	Yes		Hi Rzm
Crystal 793	Yes	Yes		Hi Rzm
Crystal 796	Yes	Yes		Hi Rzm
Crystal 803	Yes	Yes		Hi Rzm
Crystal 804	Yes	Yes	Yes	Hi Rzm
Crystal 912	Yes	Yes	Yes	Hi Rzm
Crystal 913	Yes	Yes		Hi Rzm
Crystal 021	New	New	New	Hi Rzm
Crystal 022	New	New	New	Hi Rzm
Crystal 025	New	New	New	Hi Rzm
Crystal 026	New	New	New	Hi Rzm
Crystal 029	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	New	New		Hi Rzm
Hilleshög HIL2366	New			Hi Rzm
Hilleshög HIL2367	New	New		Hi Rzm
Hilleshög HIL2368	New		New	Hi Rzm
Maribo MA504	Yes			Hi Rzm
Maribo MA717	Yes	Yes+		Hi Rzm
Maribo MA902	Yes			Hi Rzm
SV 265	Yes			Hi Rzm
SV 268	Yes	Yes+		Hi Rzm
SV 285	Yes	Yes		Hi Rzm
SV 375	Yes			Hi Rzm
SV 203	New	New		
SX 1888	Yes	Yes		Hi Rzm
SX 1898	Yes	Yes		Hi Rzm
SX 1804	New	New		Hi Rzm

2019 Conventional	Full Market	High Rzm
Crystal R761	Yes	Hi Rzm
Crystal 620	Yes	Hi Rzm
Crystal 840	Yes	Hi Rzm
Crystal 950	Yes	Hi Rzm
Hilleshög HM3035Rz	Yes	Rzm
SX 8869 Cnv	Yes	Hi Rzm
SV 48777	Yes	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

+ Previously approved Specialty variety not meeting current Specialty approval standards. According to Approval Policy, may be sold as Specialty in 2022
++ Roundup Ready sugarbeets are subject to the ACSC RRSB Bolter Destruction Policy Created 11/11/2021
Roundup Ready ® is a registered trademark of Monsanto Company.

Table 2. Performance Data of RR Varieties During 2020 & 2021 Growing Seasons (All Locations Combined) Approved for Sale to ACSC Growers in 2022 +++

	Yrs	Rev/Ton ++			Rev/Acre ++			Rec/Ton		Rec/Acre		Sugar		Yield		Molasses		Emerg		Bolter / Ac		CR +		Aph Root+		Rhizoc.+		Fusarium+		Rzm+
Variety	Com	21	2 Yr	2Y%	21	2 Yr	2Y%	21	2 Yr	21	2 Yr	21	2 Yr	21	2 Yr	21	2 Yr	21	2 Yr	21	2 Yr	21	2 Yr	21	2 Yr	21	2 Yr	21	2 Yr	
Previous Approved # locations		11	18		11	18		11	18	11	18	11	18	11	18	11	18	11	18	11	18	2	5	1	4	2	4	1	3	
BTS 8629	4	46.49	45.44	92	1590	1498	112	323	320	11076	10571	17.28	17.09	34.4	33.1	1.13	1.08	81	74	0	0	4.78	4.66	4.2	4.1	4.2	4.3	4.2	4.0	Hi
BTS 8882	2	46.33	44.99	91	1554	1468	110	322	319	10856	10419	17.34	17.07	33.8	32.8	1.22	1.14	81	77	0	0	4.92	4.81	3.2	3.8	4.3	4.3	3.2	2.7	Hi
BTS 8927	1	52.48	52.78	107	1572	1527	115	343	346	10313	10017	18.21	18.25	30.2	29.1	1.04	0.97	70	74	0	0	4.48	4.45	4.5	4.2	3.7	4.0	4.0	3.3	Hi
BTS 8938	1	49.53	48.64	99	1574	1492	112	333	331	10608	10154	17.76	17.60	31.9	30.7	1.10	1.04	68	67	0	0	4.71	4.68	4.1	4.0	3.8	3.9	4.5	4.1	Hi
BTS 8961	1	48.14	46.82	95	1556	1485	111	329	325	10652	10321	17.60	17.36	32.5	31.8	1.17	1.11	77	75	0	0	4.53	4.61	4.8	4.4	3.7	3.9	3.3	2.8	Hi
Crystal 572	5	50.88	50.94	103	1530	1468	110	338	339	10200	9794	18.02	18.02	30.3	29.0	1.13	1.06	81	77	3	1	4.75	4.61	4.5	4.4	3.9	4.0	3.3	2.9	Hi
Crystal 684	3	45.89	45.04	91	1533	1483	111	321	319	10770	10527	17.25	17.08	33.7	33.1	1.21	1.14	80	77	0	0	4.54	4.49	3.6	3.8	3.8	4.0	2.8	2.5	Hi
Crystal 793	3	51.29	50.39	102	1625	1570	118	339	337	10805	10529	18.04	17.87	32.0	31.3	1.08	1.01	80	75	0	0	4.13	4.22	3.7	3.8	4.4	4.6	2.8	2.7	Hi
Crystal 796	2	48.03	46.83	95	1578	1475	111	328	325	10820	10247	17.59	17.37	33.1	31.6	1.18	1.12	82	78	0	0	4.98	4.96	4.7	4.3	4.1	4.3	3.0	2.6	Hi
Crystal 803	1	50.56	49.79	101	1597	1521	114	337	335	10672	10242	17.97	17.80	31.8	30.6	1.13	1.04	81	79	3	1	3.86	3.89	3.9	3.9	4.4	4.7	3.5	3.0	Hi
Crystal 804	1	47.03	44.99	91	1591	1487	112	325	319	11041	10555	17.39	17.06	34.2	33.2	1.15	1.13	79	72	0	0	4.68	4.72	3.4	3.5	3.8	3.8	2.8	2.6	Hi
Crystal 912	NC	48.05	46.96	95	1665	1593	120	328	325	11422	11074	17.54	17.33	35.0	34.1	1.13	1.06	79	77	0	0	5.13	4.94	4.0	3.8	3.8	3.7	4.1	3.9	Hi
Crystal 913	1	51.35	50.08	101	1579	1534	115	340	336	10493	10322	18.05	17.83	31.1	30.8	1.08	1.03	78	76	0	0	4.10	4.12	4.4	4.1	3.9	4.3	3.7	3.1	Hi
Hilleshög HIL2317	1	49.88	49.56	100	1451	1418	106	335	334	9750	9589	17.84	17.76	29.2	28.7	1.12	1.05	75	73	0	0	4.57	4.81	5.0	4.4	4.8	4.9	6.1	6.0	Hi
Hilleshög HIL9528	6	45.74	45.94	93	1392	1377	103	320	322	9741	9659	17.14	17.18	30.4	30.0	1.13	1.08	75	72	0	0	4.52	4.68	5.5	4.6	4.5	4.5	4.9	4.8	Hi
Hilleshög HIL9708	4	47.67	47.83	97	1402	1386	104	327	328	9647	9534	17.45	17.47	29.6	29.1	1.11	1.05	79	76	0	0	4.65	4.81	6.3	5.1	3.8	3.8	4.8	4.2	Rzm
Hilleshög HIL9920	3	50.17	49.57	100	1497	1448	109	335	334	10041	9787	17.91	17.78	30.0	29.3	1.14	1.06	76	73	0	0	4.75	4.78	4.6	4.1	4.7	4.9	5.5	5.9	Hi
Maribo MA504	5	45.75	45.09	91	1401	1385	104	320	319	9831	9809	17.20	17.04	30.8	30.8	1.18	1.09	79	75	0	0	5.07	5.21	7.0	6.0	4.9	4.9	4.8	4.5	Hi
Maribo MA717	3	44.88	46.29	94	1414	1434	108	317	323	10012	10033	17.03	17.25	31.6	31.1	1.16	1.10	74	74	0	0	4.68	4.89	6.7	5.3	4.3	4.5	5.1	4.9	Hi
Maribo MA902	1	47.68	48.23	98	1427	1410	106	327	330	9808	9658	17.47	17.54	30.1	29.3	1.12	1.05	84	78	0	0	4.63	4.80	7.0	5.5	3.8	3.9	4.5	4.3	Hi
SV 265	4	47.66	48.17	98	1416	1406	106	327	330	9725	9624	17.42	17.50	29.8	29.2	1.07	1.02	76	72	0	0	4.30	4.42	4.9	4.5	4.2	4.2	5.7	5.7	Hi
SV 268	4	49.52	48.52	98	1552	1435	108	333	331	10462	9778	17.79	17.61	31.5	29.6	1.13	1.07	82	74	0	0	5.18	4.98	4.9	4.7	4.4	4.8	6.2	5.1	Hi
SV 285	1	50.28	49.94	101	1524	1449	109	336	336	10211	9737	17.90	17.82	30.5	29.0	1.11	1.04	82	73	0	0	4.78	4.64	4.5	4.4	4.3	4.1	6.3	5.8	Hi
SV 375	2	50.43	48.86	99	1541	1447	109	336	332	10313	9853	17.91	17.64	30.8	29.8	1.09	1.04	81	72	0	2	4.71	4.74	4.8	4.4	4.2	4.4	5.9	5.6	Hi
SX 1888	2	47.99	47.69	97	1434	1390	104	328	328	9829	9577	17.57	17.49	30.0	29.3	1.17	1.09	76	69	0	2	5.03	4.85	4.1	4.1	4.3	4.2	5.7	5.6	Hi
SX 1898	1	50.21	50.12	102	1479	1494	112	336	336	9932	10065	17.91	17.86	29.8	30.0	1.13	1.04	77	75	0	0	4.76	4.74	5.0	4.4	4.3	4.2	5.7	5.5	Hi
Newly Approved																														
BTS 8018	NC	50.94	49.87	101	1622	1562	117	338	335	10817	10514	17.97	17.78	32.2	31.4	1.08	1.01	83	79	0	6	2.31	2.36	4.5	4.2	3.8	4.0	3.2	2.8	Hi
BTS 8034	NC	46.59	46.89	95	1587	1561	117	323	325	11041	10828	17.34	17.37	34.3	33.3	1.17	1.10	83	81	0	0	2.56	2.63	3.2	3.8	3.9	4.2	2.7	2.5	Hi
BTS 8073	NC	49.30	49.63	101	1533	1535	115	332	335	10393	10382	17.76	17.77	31.4	31.1	1.14	1.05	80	76	0	0	4.56	4.62	4.3	3.9	3.7	3.9	3.6	3.1	Hi
BTS 8092	NC	49.22	48.57	98	1611	1543	116	332	331	10914	10529	17.67	17.54	33.0	31.9	1.07	1.00	80	75	0	0	4.62	4.44	4.1	4.0	3.8	3.8	4.1	3.9	Hi
Crystal 021	NC	48.59	47.78	97	1620	1554	117	330	328	11043	10693	17.64	17.47	33.6	32.6	1.14	1.06	76	71	0	0	2.28	2.24	4.2	3.8	3.4	3.6	4.2	3.5	Hi
Crystal 022	NC	51.73	52.52	106	1543	1539	116	341	345	10221	10134	18.12	18.22	30.2	29.5	1.08	0.99	79	75	0	0	4.97	4.84	4.8	4.3	3.5	3.5	3.5	3.1	Hi
Crystal 025	NC	49.52	49.15	100	1531	1488	112	333	333	10368	10122	17.82	17.73	31.3	30.5	1.16	1.08	76	71	8	4	4.84	4.70	3.5	3.5	3.8	3.7	2.4	2.5	Hi
Crystal 026	NC	47.97	47.84	97	1602	1546	116	328	329	10971	10625	17.61	17.53	33.6	32.4	1.21	1.10	81	77	0	0	4.43	4.60	3.7	3.7	3.3	3.5	2.8	2.6	Hi
Crystal 029	NC	50.24	49.65	101	1512	1494	112	336	335	10162	10107	17.90	17.79	30.5	30.3	1.13	1.06	83	78	0	0	4.59	4.63	4.3	3.9	3.9	4.1	2.9	2.7	Hi
Hilleshög HIL2320	NC	46.93	47.95	97	1411	1439	108	324	329	9781	9899	17.40	17.54	30.2	30.2	1.19	1.10	82	77	0	0	4.78	4.94	4.7	4.1	3.8	4.2	4.5	4.5	Hi
Hilleshög HIL2366	NC	48.97	48.21	98	1481	1432	107	331	330	10032	9813	17.68	17.54	30.3	29.8	1.12	1.05	85	82	0	0	5.01	4.98	5.8	4.8	4.0	4.1	4.6	4.6	Hi
Hilleshög HIL2367	NC	47.80	48.58	98	1443	1441	108	327	331	9901	9846	17.55	17.64	30.3	29.8	1.19	1.10	82	76	0	0	4.75	4.92	5.1	4.3	4.1	4.2	4.3	4.4	Hi
Hilleshög HIL2368	NC	50.84	51.61	105	1339	1320	99	338	341	8924	8761	18.02	18.13	26.5	25.7	1.15	1.06	82	77	0	0	4.66	4.67	5.3	4.5	2.9	3.2	4.4	4.1	Hi
SV 203	NC	50.87	49.93	101	1478	1472	110	338	336	9853	9918	18.00	17.84	29.3	29.6	1.11	1.05	78	71	0	0	4.75	4.89	4.3	4.3	4.3	4.3	6.0	5.6	Hi
SX 1804	NC	49.88	48.91	99	1512	1453	109	334	332	10164	9894	17.83	17.66	30.5	29.9	1.12	1.06	80	75	0	0	4.80	4.78	4.1	4.0	4.2	4.3	5.4	5.5	Hi
Benchmark var. mean		49.65	49.36		1403	1333		334	334	9475	9038	17.89	17.80	28.6	27.2	1.21	1.12	78	73											

2 Yr is mean of 2 years data, 2 Y% is 2-Yr mean as % of benchmark varieties.

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

Created 11/10/2021

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

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

Bolters /Ac are based upon a plant stand of 60,000.

+++2020 Sites include Casselton, Glyndon, Ada, Grand Forks, Scandia, E Grand Forks and Bathgate

+++2021 Sites include Casselton, Glyndon, Georgetown, Hendrum, Hillsboro, Grand Forks, Scandia, Climax, Forest River, Hallock and Bathgate

Table 3. Performance Data of RR Aphanomyces Specialty Varieties - Under Aphanomyces Conditions (Relative to Susceptible Checks) approved for 2022 Growing Season +++

	Years	Rev/Ton			Rev/Acre			Rec/Ton		Rec/Acre		Sugar		Yield		CR Rating +		Aph Root +		Fusarium +		Rhizoctonia +	
Description	Comm	2021#	2020	%Sus	2021#	2020	%Sus	2021#	2020	2021#	2020	2021#	2020	2021#	2020	21	2Yr	21	2 Yr	21	2Yr	21	2Yr
# of locations		0	2	2	0	2	2	0	2	0	2	0	2	2	2	2	5	3	4	1	3	2	4
Previously Approved																							
BTS 8629	4	--	32.72	106	--	789	134	--	276.5	--	6493	--	15.03	--	23.1	4.78	4.66	4.2	4.1	4.2	4.0	4.2	4.3
BTS 8882	2	--	32.66	106	--	772	131	--	276.3	--	6407	--	15.02	--	22.9	4.92	4.81	3.2	3.8	3.2	2.7	4.3	4.3
BTS 8927	1	--	43.12	140	--	985	167	--	312.6	--	7070	--	16.58	--	22.4	4.48	4.45	4.5	4.2	4.0	3.3	3.7	4.0
BTS 8938	1	--	37.24	121	--	848	144	--	292.4	--	6467	--	15.70	--	21.6	4.71	4.68	4.1	4.0	4.5	4.1	3.8	3.9
BTS 8961	1	--	36.54	119	--	835	142	--	290.0	--	6478	--	15.64	--	22.0	4.53	4.61	4.8	4.4	3.3	2.8	3.7	3.9
Crystal 572	5	--	38.70	126	--	786	133	--	297.5	--	5929	--	15.99	--	19.6	4.75	4.61	4.5	4.4	3.3	2.9	3.9	4.0
Crystal 684	3	--	32.62	106	--	799	136	--	276.2	--	6622	--	14.93	--	23.6	4.54	4.49	3.6	3.8	2.8	2.5	3.8	4.0
Crystal 793	3	--	37.97	123	--	886	150	--	294.9	--	6732	--	15.80	--	22.4	4.13	4.22	3.7	3.8	2.8	2.7	4.4	4.6
Crystal 796	2	--	36.17	117	--	795	135	--	288.6	--	6223	--	15.55	--	21.2	4.98	4.96	4.7	4.3	3.0	2.6	4.1	4.3
Crystal 803	1	--	39.43	128	--	908	154	--	299.9	--	6793	--	16.03	--	22.3	3.86	3.89	3.9	3.9	3.5	3.0	4.4	4.7
Crystal 804	1	--	33.22	108	--	864	147	--	278.7	--	7144	--	15.14	--	25.4	4.68	4.72	3.4	3.5	2.8	2.6	3.8	3.8
Crystal 912	NC	--	35.21	114	--	886	150	--	285.5	--	7041	--	15.44	--	24.4	5.13	4.94	4.0	3.8	4.1	3.9	3.8	3.7
Crystal 913	1	--	39.55	128	--	951	161	--	300.2	--	7129	--	16.06	--	23.5	4.10	4.12	4.4	4.1	3.7	3.1	3.9	4.3
Hilleshög HIL2317	1	--	36.66	119	--	741	126	--	290.5	--	5836	--	15.50	--	20.0	4.57	4.81	5.0	4.4	6.1	6.0	4.8	4.9
Hilleshög HIL9528	6	--	36.06	117	--	720	122	--	288.2	--	5703	--	15.42	--	19.6	4.52	4.68	5.5	4.6	4.9	4.8	4.5	4.5
Hilleshög HIL9708	4	--	34.56	112	--	644	109	--	283.0	--	5192	--	15.19	--	18.1	4.65	4.81	6.3	5.1	4.8	4.2	3.8	3.8
Hilleshög HIL9920	3	--	35.57	115	--	706	120	--	286.5	--	5606	--	15.37	--	19.3	4.75	4.78	4.6	4.1	5.5	5.9	4.7	4.9
Maribo MA504	5	--	31.25	101	--	565	96	--	271.4	--	4779	--	14.65	--	17.3	5.07	5.21	7.0	6.0	4.8	4.5	4.9	4.9
Maribo MA717	3	--	34.86	113	--	731	124	--	284.0	--	5834	--	15.24	--	20.2	4.68	4.89	6.7	5.3	5.1	4.9	4.3	4.5
Maribo MA902	1	--	37.28	121	--	652	111	--	292.5	--	5126	--	15.61	--	17.6	4.63	4.80	7.0	5.5	4.5	4.3	3.8	3.9
SV 265	4	--	37.96	123	--	839	142	--	294.9	--	6388	--	15.77	--	21.3	4.30	4.42	4.9	4.5	5.7	5.7	4.2	4.2
SV 268	4	--	38.06	124	--	829	141	--	295.2	--	6339	--	15.89	--	21.3	5.18	4.98	4.9	4.7	6.2	5.1	4.4	4.8
SV 285	1	--	38.37	125	--	822	139	--	296.3	--	6301	--	15.89	--	21.1	4.78	4.64	4.5	4.4	6.3	5.8	4.3	4.1
SV 375	2	--	36.41	118	--	769	130	--	289.4	--	5989	--	15.55	--	20.4	4.71	4.74	4.8	4.4	5.9	5.6	4.2	4.4
SX 1888	2	--	37.03	120	--	787	133	--	291.6	--	6038	--	15.67	--	20.3	5.03	4.85	4.1	4.1	5.7	5.6	4.3	4.2
SX 1898	1	--	37.53	122	--	855	145	--	293.4	--	6643	--	15.74	--	22.6	4.76	4.74	5.0	4.4	5.7	5.5	4.3	4.2
Newly Approved																							
BTS 8018	NC	--	40.59	132	--	982	167	--	303.9	--	7256	--	16.22	--	23.6	2.31	2.36	4.5	4.2	3.2	2.8	3.8	4.0
BTS 8034	NC	--	35.57	115	--	887	150	--	286.7	--	7046	--	15.53	--	24.3	2.56	2.63	3.2	3.8	2.7	2.5	3.9	4.2
BTS 8073	NC	--	39.92	130	--	935	159	--	301.6	--	6983	--	16.16	--	22.9	4.56	4.62	4.3	3.9	3.6	3.1	3.7	3.9
BTS 8092	NC	--	37.53	122	--	916	155	--	293.3	--	6977	--	15.76	--	23.3	4.62	4.44	4.1	4.0	4.1	3.9	3.8	3.8
Crystal 021	NC	--	38.07	124	--	935	159	--	295.3	--	7071	--	15.86	--	23.5	2.28	2.24	4.2	3.8	4.2	3.5	3.4	3.6
Crystal 022	NC	--	44.07	143	--	1047	178	--	315.8	--	7422	--	16.80	--	23.2	4.97	4.84	4.8	4.3	3.5	3.1	3.5	3.5
Crystal 025	NC	--	37.42	122	--	909	154	--	293.0	--	7062	--	15.73	--	24.0	4.84	4.70	3.5	3.5	2.4	2.5	3.8	3.7
Crystal 026	NC	--	37.63	122	--	913	155	--	293.7	--	7034	--	15.84	--	23.7	4.43	4.60	3.7	3.7	2.8	2.6	3.3	3.5
Crystal 029	NC	--	39.69	129	--	944	160	--	300.8	--	7062	--	16.17	--	23.2	4.59	4.63	4.3	3.9	2.9	2.7	3.9	4.1
Hilleshög HIL2320	NC	--	36.99	120	--	735	125	--	291.5	--	5721	--	15.58	--	19.5	4.78	4.94	4.7	4.1	4.5	4.5	3.8	4.2
Hilleshög HIL2366	NC	--	37.57	122	--	729	124	--	293.5	--	5656	--	15.66	--	19.2	5.01	4.98	5.8	4.8	4.6	4.6	4.0	4.1
Hilleshög HIL2367	NC	--	37.28	121	--	740	125	--	292.5	--	5760	--	15.64	--	19.6	4.75	4.92	5.1	4.3	4.3	4.4	4.1	4.2
Hilleshög HIL2368	NC	--	40.99	133	--	693	117	--	305.2	--	5136	--	16.25	--	16.8	4.66	4.67	5.3	4.5	4.4	4.1	2.9	3.2
SV 203	NC	--	37.75	123	--	829	141	--	294.1	--	6380	--	15.78	--	21.5	4.75	4.89	4.3	4.3	6.0	5.6	4.3	4.3
SX 1804	NC	--	37.60	122	--	885	150	--	293.6	--	6778	--	15.77	--	22.8	4.80	4.78	4.1	4.0	5.4	5.5	4.2	4.3
Aph Susc Checks		--	30.80		--	590		--	269.8	--	4984	--	14.75	--	18.0								
Mean of Aph Specialty Varieties		--	36.28		--	809		--	289.0	--	6325	--	15.55	--	21.6								

%Susc = % of susceptible varieties.

Created 11/10/2021

+ Aphanomyces ratings from Shakopee (res.<4.4, susc>5.0). Cercospora from Randolph MN, Foxhome MN & Michigan (res.<4.4, susc>5.0). Fusarium from RRV (res.<3.0, susc>5.0). Rhizoctonia from Mhd,

++ 2021 Revenue estimates based on a $45.65 beet payment at 17.5% sugar and 1.5% loss to molasses. 2020 Revenue estimates based on a $45.12 beet payment. Revenue does not consider hauling or production costs.

Lack of Aphanomyces pressure at any of the OVT sites prevented collection of Aphanomyces Yield Data for 2021.

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

	Yrs	Rev/Ton ++					Rev/Acre ++					Rec/Ton		Rec/Acre		Sugar		Yield		Molasses		Emerg		Bolter / Ac		CR +		Aph Root+		Rhizoc.+		Fusarium+		Rzm+
Variety @	Com	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	
Previous Approved # locations		3	8		14		3	8		14		3	8	3	8	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 2019-2021 (Varieties tested in 2021)

Cercospora, Aphanomyces, Rhizoctonia & Fusarium

Code	Description	< 4.5 Cercospora > 5.0					< 4.4 Aphanomyces > 5.0					< 3.82 Rhizoctonia > 5.0					< 3.0 Fusarium > 5.0					High Rzm
		21 Mean	20 Mean	19 Mean	2 Yr Mean	3 Yr Mean	21 Mean	20 Mean	19 Mean	2 Yr Mean	3 Yr Mean	21 Mean	20 Mean	19 Mean	2 Yr Mean	3 Yr Mean	21 Mean	20 Mean	19 Mean	2 Yr Mean	3 Yr Mean	
	Previously Approved																					
532	BTS 8629	4.78	4.55	4.66	4.66	4.66	4.24	3.92	5.32	4.08	4.50	4.22	4.30	3.89	4.26	4.14	4.21	3.78	3.71	4.00	3.90	Hi Rzm
518	BTS 8882	4.92	4.71	4.18	4.81	4.60	3.25	4.33	5.17	3.79	4.25	4.26	4.26	4.27	4.26	4.26	3.25	2.11	2.91	2.68	2.76	Hi Rzm
504	BTS 8927	4.48	4.42	4.35	4.45	4.42	4.51	3.87	4.06	4.19	4.15	3.68	4.37	3.93	4.03	3.99	4.00	2.59	2.77	3.29	3.12	Hi Rzm
530	BTS 8938	4.71	4.66	4.35	4.68	4.57	4.07	3.86	3.75	3.96	3.89	3.83	3.90	3.47	3.87	3.74	4.51	3.66	3.06	4.09	3.75	Hi Rzm
553	BTS 8961	4.53	4.69	4.27	4.61	4.49	4.80	4.04	3.89	4.42	4.25	3.75	4.11	3.79	3.93	3.88	3.33	2.19	2.55	2.76	2.69	Hi Rzm
551	Crystal 572	4.75	4.46	4.68	4.61	4.63	4.47	4.28	4.98	4.38	4.58	3.88	4.21	4.14	4.05	4.08	3.34	2.36	2.39	2.85	2.70	Hi Rzm
549	Crystal 684	4.54	4.44	4.12	4.49	4.37	3.60	3.97	4.33	3.78	3.96	3.82	4.15	4.01	3.99	3.99	2.76	2.32	2.10	2.54	2.39	Hi Rzm
542	Crystal 793	4.13	4.31	4.04	4.22	4.16	3.74	3.87	3.72	3.80	3.77	4.36	4.84	4.18	4.60	4.46	2.80	2.61	2.71	2.71	2.71	Hi Rzm
502	Crystal 796	4.98	4.95	4.74	4.96	4.89	4.72	3.85	3.97	4.29	4.18	4.12	4.45	3.85	4.28	4.14	2.96	2.20	2.45	2.58	2.54	Hi Rzm
536	Crystal 803	3.86	3.93	3.88	3.89	3.89	3.89	3.96	4.45	3.92	4.10	4.39	5.00	4.54	4.69	4.64	3.52	2.52	2.70	3.02	2.91	Hi Rzm
527	Crystal 804	4.68	4.77	4.46	4.72	4.63	3.43	3.61	4.30	3.52	3.78	3.76	3.90	3.72	3.83	3.80	2.84	2.29	2.28	2.56	2.47	Hi Rzm
558	Crystal 912	5.13	4.75	4.62	4.94	4.83	3.95	3.67	3.91	3.81	3.84	3.77	3.54	3.58	3.66	3.63	4.11	3.61	3.37	3.86	3.69	Hi Rzm
513	Crystal 913	4.10	4.13	4.11	4.12	4.11	4.39	3.75	3.58	4.07	3.91	3.94	4.58	4.31	4.26	4.28	3.68	2.59	2.56	3.13	2.94	Hi Rzm
531	Hilleshög HIL2317	4.57	5.05	4.90	4.81	4.84	5.01	3.86	3.96	4.44	4.28	4.76	4.95	4.19	4.85	4.63	6.06	5.97	5.30	6.02	5.78	Hi Rzm
557	Hilleshög HIL9528	4.52	4.84	4.93	4.68	4.76	5.51	3.72	4.56	4.62	4.60	4.47	4.57	4.10	4.52	4.38	4.91	4.68	4.16	4.80	4.59	Hi Rzm
521	Hilleshög HIL9708	4.65	4.97	4.96	4.81	4.86	6.34	3.96	4.61	5.15	4.97	3.78	3.83	3.87	3.81	3.83	4.76	3.64	3.89	4.20	4.10	Rzm
569	Hilleshög HIL9920	4.75	4.82	4.95	4.78	4.84	4.65	3.65	5.05	4.15	4.45	4.70	5.12	4.68	4.91	4.83	5.45	6.28	5.42	5.87	5.72	Hi Rzm
525	Maribo MA504	5.07	5.35	5.34	5.21	5.25	6.97	5.06	6.17	6.01	6.06	4.91	4.83	4.69	4.87	4.81	4.76	4.25	4.61	4.51	4.54	Hi Rzm
512	Maribo MA717	4.68	5.11	5.11	4.89	4.97	6.75	3.77	4.42	5.26	4.98	4.31	4.61	4.15	4.46	4.36	5.11	4.62	4.81	4.87	4.85	Hi Rzm
519	Maribo MA902	4.63	4.96	4.91	4.80	4.83	6.96	4.01	5.31	5.48	5.43	3.80	3.93	3.97	3.86	3.90	4.50	4.01	3.71	4.26	4.08	Hi Rzm
506	SV 265	4.30	4.55	4.28	4.42	4.38	4.95	3.98	5.47	4.47	4.80	4.17	4.21	4.25	4.19	4.21	5.65	5.70	5.64	5.68	5.66	Hi Rzm
528	SV 268	5.18	4.78	4.82	4.98	4.93	4.93	4.49	5.08	4.71	4.83	4.38	5.24	4.21	4.81	4.61	6.21	4.04	4.92	5.12	5.06	Hi Rzm
563	SV 285	4.78	4.50	4.84	4.64	4.70	4.48	4.28	4.47	4.38	4.41	4.26	4.03	4.38	4.15	4.22	6.26	5.40	4.76	5.83	5.47	Hi Rzm
543	SV 375	4.71	4.78	4.11	4.74	4.53	4.77	4.04	5.03	4.41	4.62	4.22	4.54	4.05	4.38	4.27	5.86	5.25	4.97	5.56	5.36	Hi Rzm
568	SX 1888	5.03	4.67	4.89	4.85	4.87	4.12	3.99	4.65	4.06	4.25	4.25	4.17	4.19	4.21	4.20	5.74	5.54	5.51	5.64	5.60	Hi Rzm
533	SX 1898	4.76	4.73	4.68	4.74	4.72	4.97	3.76	4.74	4.37	4.49	4.34	4.16	4.21	4.25	4.24	5.67	5.41	5.14	5.54	5.41	Hi Rzm
	Newly Approved																					
522	BTS 8018	2.31	2.41	--	2.36	--	4.52	3.87	--	4.20	--	3.83	4.16	--	3.99	--	3.22	2.47	--	2.85	--	Hi Rzm
514	BTS 8034	2.56	2.70	--	2.63	--	3.24	4.36	--	3.80	--	3.88	4.56	--	4.22	--	2.71	2.26	--	2.48	--	Hi Rzm
508	BTS 8073	4.56	4.68	--	4.62	--	4.30	3.45	--	3.87	--	3.67	4.11	--	3.89	--	3.63	2.58	--	3.11	--	Hi Rzm
561	BTS 8092	4.62	4.26	--	4.44	--	4.11	3.85	--	3.98	--	3.81	3.81	--	3.81	--	4.07	3.70	--	3.88	--	Hi Rzm
555	Crystal 021	2.28	2.20	--	2.24	--	4.19	3.46	--	3.83	--	3.38	3.88	--	3.63	--	4.18	2.85	--	3.52	--	Hi Rzm
534	Crystal 022	4.97	4.71	--	4.84	--	4.79	3.81	--	4.30	--	3.53	3.49	--	3.51	--	3.50	2.60	--	3.05	--	Hi Rzm
501	Crystal 025	4.84	4.56	--	4.70	--	3.52	3.40	--	3.46	--	3.76	3.72	--	3.74	--	2.42	2.51	--	2.47	--	Hi Rzm
535	Crystal 026	4.43	4.76	--	4.60	--	3.74	3.75	--	3.74	--	3.34	3.57	--	3.45	--	2.79	2.31	--	2.55	--	Hi Rzm
565	Crystal 029	4.59	4.67	--	4.63	--	4.30	3.60	--	3.95	--	3.87	4.31	--	4.09	--	2.88	2.42	--	2.65	--	Hi Rzm
511	Hilleshög HIL2320	4.78	5.11	4.92	4.94	4.94	4.66	3.55	4.58	4.11	4.26	3.80	4.64	4.04	4.22	4.16	4.50	4.56	4.37	4.53	4.48	Hi Rzm
545	Hilleshög HIL2366	5.01	4.94	--	4.98	--	5.81	3.81	--	4.81	--	3.98	4.24	--	4.11	--	4.65	4.55	--	4.60	--	Hi Rzm
556	Hilleshög HIL2367	4.75	5.08	--	4.92	--	5.13	3.51	--	4.32	--	4.10	4.26	--	4.18	--	4.27	4.44	--	4.35	--	Hi Rzm
509	Hilleshög HIL2368	4.66	4.69	--	4.67	--	5.25	3.70	--	4.47	--	2.92	3.52	--	3.22	--	4.44	3.86	--	4.15	--	Hi Rzm
559	SV 203	4.75	5.03	--	4.89	--	4.35	4.34	--	4.34	--	4.34	4.29	--	4.31	--	5.99	5.26	--	5.62	--	Hi Rzm
520	SX 1804	4.80	4.76	--	4.78	--	4.07	4.02	--	4.04	--	4.19	4.38	--	4.28	--	5.37	5.56	--	5.46	--	Hi Rzm

Created 11/11/2021

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, Betaseed and Hilleshog from 2019 - 2021

	Moorhead, MN[X] (1=Exc - 4=Poor)					Shakopee, MN[Y] (1=Exc - 4=Poor)					Longmont, CO[Z] (% Infested Plants)				
Variety	2019*	2020*	2021**	2 Yr Mean	3 Yr Mean	2019*	2020*	2021	2 Yr Mean	3 Yr Mean	2019	2020	2021	2 Yr Mean	3 Yr Mean
BTS 8018								1.00					67.94		
BTS 8034								1.32					68.72		
BTS 8073								1.19					80.81		
BTS 8092								1.21					61.48		
BTS 8629								1.46			3.60	10.20	82.76	46.48	32.19
BTS 8882								1.08			2.20	2.60	48.36	25.48	17.72
BTS 8927								1.16				7.90	76.97	42.44	42.44
BTS 8938								1.32				7.30	76.66	41.98	41.98
BTS 8961								1.00				9.20	51.05	30.13	30.13
Crystal 021								1.22					69.71		
Crystal 022								1.00					68.23		
Crystal 025								1.15					71.77		
Crystal 026								1.00					62.89		
Crystal 029								1.00					67.44		
Crystal 572								1.08			0.00	9.60	61.07	35.33	23.56
Crystal 684								1.28			2.10	14.40	67.74	41.07	28.08
Crystal 793								1.08			7.40	8.60	84.86	46.73	33.62
Crystal 796								1.00			1.60	3.30	70.75	37.03	25.22
Crystal 803								1.16			1.70	17.80	71.36	44.58	30.29
Crystal 804								1.24			2.80	13.10	57.64	35.37	24.51
Crystal 912								1.24				3.30	64.72	34.01	34.01
Crystal 913								1.12				1.40	62.18	31.79	31.79
Hilleshög HIL2317								3.41				34.40	76.15	55.28	55.28
Hilleshög HIL2320								3.33				49.20	80.33	64.77	64.77
Hilleshög HIL2366								3.72					73.41		
Hilleshög HIL2367								3.60					77.92		
Hilleshög HIL2368								3.54					73.23		
Hilleshög HIL9528								3.35			52.20	68.20	68.62	68.41	63.01
Hilleshög HIL9708								3.38			49.80	71.10	72.26	71.68	64.39
Hilleshög HIL9920								3.58			49.50	44.40	74.56	59.48	56.15
Maribo MA504								3.60			13.50	40.00	71.90	55.95	41.80
Maribo MA717								3.68			35.80	71.60	68.33	69.96	58.58
Maribo MA902								3.75				62.50	73.70	68.10	68.10
SV 203								2.32					70.81		
SV 265								3.65			28.80	83.10	70.81	76.95	60.90
SV 268								1.88			27.50	20.20	67.80	44.00	38.50
SV 285								2.28			4.90	28.20	66.81	47.50	33.30
SV 375								2.96			18.50	43.90	68.54	56.22	43.65
SX 1804								2.62					75.84		
SX 1888								2.92			29.40	69.50	83.66	76.58	60.85
SX 1898								2.21				43.20	54.21	48.70	48.70
Root Aphid Res Chk#2								1.13			3.60	19.80	80.06	49.93	34.49
Root Aphid Res Chk#3								1.36			0.00	9.60	70.65	40.12	26.75
Root Aphid Susc Chk#4								3.48			41.50	64.30	71.31	67.80	59.04
Root Aphid Susc Chk#5								3.60			52.20	68.20	76.10	72.15	65.50

Created 11/11/2021

[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, Betaseed

[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

** Trial in process

Table 7. Planting & Harvest Dates, Previous Crop and Disease Levels for 2021 ACSC Official Trial Sites *

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	5/4	9/13	Fallow	Medium/Light	N	L	N	N	N	N	
Glyndon MN	Mhd/Hlb	Menholt Farms	5/2	9/16	Wheat	Medium/Light	N	L	N	N	N	N	Moisture stress
Georgetown MN	Mhd/Hlb	Hoff Farms	5/4	9/22	Fallow	Medium	L	L	N	N	N	L	Moisture stress
Hendrum MN	Mhd/Hlb	Mark Maring	5/2	10/7	Wheat	Medium	N	N	N	N	N	L	Severe moisture stress
Hillsboro ND	Mhd/Hlb	CCK Farms	5/5	9/14	Soybean	Medium	L	L-M	N	N	N	L	Scattered small Aph and Rhizoc patches
Caledonia ND	Mhd/Hlb	Cotton Farms	5/8	Abandon	Wheat	Medium	N	L-M	N	N	N	N	Not harvested due to poor stand establishment
Grand Forks ND	EGF/Crk	Drees Farming Association	5/1	9/24	Wheat	Medium/Light	N	L	N	N	N	N	
Scandia MN	EGF/Crk	Deboer Farms	4/30	10/6	Wheat	Medium	N	L	N	L	N	N	Moisture stress; Fus in exp demo
Climax MN	EGF/Crk	Larson Farms	4/22	9/23	Wheat	Medium/Light	N	M	N	N	N	L	Moisture stress; scattered small to medium Rhizoc patches
Forest River MN	EGF/Crk	Forest River Farms Partnership	4/29	9/30	Wheat	Medium	N	L	N	N	N	L	Gaps and stunting in ranges 5-10 of commercial OVT
St. Thomas ND	Dtn	Kennelly Farms	4/28	Abandon	Beans	Medium/Light	N	L	N	N	L-M	N	Not harvested due to poor stand establishment
Hallock MN	Dtn	Prosser Kusnia Beets	4/27	10/4	Wheat	Medium/Heavy	N	L-M	N	N	N	L	Severe moisture stress; scattered small Rhizoc patches
Bathgate ND	Dtn	Shady Bend Farm	4/26	10/2	Wheat	Medium	N	L	N	N	N	N	Moisture stress

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	6/15	Multiple	Wheat	Medium/Heavy	NA	NA	NA	V	NA	NA	Replanted due to poor stand establishment
Sabin Fus-S MN	Fus Nurs	Krabbenhoft & Sons Farm	6/15	Multiple	Soybeans	Medium	NA	NA	NA	M-V	NA	NA	Replanted due to poor stand establishment; not rated due to erratic stands on replant
Mhd Rhc-E MN	Rhc Nurs	Jon Hickel	5/6	8/10	Wheat	Heavy	NA	M	NA	L	NA	NA	
Mhd Rhc-W MN	Rhc Nurs	Jon Hickel	5/7	9/8	Wheat	Heavy	NA	M	NA	L	NA	NA	
NWROC MN	Rhc Nurs	Maureen Aubol	5/8	Abandon	NA	Medium	NA	L-M	NA	NA	M-S	NA	Not inoculated or rated due to erratic stands and abundance of root maggot damage
East Lansing MI	Rhc Nurs	Mitch McGrath	5/14	8/25	NA	NA	NA	V	NA	NA	NA	NA	Ratings not used due to high severity and lack of separation among checks
Shakopee MN	Aphanomyces	Patrick O'Boyle	5/5	8/25	NA	NA	M-V	L	NA	NA	NA	NA	Disease pressure higher earlier in season
Glyndon MN	Aphanomyces	Dennis Simmons	5/2	Abandon	Wheat	Medium	L	L	NA	L-M	NA	NA	Abandoned due to lack of Aph pressure
Georgetown MN	Aphanomyces	Hoff Farms	5/4	Abandon	Fallow	Medium	L	L	N	N	N	L	Abandoned due to lack of Aph pressure
Hillsboro ND	Aphanomyces	CCK Farms	9/14	Abandon	Soybeans	Medium	L	L	N	N	N	L	Abandoned due to lack of Aph pressure
Longmont CO	Root Aphids	Kara Guffey			NA	NA	NA	NA	NA	NA	NA		
Foxhome MN	Cercospora	NDSU/Kevin Etzler	5/6	Multiple	Wheat	Medium	NA	L	NA	NA	NA	NA	
East Lansing MI	Cercospora	Mitch McGrath	5/14	Multiple	NA	NA	NA	NA	NA	NA	NA	NA	Ratings not used due to lack of correlation with Randolph and Foxhome sites
Randolph MN	Cercospora	Patrick O'Boyle	5/1	Multiple	NA	NA	NA	NA	NA	NA	NA	NA	

Created 11/04/2021

* 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)

Table 8. Seed Treatments Used on Varieties in Official Variety Trials in 2021

Description	Years in Trial	Years ** Comm.	Fungicide Seed Treatment (Damping Off)	(Rhizoctonia)	(Aphanomyces)	Insecticide (Springtails & Maggots)	Priming (Emergence)
ACSC Commercial							
BTS 8629	6	4	Allegiance Thiram	Vibrance	Tach 35	Poncho Beta	Ultipro
BTS 8882	4	2	Allegiance Thiram	Vibrance	Tach 35	Poncho Beta	Ultipro
BTS 8927	3	1	Allegiance Thiram	Vibrance	Tach 35	Poncho Beta	Ultipro
BTS 8938	3	1	Allegiance Thiram	Vibrance	Tach 35	Poncho Beta	Ultipro
BTS 8961	3	1	Allegiance Thiram	Vibrance	Tach 35	Poncho Beta	Ultipro
Crystal 572	7	5	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
Crystal 684	6	3	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
Crystal 793	5	3	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
Crystal 796	5	2	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
Crystal 803	4	1	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
Crystal 804	4	1	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
Crystal 913	3	1	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
Hilleshög HIL2317	3	1	Apron XL Maxim	Vibrance	Tach 20	Cruiser Maxx	XBEET
Hilleshög HIL9528	8	6	Apron XL Maxim	Vibrance	Tach 20	Cruiser Maxx	XBEET
Hilleshög HIL9708	7	4	Apron XL Maxim	Vibrance	Tach 20	Cruiser Maxx	XBEET
Hilleshög HIL9920	5	3	Apron XL Maxim	Vibrance	Tach 20	Cruiser Maxx	XBEET
Maribo MA504	7	5	Apron XL Maxim	Vibrance	Tach 20	Cruiser Maxx	XBEET
Maribo MA717	5	3	Apron XL Maxim	Vibrance	Tach 20	Cruiser Maxx	XBEET
Maribo MA902	3	1	Apron XL Maxim	Vibrance	Tach 20	Cruiser Maxx	XBEET
SV 265	6	4	Apron XL Thiram	Metlock/Rizolex/Zeltera	Int Sol	Nipsit	XBEET
SV 268	6	4	Apron XL Thiram	Metlock/Rizolex/Zeltera	Int Sol	Nipsit	XBEET
SV 285	4	1	Apron XL Thiram	Metlock/Rizolex/Zeltera	Int Sol	Nipsit	XBEET
SV 375	5	2	Apron XL Thiram	Metlock/Rizolex/Zeltera	Int Sol	Nipsit	XBEET
SX 1888	4	2	Apron XL Thiram	Zeltera	Int Sol	Nipsit	XBEET
SX 1898	3	1	Apron XL Thiram	Zeltera	Int Sol	Nipsit	XBEET
Crystal 355RR(Check)	9	6	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
BTS 8572 (Check)	7	5	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	Ultipro
BTS 8337 (Check)	9	7	Allegiance Thiram	Systiva	Tach 35	Poncho Beta	Ultipro
Crystal 578RR (Check)	7	4	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
AP CHK MOD SUS RR#5	6	4	Allegiance Thiram	Systiva	Tach 35	Poncho Beta	Ultipro
AP CHK MOD RR#4	10	8	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
Root Aphid Susc Chk#5	8	6	Apron XL Maxim	Vibrance	Tach 20	Cruiser Maxx	XBEET
ACSC Experimental							
BTS 8018	2	NC	Allegiance Thiram	Vibrance	Tach 35	Poncho Beta	Ultipro
BTS 8034	2	NC	Allegiance Thiram	Vibrance	Tach 35	Poncho Beta	Ultipro
BTS 8073	2	NC	Allegiance Thiram	Vibrance	Tach 35	Poncho Beta	Ultipro
BTS 8092	2	NC	Allegiance Thiram	Vibrance	Tach 35	Poncho Beta	Ultipro
BTS 8100	1	NC	Allegiance Thiram	Vibrance	Tach 35	Poncho Beta	Ultipro
BTS 8122	1	NC	Allegiance Thiram	Vibrance	Tach 35	Poncho Beta	Ultipro
BTS 8133	1	NC	Allegiance Thiram	Vibrance	Tach 35	Poncho Beta	Ultipro
BTS 8140	1	NC	Allegiance Thiram	Vibrance	Tach 35	Poncho Beta	Ultipro
BTS 8156	1	NC	Allegiance Thiram	Vibrance	Tach 35	Poncho Beta	Ultipro
BTS 8164	1	NC	Allegiance Thiram	Vibrance	Tach 35	Poncho Beta	Ultipro
BTS 8187	1	NC	Allegiance Thiram	Vibrance	Tach 35	Poncho Beta	Ultipro
Crystal 021	2	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
Crystal 022	2	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
Crystal 025	2	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
Crystal 026	2	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
Crystal 029	2	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
Crystal 130	1	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
Crystal 132	1	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
Crystal 134	1	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
Crystal 137	1	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
Crystal 138	1	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
Crystal 912	3	NC	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
Hilleshög HIL2320	3	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEET
Hilleshög HIL2366	2	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEET
Hilleshög HIL2367	2	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEET
Hilleshög HIL2368	2	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEET
Hilleshög HIL2385	1	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEET
Hilleshög HIL2386	1	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEET
Hilleshög HIL2387	1	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEET
Hilleshög HIL2388	1	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEET
Hilleshög HIL2389	1	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEET
Maribo MA930	1	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEET
Maribo MA931	1	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEET
Maribo MA932	1	NC	Apron XL Maxim	Vibrance	Tach 45	Cruiser Maxx	XBEET
SV 203	2	NC	Apron XL Thiram	Zeltera	Int Sol	NipsIt	XBEET
SV 211	1	NC	Apron XL Thiram	Zeltera	Int Sol	NipsIt	XBEET
SV 213	1	NC	Apron XL Thiram	Zeltera	Int Sol	NipsIt	XBEET
SV 214	1	NC	Apron XL Thiram	Zeltera	Int Sol	NipsIt	XBEET
SV 215	1	NC	Apron XL Thiram	Zeltera	Int Sol	NipsIt	XBEET
SX 1804	2	NC	Apron XL Thiram	Metlock/Rizolex/Kabina	Tach 20	NipsIt	XBEET
SX 1815	1	NC	Apron XL Thiram	Metlock/Rizolex/Kabina	Tach 20	NipsIt	XBEET
SX 1816	1	NC	Apron XL Thiram	Metlock/Rizolex/Kabina	Tach 20	NipsIt	XBEET
SX 1817	1	NC	Apron XL Thiram	Metlock/Rizolex/Kabina	Tach 20	NipsIt	XBEET
SX 1818	1	NC	Apron XL Thiram	Metlock/Rizolex/Kabina	Tach 20	NipsIt	XBEET
SX 1819	1	NC	Apron XL Thiram	Metlock/Rizolex/Kabina	Tach 20	NipsIt	XBEET
Crystal 355RR(Check)	9	6	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
BTS 8572 (Check)	7	5	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	Ultipro
BTS 8337 (Check)	9	7	Allegiance Thiram	Systiva	Tach 35	Poncho Beta	Ultipro
Crystal 578RR (Check)	7	4	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
BTS 8815 (Check)	4	2	Allegiance Thiram	Systiva	Tach 35	Poncho Beta	Ultipro
AP CHK MOD SUS RR#5	6	4	Allegiance Thiram	Systiva	Tach 35	Poncho Beta	Ultipro
AP CHK MOD RR#4	10	8	Allegiance Thiram	Kabina	Tach 45	Poncho Beta	XBEET
Root Aphid Susc Chk#5	8	6	Apron XL Maxim	Vibrance	Tach 20	Cruiser Maxx	XBEET
AP CHK MOD SUS RR#5	6	4	Allegiance Thiram	Systiva	Tach 35	Poncho Beta	Ultipro

Created 11/11/2021