

2021 Soybean Field Crop Trials Results

Minnesota Agricultural Experiment Station and the College of Food, Agricultural and Natural Resource Sciences

Each year Minnesota Agricultural Experiment Station scientists conduct performance tests of appropriately adapted public and private soybean entries. Companies are charged a fee for each entry they enter to partially cover the costs of conducting these tests. One of the stipulations of the testing program is that the company is marketing or intends to begin marketing the entry in the next growing season. This information is also available electronically at www.soybeans.umn.edu and varietytrials.umn.edu/soybean.

The 2021 season was abnormally dry across much of the state, especially in the northwestern part of the state. There were scattered and timely precipitation events that greatly helped the crop. Overall, yields in the trials were higher than expected based on localized timely rainfall and strong performance from today's elite varieties. The locations that experienced the worst yield reductions included Crookston and Rosemount. Another casualty of the dry year was lack of iron deficiency chlorosis in our dedicated nurseries. We observed very little pressure and therefore have few results to report.

The 2021 Variety Trials were generally planted and harvested on time. Data was collected from all locations except from Thief River Falls where the ground was too wet for harvest in the fall.

Tables 1 to 4 provide results from

tests of available conventional, special purpose, and transgenic entries adapted to the far northern, northern, central, and southern production zones. The map shows test locations and zone boundaries. All of these tests were planted between May 5 and May 29 at planting rates of 174,000 seeds/acre.

Location	2021 Planting Date
Becker	May 5
Crookston	May 18
Danvers	May 12
Fairfax	May 16
Glyndon	May 18
Lamberton	May 15
Moorhead	May 21
Roseau	May 29
Rosemount	May 19
Rosemount SCN	May 26
Shelly	May 22
Waseca	May 10
Waseca SCN	May 11
Westbrook	May 16

Herbicides were used as necessary for good weed control. Row spacings were 24 inches at Crookston and 30 inches at all other locations. Plots were machine harvested using a small plot combine.

Tables 5 to 10 provide characteristics and performance data from special-purpose soybean entry tests. These tests were conducted to provide reliable data for growers who are interested in producing special-purpose soybeans, which are typically grown under contract.

Table 11 provides important characteristics of publicly developed



entries in the 2021 tests as well as those for which seed is available.

Tables 12 to 14 provide results from the performance tests of soybean cyst nematode (SCN) resistant entries in infested field sites near Danvers, Fairfax, Lamberton, Rosemount, and Waseca. SCN pressure should be gauged by comparing a susceptible check to resistant varieties within that same range of maturity (+/- 5 days). This year not enough varieties were entered into the Northern SCN Tests to justify a separate test. The few varieties entered into this test were merged into the general test displayed in Table 2.

Tables 15 displays results from greenhouse tests conducted by the Nematology Laboratory at the University of Minnesota Southern Research and Outreach Center in Waseca, MN. Plants were grown in soil inoculated with an HG type 7

(race 6) population of soybean cyst nematode in 2021.

To better understand and use the data provided in these tables, please carefully read the following additional information.

Seed Treatments and Transgenic Traits

Entrants were allowed to enter treated seed in 2021. The type of seed treatment, as provided by the originator, is designated as follows:

AC = Acceleron
 AMS = Agrishield Max + Saltro
 CM = Cruiser Maxx + Ileva
 CMVC = Cruiser Maxx + Vibrance + Clariva pn
 MA = Maximum ArmourGuard
 Met/Azo = Metalaxyl/Azoxystrobin
 OPVI = Obvious Plus,
 Poncho/Votivo+ ILeVO
 LI = Lumigen+Ileva
 PS = Peterson Select
 FVM = Fortenza Vibrance Maxx

Research indicates that under some conditions seed treatments can affect the final yield. The exact situations are not always clear but when comparing entries note if a seed treatment was used on the seed being tested.

In some tables the transgenic trait is indicated in a separate column using the following designations:

CV = conventional variety (non-transgenic)
 E3 = Enlist E3 (glyphosate, glufosinate and 2,4-D tolerant)
 LL = LibertyLink (glufosinate tolerant)
 GT = glyphosate tolerant
 R2 = Roundup Ready 2 Yield (glyphosate tolerant)
 R2-Xt = glyphosate and dicamba tolerant
 XF = Xtendflex (dicamba, glyphosate and glufosinate tolerant)
 LLGT27 = glyphosate, glufosinate,

and HPPD/Group 27 herbicide tolerant

GT27 = glyphosate and HPPD/Group 27 tolerant

Relative Maturity and Calendar Dates of Maturity

Soybeans are photoperiod sensitive; that is, they respond to changing day length. The actual calendar date of maturity achievement is affected by latitude. Each entry has a narrow range (about 100 miles) of north-south adaptation. Soybean yield and quality are best achieved when physiological maturity occurs before a hard frost. Maturity is determined visually by noting the calendar date when 95 percent of the pods show their genetically programmed mature color. The dates for 2021 are provided in the tables under the column heading "Maturity Date". Harvest dates are typically 7 to 14 days later depending upon drying conditions. Almost all entries were essentially mature before a hard frost.

Relative maturity ratings are also provided for each entry. These ratings consist of a number for the maturity group designations (000, 00, 0, 1, 2) followed by a decimal and another number, ranging from 0-9, which indicates a ranking within each maturity group. For example, the entry MN0101 indicates a 0.1, making it an early group 0, while MN0901, with a 0.9 rating, is the latest group 0. The values for public entries are developed after observing them for several years in many locations. Relative maturity ratings for private entries in these tables were provided by their originators and were developed in a similar manner.

Yield

Because maturity is a very important attribute, entries are ordered in the tables according to their actual 2021 calendar date of maturity.

Later maturing entries usually can

be expected to have higher yields than earlier maturing types. If you wish to compare yields, do so only between entries with similar calendar dates of maturity, usually within 3 to 5 days. More reliable comparisons can be made using yields from several consecutive years. All yield determinations were made from replicated tests harvested with a plot combine. Multi-location data are necessary for determining true differences between varieties, and therefore only multi-location averages are reported.

The yield information is presented as a percent of the mean of the test. The actual mean value is given at the bottom of each table. Values over 100 indicate the entry had a yield greater than the mean while those less than 100 have a yield less than the mean.

LSD values associated with data in these tables are measures of variability within the trials. The LSD numbers beneath the yield columns indicate whether the difference between yields is due to genetics or other factors, such as environmental variation and measurement error. If yield differences between two entries equals or exceeds the LSD value, the higher-yielding entry probably was superior in yield. A difference less than the LSD value is probably due to environmental and/or measurement factors. The LSD values are given on the percent of mean data, not the actual yields. A 25% level of significance is used in all tables contained in this report. This means that there is a 25% probability that yield differences exceeding the stated LSD are not true yield differences.

Chlorosis

Iron deficiency chlorosis (IDC) is a yield-limiting condition of soybeans grown in alkaline soils with high calcium carbonate or calcium sulfate ions present, making iron unavailable and causing soybean plants to turn yellow. This yellowing is visually

scored on a 1 to 5 scale, where 1 indicates no yellowing and 5 indicates severe yellowing and necrosis that may even include death of the plant.

Research has shown that for every unit increase in chlorosis, a 20% reduction in yield may occur. For example, a plot rated as a 3 may yield 20% less than a plot given a rating of 2. All IDC ratings in tables are from tests conducted on high lime (high pH) soils near Danvers and Graceville, MN in 2021. **Limited IDC pressure in 2021 prevented us from obtaining reliable scores and therefore results are not available for most trials.**

Comparing chlorosis scores of entries allows you to estimate how well they perform relative to each other. Actual chlorosis ratings can vary depending on the specific site, year of test, and location in the field. Because of this high level of variability, it is usually very difficult to identify the best performing entries. Varieties should be compared for IDC ratings relative to one another within a single trial only and not across trials. Producers with a known history of IDC problems should at least avoid entries with the most severe (4 or 5) IDC ratings. Different organizations may use different scales or descriptions. The below table provides some general rules for a trial with moderate stress able to produce ratings ranging from 1 to 5.

Numerical Score	Rating
1 to 2	Tolerant (T)
2.1 to 3	Moderately Tolerant (MT)
3.1 to 4	Moderately Susceptible (MS)
4.1 to 5	Susceptible (S)

Protein and Oil

Protein and oil values were determined from mature seed using near infrared reflectance spectroscopy. **The tabled values are for the 2021 season only.** Protein and oil results are presented on a percent of the mean for each test.

The actual mean values, expressed on a 13% moisture basis, are given at the bottom of each table. Values over 100 indicate the protein and/or oil contents of the entry are greater than the mean value while those less than 100 have protein and/or oil contents less than the mean. Absolute values of protein and oil can vary from year to year. The following formula is used to adjust the protein and oil values to another moisture basis.

100-desired moisture \times protein or oil value
87 given in the table

The value of a bushel of soybeans (APV) based on its oil and protein content can be calculated by:

$$APV = 60 [Po (X) + Pm (Y)] .44$$

Where:

APV = Approximate value of a bushel of soybeans
 Po = soybean oil price (in \$ per pound)
 Pm = price of 44% meal (in \$ per pound)*
 X = oil content at 13% moisture (in decimals)
 Y = protein content at 13% moisture (in decimals)

And:

$$\frac{\text{*price of meal \$ / ton}}{2,000} = \$ / \text{pound}$$

The value of an acre of soybeans can be calculated by multiplying the APV by the yield in bushels per acre.

Phytophthora

Phytophthora root rot is a soil-borne disease that occurs in heavy wet soils. Infection generally occurs during germination. Phytophthora root rot can cause significant yield reductions if susceptible varieties are planted in poorly drained, infested fields. Variety selection is the best defense against this yield reducing pathogen. There are many known pathotypes (races) of this fungus, and therefore it is important to know which are present in a particular field. Genes can be incorporated into varieties to provide resistance to races present in a field. Soybean

varieties that have specific resistance genes (or gene) provide some level of protection, but race-specific resistance genes do not guarantee protection against infection and yield loss because so many different races exist. Research indicates that *Rps3a* and *Rps6* provide the broadest protection to Phytophthora races currently present in soybean fields in the Midwest.

Some published information refers to Phytophthora “tolerance” or “field resistance”, which is not race-specific and should not be confused with race-specific resistance. It is possible that a certain level of field tolerance can provide yield protection even when the race-specific genes are not effective. Reliable tests for tolerance have not yet been fully developed.

Tables included in this report indicate which race-specific Phytophthora gene or genes is/are present in each entry. This information was provided by the originator. A “S” indicates a variety is expected to be susceptible to all races. A “--” indicates that a Phytophthora gene was not specified by the originator.

Soybean Cyst Nematode

Soybean Cyst Nematode (SCN) is a microscopic round worm that infects and reproduces in soybean roots. It was first identified in Minnesota in 1978 and is now known to occur in most Minnesota counties where soybeans are grown. Both the area of infestation and number of nematodes per unit of soil appear to be increasing. Several races of this pest are known to occur in Minnesota. When SCN numbers are high (> than 5,000 eggs/100 cc soil), significant yield losses can occur. Rotations to non-host crops and planting of resistant varieties can assist in reducing nematode populations as well as reducing the SCN’s impact on yield.

Yield performance results of susceptible (S), moderately susceptible

(MS), moderately resistant (MR) and resistant (R) entries planted in infested fields in northern, central and southern Minnesota are provided in Tables 12 to 14. The source for SCN resistance for each entry was provided by the originator. In Table 15 the resistance ratings were given based on a greenhouse bioassay with five replicates using an HG Type 7 (Race 6) SCN population. Each container (one plant) was inoculated with 4000 SCN eggs. After 30 days a female index (FI) was calculated for each entry using Lee 74 as the susceptible check. $FI = (\# \text{ of cysts on entry} / \# \text{ of cysts on Lee 74}) \times 100$. If the FI was < 10%, an entry was considered R. If the FI was 10 – 30%, it was considered MR. If the FI was 10-60%, it was considered MS, and greater than 60% S. These are fairly arbitrary cutoffs, and thus it is important to look at the actual FI values to judge the level of resistance. Comparison to varieties known to have a good level of resistance is also advisable.

For proper management of fields with SCN, it is recommended that entries with an R rating be planted. If the SCN population numbers are relatively low (<1500 eggs/100 cm³) an entry with an MR rating might be considered. Entries with S and MS ratings should not be considered for planting in fields where SCN is present at levels greater than 200 eggs/100 cm³. Some entries are rated as tolerant, however no data from the northern United States has verified the usefulness of tolerant entries in maintaining yield and reducing SCN numbers.

Management information is available from the website www.soybeans.umn.edu or from the Minnesota Soybean Research and Promotion Council,

151 St. Andrews Court, Suite 710, Mankato, MN 56001, 1-888-896-9678, www.mnsoybean.org.

White Mold

White mold, also known as Sclerotinia stem rot, develops in infested fields when high relative humidity and moderate temperatures occur during soybean flowering. Planting less susceptible entries in wider row spacings or at lower populations is the most effective method of reducing the severity of white mold. Accurate ratings for resistance to white mold are difficult to obtain because both infection and disease development are dependent on weather conditions. Because of this variability, performance can change significantly among locations and years depending on the interaction of plant development, precipitation, relative humidity, and temperature. White mold severity also tends to be greater if lodging occurs. Growers concerned about performance in the presence of white mold should select varieties that show consistently less white mold during several years of testing

Brown Stem Rot

Brown stem rot (BSR) is a fungal disease that can cause yield losses in certain situations. The disease occurs most frequently when soybeans follow soybeans but can occur where soybeans are planted every other year. Resistant entries, or longer rotations, assist in the management of this disease. MN0304, MN0902CN, MN1302, Freeborn, and IA2008R are available public varieties with resistance to BSR. Some information refers to “tolerance” or “field resistance.” Reliable tests for tolerance or field resistance have not yet been

developed.

Special-Purpose Entries

There continues to be interest in producing soybeans with special characteristics important to specialty food product manufacturers, such as tofu, natto, miso, and soy milk. Soybean scientists previously developed some of these special-purpose entries, which were general releases, but more recently entries have been released under exclusive or nonexclusive licenses to specific companies who then contract with growers for production. For further information, contact Minnesota Crop Improvement Association at website www.mncia@tc.umn.edu or telephone number 612-625-7766

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Test plot establishment and management are supervised by Michael Leiseth, Gerald Holz, Tom Hoverstad, Steve Quiring, Curtis Reese, and Donn Vellekson.

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Names and email addresses of seed company representatives that entered varieties into the 2021 trials.

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Table 1. Performance and characteristics of transgenic, conventional and special purpose soybean entries evaluated in the far northern zone. Trial was conducted in Crookston and Roseau.

Entry	Originator	Maturity Date	Yield % of Mean		% of Mean		Maturity Rating	Phyto. Gene	Chlorosis Score [†]	Seed Treatment	Trans. Trait
			2020	2021	Protein	Oil					
22XF006	Peterson Farms Seed	9/7	—	88	98	107	00.6	Rps1k	NA	PS	R2-Xt
21X007	Peterson Farms Seed	9/9	—	90	96	103	00.7	Rps1c	NA	PS	R2-Xt
XT20-07	Proseed	9/9	103	96	96	104	00.7	Rps1c	NA	CMVC	R2-Xt
Liska	Prograin	9/9	83	90	110	92	00.3	Rps1c	NA	Met/Azo	CV
22XF009	Peterson Farms Seed	9/9	—	100	96	104	00.9	Rps1k	NA	PS	R2-Xt
EL80-093N	Proseed	9/9	—	101	99	100	00.9	Rps1a	NA	CMVC	E3
Maya	Prograin	9/11	—	93	109	90	00.7	Rps1c	NA	Met/Azo	CV
19EN008	Peterson Farms Seed	9/11	—	100	93	102	00.8	S	NA	PS	E3
Hana	Prograin	9/11	99	100	108	95	0.1	S	NA	Met/Azo	CV
P00A75X	Pioneer	9/13	—	106	96	110	0.0	Rps1k	NA	None	R2-Xt
AG11XF2	Bayer Crop Science	9/24	—	122	98	97	1.1	Rps3a	NA	AC	R2-Xt
AG10XF1	Bayer Crop Science	9/25	—	115	102	97	1.0	Rps3a	NA	AC	R2-Xt
Mean		9/12	37 bu/a	35 bu/a	33%	19%					
LSD 25%		1d	7%	8%	2%	3%					

LSD numbers beneath yield columns indicate whether the difference between yield is due to genetics or other factors, such as variations in environment. If a yield difference between two entries equals or exceeds the LSD value, the higher yielding entry probably was superior in yield. A difference less than the LSD value is likely due to environmental factors.

— indicates “not specified.”

[†]NA indicates ratings could not be made this year because of lack of IDC pressure in the field.

Table 2. Performance and characteristics of transgenic, conventional and special purpose soybean entries evaluated in the northern zone. Trial was conducted in Crookston, Moorhead and Shelly.

Entry	Originator	Maturity Date	Yield % of Mean		% of Mean		Maturity Rating	Phyto. Gene	Chlorosis Score [†]	Seed Treatment	Trans. Trait
			2020	2021	Protein	Oil					
DSR-0119E	Dairyland Seed	9/04	—	90	96	107	0.1	Rps1c	NA	LI	E3
P07A18X	Pioneer	9/06	—	107	100	103	0.7	Rps1k	NA	None	R2-Xt
22XF03	Peterson Farms Seed	9/06	—	108	100	103	0.3	Rps1c	NA	PS	R2-Xt
2201E	P3 Genetics	9/07	—	94	99	103	0.1	Rps3a	NA	PS	E3
2106E	P3 Genetics	9/07	—	107	99	102	0.6	Rps3a	NA	PS	E3
Hana	Prograin	9/08	—	84	107	96	0.1	S	NA	Met/Azo	CV
P03A17X	Pioneer	9/08	—	102	99	109	0.3	Rps1c	NA	None	R2-Xt
EL90-33N	Proseed	9/08	—	101	99	101	0.3	S	NA	CMVC	E3
22XF06	Peterson Farms Seed	9/08	—	107	100	96	0.6	Rps1c	NA	PS	R2-Xt
DSR-0645E	Dairyland Seed	9/09	110	101	96	105	0.4	Rps3a	NA	LI	E3
XT80-20N	Proseed	9/09	105	99	97	101	0.2	Rps1c	NA	CMVC	R2-Xt
MK0249	Richland IFC, Inc.	9/10	—	91	98	102	0.2	S	NA	None	CV
21XF07	Peterson Farms Seed	9/10	—	98	100	99	0.7	Rps3a	NA	PS	R2-Xt
AG11XF2	Bayer Crop Science	9/11	—	99	99	98	1.1	Rps3a	NA	AC	R2-Xt
MK808CN	Richland IFC, Inc.	9/12	89	105	98	103	0.8	Rps1c	NA	None	CV
MK0508	Richland IFC, Inc.	9/12	86	107	99	95	0.8	S	NA	None	CV
Marula	Prograin	9/13	98	96	108	92	0.6	Rps1c	NA	Met/Azo	CV
MK0603	Richland IFC, Inc.	9/13	87	93	102	90	0.6	S	NA	None	CV
CZ 0661GTLL	Credenz Soybean Seed	9/15	—	93	100	103	0.6	Rps1k	NA	OPVI	LLGT27
DSR-0660E	Dairyland Seed	9/16	—	100	100	98	0.6	S	NA	LI	GT27
AG10XF1	Bayer Crop Science	9/16	—	114	102	98	1.0	Rps3a	NA	AC	R2-Xt
XO 0602E	Xitavo Soybean Seed	9/17	—	104	101	96	0.6	S	NA	OPVI	E3
Mean		9/10	42 bu/a	31 bu/a	33%	19%					
LSD 25%		NA^{††}	7%	7%	2%	2%					

LSD numbers beneath yield columns indicate whether the difference between yield is due to genetics or other factors, such as variations in environment. If a yield difference between two entries equals or exceeds the LSD value, the higher yielding entry probably was superior in yield. A difference less than the LSD value is likely due to environmental factors.

— indicates "not specified."

[†]NA indicates ratings could not be made this year because of lack of IDC pressure in the field.

^{††}LSD not estimable because of lack of replication. Maturity dates in this trial should be treated with caution because of lack of replication.

Table 3. Performance and characteristics of transgenic, conventional and special purpose soybean entries evaluated in the central zone. Trial was conducted in Becker, Danvers, and Rosemount.

Entry	Originator	Maturity Date	Yield % of Mean		% of Mean		Maturity Rating	Phyto. Gene	Chlorosis Score	Seed Treatment	Trans. Trait
			2020	2021	Protein	Oil					
MK1016	Richland IFC, Inc.	8/25	72	69	101	103	1.0	S	1.5	None	CV
O.1202N	Albert Lea Seed/Viking Seed	8/31		100	100	99	1.2	Rps1k	2.5	None	CV
MK9101	Richland IFC, Inc.	9/04		87	105	100	1.1	S	2.0	None	CV
DSR-1450E	Dairyland Seed	9/04		101	100	94	1.4	S	2.5	LI	E3
MK41	Richland IFC, Inc.	9/05	92	81	106	93	1.1	S	2.0	None	CV
MK0508	Richland IFC, Inc.	9/06	88	69	99	97	0.8	S	1.8	None	CV
MK808CN	Richland IFC, Inc.	9/07	99	88	99	103	0.8	Rps1c	2.3	None	CV
Marula	Prograin	9/07	92	84	105	98	0.6	Rps1c	1.5	Met/Azo	CV
MK0603	Richland IFC, Inc.	9/07	82	61	101	94	0.6	S	1.0	None	CV
2207E	P3 Genetics	9/07		85	99	99	0.7	S	2.8	PS	E3
2108E	P3 Genetics	9/08		109	101	100	0.8	Rps3a+Rps1c	1.5	PS	E3
AG11XF2	Bayer Crop Science	9/08		96	100	100	1.1	Rps3a	1.8	AC	R2-Xt
P07A18X	Pioneer	9/08		91	100	105	0.7	Rps1k	1.5	None	R2-Xt
Asana	Prograin	9/09		82	102	101	0.6	Rps1c	2.8	Met/Azo	CV
DSR-1010E	Dairyland Seed	9/10		94	105	95	1.0	S	1.5	LI	E3
P11T55E	Pioneer	9/10		106	100	101	1.1	-	1.5	None	E3
XO 0731E	Xitavo Soybean Seed	9/10	106	103	100	101	0.7	Rps1c+Rps3a	3.0	OPVI	E3
0821N	Albert Lea Seed/Viking Seed	9/11	123	117	100	98	0.8	S	1.8	None	CV
CZ 1171GTLL	Credenz Soybean Seed	9/11		96	99	100	1.1	Rps1c	2.5	OPVI	LLGT27
DSR-1290E	Dairyland Seed	9/12		104	96	107	1.2	S	2.8	LI	E3
P09T24E	Pioneer	9/12		105	101	99	0.9	-	2.3	None	R2-Xt
22XF10	Peterson Farms Seed	9/13		101	97	103	1.0	Rps3a	1.5	PS	R2-Xt
1218N	Albert Lea Seed/Viking Seed	9/14	112	110	102	100	1.2	Rps3a	3.0	None	CV
Atena	Prograin	9/14	84	95	104	99	1.2	Rps3a+Rps1c	2.5	Met/Azo	CV
P13T61E	Pioneer	9/14		98	99	94	1.3	Rps1c	3.3	None	E3
Virtue V1621	GDM Seeds	9/15		100	99	98	1.6	Rps1c	2.8	CMVC	CV
2212E	P3 Genetics	9/15		100	101	101	1.2	Rps1c	2.8	PS	E3
MK146	Richland IFC, Inc.	9/16		89	103	99	1.1	S	2.3	None	CV
XO 1372E	Xitavo Soybean Seed	9/16		113	93	105	1.3	S	1.5	OPVI	E3
AG10XF1	Bayer Crop Science	9/16		112	100	100	1.0	Rps3a	2.0	AC	R2-Xt
1518N	Albert Lea Seed/Viking Seed	9/18	100	91	100	96	1.5	S	2.3	None	CV
CZ 1331GTLL	Credenz Soybean Seed	9/18		111	99	101	1.3	Rps1k	1.8	OPVI	LLGT27
XO 1632E	Xitavo Soybean Seed	9/18		112	99	100	1.6	Rps3a	2.5	OPVI	E3
AG14XF2	Bayer Crop Science	9/18		118	101	101	1.4	Rps1c	1.3	AC	R2-Xt
AgriGold G1720XF	AgriGold	9/18		94	97	103	1.7	Rps1c	2.8	AMS	R2-Xt
AG17XF2	Bayer Crop Science	9/19		112	98	99	1.7	Rps3a	2.5	AC	R2-Xt
DSR-2040E	Dairyland Seed	9/19		107	95	104	2.0	Rps1k	3.3	LI	E3
DSR-1707E	Dairyland Seed	9/20		109	99	105	1.7	Rps1k	2.3	LI	E3
DSR-1820E	Dairyland Seed	9/20		106	99	102	1.8	Rps1k	2.3	LI	E3
O.1718N	Albert Lea Seed/Viking Seed	9/21		112	99	101	1.7	Rps1k	2.0	None	CV
XO 1212E	Xitavo Soybean Seed	9/21		116	101	99	1.2	Rps1c	2.0	OPVI	E3
AG18XF1	Bayer Crop Science	9/21		114	97	100	1.8	S	2.0	AC	R2-Xt
XO 1822E	Xitavo Soybean Seed	9/21		112	99	99	1.8	Rps3a	2.8	OPVI	E3
V1821	Albert Lea Seed/Viking Seed	9/23		117	99	98	1.8	Rps1c	1.0	None	CV
XO 1971E	Xitavo Soybean Seed	9/23	92	113	98	97	1.9	S	3.0	OPVI	E3
P18A33X	Pioneer	9/23		112	97	105	1.8	Rps1k	1.8	None	R2-Xt
XO 1761E	Xitavo Soybean Seed	9/23	109	108	98	103	1.7	Rps1k	2.3	OPVI	E3
MK373	Richland IFC, Inc.	9/25		74	102	99	2.0	S	2.3	None	CV
DSR-2424E	Dairyland Seed	9/25		106	101	99	2.4	Rps1k	1.5	LI	E3
AG21XF0	Bayer Crop Science	9/25		110	103	102	2.1	Rps1c	2.5	AC	R2-Xt
Mean		9/14	60 bu/a	49 bu/a	34%	19%			2.2		
LSD 25%		2d	9%	8%	2%	3%					

LSD numbers beneath yield columns indicate whether the difference between yield is due to genetics or other factors, such as variations in environment. If a yield difference between two entries equals or exceeds the LSD value, the higher yielding entry probably was superior in yield. A difference less than the LSD value is likely due to environmental factors.

— indicates “not specified.”

Table 4. Performance and characteristics of transgenic, conventional and special purpose soybean entries evaluated in the southern zone. Trial was conducted in Waseca, Lamberton and Westbrook.

Entry	Originator	Maturity Date	Yield % of Mean		% of Mean		Maturity Rating	Phyto. Gene	Chlorosis Score [†]	Seed Treatment	Trans. Trait
			2020	2021	Protein	Oil					
MK41	Richland IFC, Inc.	9/09	94	77	108	93	1.1	S	NA	None	CV
MK9101	Richland IFC, Inc.	9/12		76	110	91	1.1	S	NA	None	CV
159RXT	Anderson Seeds	9/13	101	105	101	96	1.5	Rps1c	NA	None	R2-Xt
AG14XF2	Bayer Crop Science	9/14		105	98	105	1.4	Rps1c	NA	AC	R2-Xt
MK146	Richland IFC, Inc.	9/15	92	81	105	98	1.1	S	NA	None	CV
XO 1372E	Xitavo Soybean Seed	9/16		98	97	104	1.3	S	NA	OPVI	E3
A151E3	Anderson Seeds	9/17		104	99	100	1.5	Rps3a	NA	None	E3
AG17XF2	Bayer Crop Science	9/18		97	100	102	1.7	Rps3a	NA	AC	R2-Xt
A180E3	Anderson Seeds	9/18	98	105	98	103	1.8	Rps1k	NA	None	E3
XO 1632E	Xitavo Soybean Seed	9/18		106	99	103	1.6	Rps3a	NA	OPVI	E3
AgriGold G1720XF	AgriGold	9/19		105	100	97	1.7	Rps1c	NA	AMS	R2-Xt
DSR-1820E	Dairyland Seed	9/19		98	100	100	1.8	Rps1k	NA	LI	E3
O.e1993N	Albert Lea Seed/Viking Seed	9/19		98	98	98	1.9	Rps1k	NA	None	CV
P18A33X	Pioneer	9/19		115	96	109	1.8	Rps1k	NA	None	R2-Xt
DSR-2040E	Dairyland Seed	9/20		102	94	105	2.0	Rps1k	NA	LI	E3
XO 1761E	Xitavo Soybean Seed	9/20	98	101	99	99	1.7	Rps1k	NA	OPVI	E3
AG18XF1	Bayer Crop Science	9/21		107	98	97	1.8	S	NA	AC	R2-Xt
AG22XF2	Bayer Crop Science	9/21		102	101	99	2.2	Rps1c	NA	AC	R2-Xt
Virtue V1821	GDM Seeds	9/21		102	100	99	1.8	Rps1c	NA	CMVC	CV
DSR-1707E	Dairyland Seed	9/21		105	99	104	1.7	Rps1k	NA	LI	E3
XO 1822E	Xitavo Soybean Seed	9/21		103	102	98	1.8	Rps3a	NA	OPVI	E3
1940KN	Albert Lea Seed/Viking Seed	9/23	97	100	94	105	1.9	S	NA	None	CV
A1821XF	Anderson Seeds	9/23		105	98	98	1.8	S	NA	None	XF
2418N	Albert Lea Seed/Viking Seed	9/24	106	116	101	97	2.4	Rps1c	NA	None	CV
O.1718N	Albert Lea Seed/Viking Seed	9/24		102	99	99	1.7	Rps1k	NA	None	CV
A200E3	Anderson Seeds	9/24	114	114	96	104	2.0	Rps1k	NA	None	E3
217RXT	Anderson Seeds	9/25	108	112	102	99	2.0	Rps1c	NA	None	R2-Xt
XO 1971E	Xitavo Soybean Seed	9/25	106	99	100	99	1.9	S	NA	OPVI	E3
XO 2181E	Xitavo Soybean Seed	9/25	103	100	98	104	2.1	Rps1k	NA	OPVI	E3
AG21XF0	Bayer Crop Science	9/26		92	105	101	2.1	Rps1c	NA	AC	R2-Xt
O.2244AT	Albert Lea Seed/Viking Seed	9/26	101	99	102	99	2.2	S	NA	None	CV
2340KN	Albert Lea Seed/Viking Seed	9/27	103	100	98	103	2.3	Rps1k	NA	None	CV
PA23A15X	Pioneer	9/27		100	98	100	2.3	Rps1c	NA	None	R2-Xt
DSR-2424E	Dairyland Seed	9/28	102	98	100	99	2.4	Rps1k	NA	LI	E3
A2121XF	Anderson Seeds	9/28		107	105	100	2.0	Rps3a	NA	None	XF
2155N	Albert Lea Seed/Viking Seed	9/29	102	107	101	97	2.1	S	NA	None	CV
MK373	Richland IFC, Inc.	9/29		69	104	93	2.0	S	NA	None	CV
P24T35E	Pioneer	9/29		91	98	100	2.4	Rps1k	NA	None	E3
CZ 2121GTLL	Credezn Soybean Seed	9/29		96	98	102	2.1	S	NA	OPVI	LLGT27
Mean		9/21	76 bu/a	65 bu/a	34%	19%					
LSD 25%		2d	4%	3%	2%	3%					

LSD numbers beneath yield columns indicate whether the difference between yield is due to genetics or other factors, such as variations in environment. If a yield difference between two entries equals or exceeds the LSD value, the higher yielding entry probably was superior in yield. A difference less than the LSD value is likely due to environmental factors.

— indicates “not specified.”

[†]NA indicates ratings could not be made this year because of lack of IDC pressure in the field.

Table 5. Characteristics of special purpose soybean entries evaluated in the northern zone. Trial was conducted in Crookston, Moorhead, Shelly and Glydon.

Entry	Originator	Maturity Date	Special Characteristics	Hilum Color	Phyto. Gene	Seeds/lb	Trans. Trait
MN0083	Minnesota AES	8/31	General purpose	Yellow	Rps6	4,095	CV
M10-159-1007	Minnesota AES	8/31	Natto	Yellow	Rps1a	6,402	CV
M11-320-1018	Minnesota AES	8/31	Natto	Yellow	Rps1k	5,903	CV
M08-450148	Minnesota AES	9/07	Natto	Yellow	S	5,165	CV
ND Stutsman	No Dakota AES	9/09	General purpose	Yellow	Rps1c	3,247	CV
Panorama	Sevita International	9/10	Tofu	Yellow	S	3,051	CV
MN0303SP	Minnesota AES	9/10	Natto	Yellow	Rps1a	6,887	CV
M10-159-4011	Minnesota AES	9/10	Natto	Yellow	Rps1c	6,887	CV
M13-171089	Minnesota AES	9/13	Natto	Yellow	Rps1c	6,227	CV
Astor	Sevita International	9/14	Tofu	Yellow	S	2,539	CV
MN0205SP	Minnesota AES	9/14	Natto	Yellow	S	5,225	CV
M03-238028	Minnesota AES	9/14	Natto	Yellow	Rps1a	6,684	CV
M06-260048	Minnesota AES	9/14	Natto	Yellow	Rps1a	6,494	CV
M10-159-4007	Minnesota AES	9/14	Natto	Yellow	Rps1a	5,754	CV
M12-395086	Minnesota AES	9/14	Tofu	Yellow	S	2,261	CV
MN1012SP	Minnesota AES	9/15	Natto	Yellow	Rps1a	5,903	CV
M07-257020	Minnesota AES	9/15	Natto, SCN	Yellow	S	4,288	CV
M10-159-2022	Minnesota AES	9/15	Natto	Yellow	Rps1a	6,402	CV

Table 6. Performance and characteristics of special purpose soybean entries evaluated in the northern zone. Trial was conducted in Crookston, Moorhead, Shelly and Glydon.

Entry	Originator	Maturity Date	% of Mean			Chlorosis Score [†]
			Yield	Protein	Oil	
MN0083	Minnesota AES	8/31	97	101	104	NA
M10-159-1007	Minnesota AES	8/31	100	105	102	NA
M11-320-1018	Minnesota AES	8/31	93	99	102	NA
M08-450148	Minnesota AES	9/07	112	98	103	NA
ND Stutsman	No Dakota AES	9/09	136	96	104	NA
Panorama	Sevita International	9/10	98	104	93	NA
MN0303SP	Minnesota AES	9/10	92	99	100	NA
M10-159-4011	Minnesota AES	9/10	108	99	98	NA
M13-171089	Minnesota AES	9/13	96	98	100	NA
Astor	Sevita International	9/14	83	108	98	NA
MN0205SP	Minnesota AES	9/14	82	100	100	NA
M03-238028	Minnesota AES	9/14	102	101	102	NA
M06-260048	Minnesota AES	9/14	91	97	104	NA
M10-159-4007	Minnesota AES	9/14	89	97	104	NA
M12-395086	Minnesota AES	9/14	103	107	96	NA
MN1012SP	Minnesota AES	9/15	98	96	96	NA
M07-257020	Minnesota AES	9/15	103	101	95	NA
M10-159-2022	Minnesota AES	9/15	117	94	101	NA
Mean		9/10	29 bu/a	34%	19%	
LSD 25%		3d	6%	2%	2%	

LSD numbers beneath yield columns indicate whether the difference between yield is due to genetics or other factors, such as variations in environment.

If a yield difference between two entries equals or exceeds the LSD value, the higher yielding entry probably was superior in yield.

A difference less than the LSD value is likely due to environmental factors.

[†]NA indicates ratings could not be made this year because of lack of IDC pressure in the field.

Table 7. Characteristics of special purpose soybean entries evaluated in the central zone. Trial was conducted in Danvers and Rosemount.

Entry	Originator	Maturity Date	Special Characteristics	Hilum Color	Phyto. Gene	Seeds/lb	Trans. Trait
M08-450148	Minnesota AES	8/26	Natto	Yellow	S	4,545	CV
M03-238028	Minnesota AES	8/30	Natto	Yellow	Rps1a	5,981	CV
M13-172108	Minnesota AES	8/30	Natto	Yellow	S	4,785	CV
M10-159-4007	Minnesota AES	8/31	Natto	Yellow	Rps1a	5,612	CV
MN1012SP	Minnesota AES	9/04	Natto	Yellow	Rps1a	5,754	CV
MN0811CN	Minnesota AES	9/05	SCN, General purpose	Black	Rps1k	3,318	CV
MN0810CN	Minnesota AES	9/06	SCN, General purpose	Yellow	S	3,270	CV
M07-257020	Minnesota AES	9/07	SCN, Natto	Yellow	S	4,413	CV
MK1016	Richland IFC, Inc.	9/07	Natto	Yellow	Rps1a	5,612	CV
M10-159-2022	Minnesota AES	9/08	Natto	Yellow	Rps1a	5,981	CV
M10-161065	Minnesota AES	9/08	Natto	Yellow	Rps1c	5,225	CV
M07-303013	Minnesota AES	9/09	Tofu	Yellow	S	1,994	CV
BS1282	Brushvale Seed, Inc.	9/10	Hi Oleic	Yellow	S	3,418	CV
M13-170064	Minnesota AES	9/10	Natto	Yellow	S	5,411	CV
BS1512	Brushvale Seed, Inc.	9/11		Yellow	Rps1k	2,914	CV
Skyline	Sevita International	9/11	Tofu	Yellow	S	2,568	CV
M11-314101	Minnesota AES	9/11	High Protein	Yellow	Rps1k	2,284	CV
M11-297035	Minnesota AES	9/12	Tofu	Yellow	Rps1c	1,762	CV
M08-332003	Minnesota AES	9/14	High Protein	Buff	S	2,877	CV
BS1146	Brushvale Seed, Inc.	9/16	High protein/tofu	Yellow	S	2,859	CV
MN1807CN	Minnesota AES	9/19	SCN, General purpose	Buff	Rps1c	2,877	CV

Table 8. Performance and characteristics of special purpose soybean entries evaluated in the central zone. Trial was conducted in Danvers and Rosemount.

Entry	Originator	Maturity Date	% of Mean			Chlorosis Score [†]
			Yield	Protein	Oil	
M08-450148	Minnesota AES	8/26	90	96	107	NA
M03-238028	Minnesota AES	8/30	89	98	103	NA
M13-172108	Minnesota AES	8/30	97	98	103	NA
M10-159-4007	Minnesota AES	8/31	78	98	103	NA
MN1012SP	Minnesota AES	9/04	54	97	98	NA
MN0811CN	Minnesota AES	9/05	111	96	102	NA
MN0810CN	Minnesota AES	9/06	105	102	98	NA
M07-257020	Minnesota AES	9/07	103	98	99	NA
MK1016	Richland IFC, Inc.	9/07	85	101	100	NA
M10-159-2022	Minnesota AES	9/08	91	98	102	NA
M10-161065	Minnesota AES	9/08	74	100	100	NA
M07-303013	Minnesota AES	9/09	106	104	97	NA
BS1282	Brushvale Seed, Inc.	9/10	110	101	99	NA
M13-170064	Minnesota AES	9/10	107	98	98	NA
BS1512	Brushvale Seed, Inc.	9/11	112	101	101	NA
Skyline	Sevita International	9/11	118	101	100	NA
M11-314101	Minnesota AES	9/11	116	102	100	NA
M11-297035	Minnesota AES	9/12	127	101	98	NA
M08-332003	Minnesota AES	9/14	102	111	89	NA
BS1146	Brushvale Seed, Inc.	9/16	114	101	100	NA
MN1807CN	Minnesota AES	9/19	111	98	101	NA
Mean		9/8	38 Bu/A	35%	20%	
LSD 25%		1d	8%	2%	3%	

LSD numbers beneath yield columns indicate whether the difference between yield is due to genetics or other factors, such as variations in environment. If a yield difference between two entries equals or exceeds the LSD value, the higher yielding entry probably was superior in yield. A difference less than the LSD value is likely due to environmental factors.

[†]NA indicates ratings could not be made this year because of lack of IDC pressure in the field.

Table 9. Characteristics of special purpose soybean entries evaluated in the southern zone. Trial was conducted in Lamberton, Waseca and Westbrook.

Entry	Originator	Maturity Date	Special Characteristics	Hilum Color	Phyto. Gene	Seeds/lb	Trans. Trait
M10-238-2036	Minnesota AES	9/13	High Oleic	Gray	Rps1k	2,971	CV
M11-314101	Minnesota AES	9/15	High Protein	Yellow	Rps1k	2,175	CV
M11-297035	Minnesota AES	9/16	Tofu	Yellow	Rps1c	1,790	CV
BS1743	Brushvale Seed, Inc.	9/20		Yellow	S	2,431	CV
M07-2074210	Minnesota AES	9/20	SCN, Natto	Yellow	Rps1a	4,545	CV
Candor	Sevita International	9/21	Tofu	Yellow	S	1,878	CV
MN1807CN	Minnesota AES	9/21	SCN, General Purpose	Buff	Rps1c	2,772	CV
MN1901CN	Minnesota AES	9/21	SCN, General Purpose	Imperfect Black	S	2,568	CV
M12-377028	Minnesota AES	9/22	High Protein	Black	Rps1k	2,755	CV
MN1806CN	Minnesota AES	9/23	SCN, General Purpose	Yellow	Rps1k	2,658	CV
M13-172117	Minnesota AES	9/23	Natto	Yellow	Rps1c	4,058	CV
M11-297025	Minnesota AES	9/24	Tofu	Yellow	Rps1k	1,863	CV

Table 10. Performance and characteristics of special purpose soybean entries evaluated in the southern zone. Trials were conducted in Lamberton, Waseca and Westbrook.

Entry	Originator	Maturity Date	% of Mean			Chlorosis Score [†]
			Yield	Protein	Oil	
M10-238-2036	Minnesota AES	9/13	92	100	106	NA
M11-314101	Minnesota AES	9/15	94	103	104	NA
M11-297035	Minnesota AES	9/16	98	102	98	NA
BS1743	Brushvale Seed, Inc.	9/20	111	101	99	NA
M07-2074210	Minnesota AES	9/20	87	96	100	NA
Candor	Sevita International	9/21	106	103	95	NA
MN1807CN	Minnesota AES	9/21	107	94	106	NA
MN1901CN	Minnesota AES	9/21	120	92	108	NA
M12-377028	Minnesota AES	9/22	86	113	87	NA
MN1806CN	Minnesota AES	9/23	95	98	103	NA
M13-172117	Minnesota AES	9/23	96	95	96	NA
M11-297025	Minnesota AES	9/24	109	103	99	NA
Mean		9/20	50 bu/a	35%	18%	
LSD 25%		2d	7%	2%	3%	

LSD numbers beneath yield columns indicate whether the difference between yield is due to genetics or other factors, such as variations in environment. If a yield difference between two entries equals or exceeds the LSD value, the higher yielding entry probably was superior in yield. A difference less than the LSD value is likely due to environmental factors.

[†]NA indicates ratings could not be made this year because of lack of IDC pressure in the field.

Table 11. Characteristics of publicly developed general-purpose soybean varieties entered in 2021 tests, and/or seed produced in Minnesota.

Entry	Originator	Maturity Rating	Hilum Color	Phyto. Gene	SCN Rating	Trans. Trait
IA1022	Iowa AES	1.9	Yellow	S	S	CV
IA1029	Iowa AES	1.8	Yellow	—	S	CV
IA2053	Iowa AES	2.0	Black	Rps1a	S	CV
IA2076LF	Iowa AES	2.0	Yellow	—	S	CV
IA2104	Iowa AES	2.2	Yellow	S	S	CV
IA2104RA12	Iowa AES	2.3	Yellow	S	S	CV
IA2113RA12	Iowa AES	2.2	Yellow	S	S	CV
MN0083	Minnesota AES	00.8	Yellow	Rps6	S	CV
MN0702CN	Minnesota AES	0.7	Yellow	Rps1k	R	CV
MN0808CN	Minnesota AES	0.8	Yellow	Rps1c	R	CV
MN0810CN	Minnesota AES	0.8	Yellow	S	R	CV
MN0811CN	Minnesota AES	0.8	Black	Rps1k	R	CV
MN1012SP	Minnesota AES	1.2	Yellow	Rps1a	S	CV
MN1312CN	Minnesota AES	1.3	Yellow	Rps1a	R	CV
MN1806CN	Minnesota AES	1.8	Yellow	Rps1k	R	CV
MN1807CN	Minnesota AES	1.8	Buff	Rps1c	R	CV
MN1901CN	Minnesota AES	1.9	Imperfect black	S	R	CV
ND Benson	No Dakota AES	0.4	Buff	Rps3a	R	CV
ND Dickey	No Dakota AES	0.7	Yellow	Res.*	S	CV
ND Stutsman	No Dakota AES	0.7	Yellow	Res.*	S	CV
ND1406HP	No Dakota AES	0.6	Yellow	S	S	CV
ND17009GT	No Dakota AES	00.9	Brown	Rps4	S	GT
ND21008GT20	No Dakota AES	00.8	Gray	—	S	GT
ND2108GT73	No Dakota AES	0.8	Yellow	—	S	GT
Sheyenne	No Dakota AES	0.7	Yellow	Rps1c	S	CV
Traill	No Dakota AES	0.0	Yellow	S	S	CV
Brookings	So Dakota AES	1.7	Brown	Rps1k	S	CV

*Resistance to certain races of Phytophthora indicated in variety release information but information on gene not provided.

— indicates “not specified.”

Table 12. The Northern SCN Test was not conducted in 2021 because only a limited number of varieties were entered. Those entries were placed in the General Purpose Northern Test displayed in Table 2.

Entry	Originator	Maturity Date	Yield % of Mean		% of Mean		Maturity Rating	Phyto. Gene	Chlorosis Score	SCN Rating	Seed Treatment	Trans. Trait
			2018	2019	Protein	Oil						

NO TEST 84 THIS YEAR

Mean	Bu/A	Bu/A	%	%
LSD 20%	%	%	%	%

LSD numbers beneath yield columns indicate whether the difference between yield is due to genetics or other factors, such as variations in environment. If a yield difference between two entries equals or exceeds the LSD value, the higher yielding entry probably was superior in yield. A difference less than the LSD value is likely due to environmental factors.

Table 13. Performance and characteristics of soybean entries evaluated at soybean cyst nematode infested sites in the central zone. Trial was conducted at Becker, Danvers and Rosemount.

Entry	Originator	Maturity Date	Yield % of Mean		% of Mean		Maturity Rating	Phyto. Gene	Chlorosis Score [†]	SCN Rating	Seed Treatment	Trans. Trait
			2020	2021	Protein	Oil						
P07A18X	Pioneer	9/12	—	101	96	106	0.7	Rps1k	NA	MR	None	R2-Xt
Skyline	Sevita International	9/13	78	80	105	100	1.0	S	NA	MR	FVM	CV
AG11XF2	Bayer Crop Science	9/14	—	102	98	103	1.1	Rps3a	NA	MR	AC	R2-Xt
P11T55E	Pioneer	9/15	—	101	99	100	1.1	-	NA	MR	None	E3
P09T24E	Pioneer	9/15	—	96	102	99	0.9	-	NA	R	None	R2-Xt
P13T61E	Pioneer	9/17	—	95	99	98	1.3	Rps1c	NA	MR	None	E3
AG10XF1	Bayer Crop Science	9/17	—	99	100	100	1.0	Rps3a	NA	R	AC	R2-Xt
AG17XF2	Bayer Crop Science	9/21	—	94	99	103	1.7	Rps3a	NA	R	AC	R2-Xt
AG14XF2	Bayer Crop Science	9/22	—	105	97	103	1.4	Rps1c	NA	R	AC	R2-Xt
A151E3	Anderson Seeds	9/22	—	107	103	99	1.5	Rps3a	NA	MR	None	E3
AE1910	Federal Hybrids	9/23	—	99	101	99	1.9	None	NA	R	MA	E3
F2290N R2X	Federal Hybrids	9/25	123	110	99	100	2.2	Rps1c	NA	MR	MA	R2-Xt
AE2110	Federal Hybrids	9/25	—	110	99	95	2.1	Rps1k	NA	MR	MA	E3
P18A33X	Pioneer	9/25	—	110	97	107	1.8	Rps1k	NA	R	None	R2-Xt
F2121 LLGT+	Federal Hybrids	9/25	—	101	105	93	2.1	None	NA	R	MA	LLGT27
A1821XF	Anderson Seeds	9/26	—	94	98	97	1.8	None	NA	MR	None	XF
A2121XF	Anderson Seeds	9/28	—	97	103	98	2.0	Rps3a	NA	MR	None	XF
Mean		9/20	50 bu/a	48 bu/a	35%	19%						
LSD 25%		1d	10%	7%	3%	3%						

LSD numbers beneath yield columns indicate whether the difference between yield is due to genetics or other factors, such as variations in environment. If a yield difference between two entries equals or exceeds the LSD value, the higher yielding entry probably was superior in yield. A difference less than the LSD value is likely due to environmental factors.

— indicates “not specified.”

[†]NA indicates ratings could not be made this year because of lack of IDC pressure in the field.

Table 14. Performance and characteristics of soybean entries evaluated at soybean cyst nematode infested sites in the southern zone. Trial was conducted at Fairfax, Lamberton and Waseca.

Entry	Originator	Maturity Date	Yield % of Mean		% of Mean		Maturity Rating	Phyto. Gene	Chlorosis Score [†]	SCN Rating	Seed Treatment	Trans. Trait
			2020	2021	Protein	Oil						
AE1910	Federal Hybrids	9/17	—	95	99	99	1.9	None	NA	R	MA	E3
F1909N LLGT+	Federal Hybrids	9/19	111	99	100	100	1.9	Rps1c	NA	MR	MA	LLGT27
AG21XF0	Bayer Crop Science	9/20	—	99	105	98	2.1	Rps1c	NA	R	AC	R2-Xt
AG22XF2	Bayer Crop Science	9/20	—	103	104	99	2.2	Rps1c	NA	R	AC	R2-Xt
F2121 LLGT+	Federal Hybrids	9/20	—	99	99	99	2.1	None	NA	R	MA	LLGT27
P18A33X	Pioneer	9/20	—	106	99	104	1.8	Rps1k	NA	R	None	R2-Xt
AE2110	Federal Hybrids	9/21	—	96	101	99	2.1	Rps1k	NA	MR	MA	E3
AG18XF1	Bayer Crop Science	9/21	—	109	97	103	1.8	S	NA	R	AC	R2-Xt
P24T35E	Pioneer	9/26	—	93	98	102	2.4	Rps1k	NA	MS	None	E3
PA23A15X	Pioneer	9/27	—	102	100	97	2.3	Rps1c	NA	MR	None	R2-Xt
Mean		9/21	59 bu/a	52 bu/a	34%	20%						
LSD 25%		3d	5%	5%	2%	2%						

LSD numbers beneath yield columns indicate whether the difference between yield is due to genetics or other factors, such as variations in environment. If a yield difference between two entries equals or exceeds the LSD value, the higher yielding entry probably was superior in yield. A difference less than the LSD value is likely due to environmental factors.

— indicates “not specified.”

[†]NA indicates ratings could not be made this year because of lack of IDC pressure in the field.

Table 15. Results of soybean cyst nematode greenhouse bioassay performed on soybean entries grown in 2021 SCN trials, all zones. Entries are sorted by originator and entry name.

Entry	Originator	SCN Resist Source ¹	Greenhouse Test	
			HG Type 7 (Race 6) FI	SCN Rating ²
A151E3	Anderson Seeds	PI 88788	13	MR
A1821XF	Anderson Seeds	PI 88788	12	MR
A2121XF	Anderson Seeds	PI 88788	18	MR
AG10XF1	Bayer Crop Science	PI 88788	1	R
AG11XF2	Bayer Crop Science	PI 88788	13	MR
AG14XF2	Bayer Crop Science	PI 88788	0	R
AG17XF2	Bayer Crop Science	PI 88788	0	R
AG18XF1	Bayer Crop Science	PI 88788	0	R
AG21XF0	Bayer Crop Science	PI 88788	0	R
AG22XF2	Bayer Crop Science	PI 88788	0	R
AE1910	Federal Hybrids	PI 88788	7	R
AE2110	Federal Hybrids	PI 88788	11	MR
F1909N LLGT+	Federal Hybrids	PI 88788	12	MR
F2121 LLGT+	Federal Hybrids	PI 88788	9	R
F2290N R2X	Federal Hybrids	Peking	12	MR
P07A18X	Pioneer	PI 88788	13	MR
P09T24E	Pioneer	PI 88788	9	R
P11T55E	Pioneer	PI 88788	22	MR
P13T61E	Pioneer	PI 88788	17	MR
P18A33X	Pioneer	Peking	3	R
P24T35E	Pioneer	Peking	60	MS
PA23A15X	Pioneer	PI 88788	28	MR
Skyline	Sevita International	PI 88788	24	MR

¹Resistance source provided by originator.

²SCN resistance rating: R = resistant (FI less than or equal to 10%); MR = moderately resistant (FI 11-30%); MS = moderately susceptible (FI 31-60%); S = susceptible (FI greater than 60%).

Female index (FI) was calculated using Williams 82 as the susceptible check.