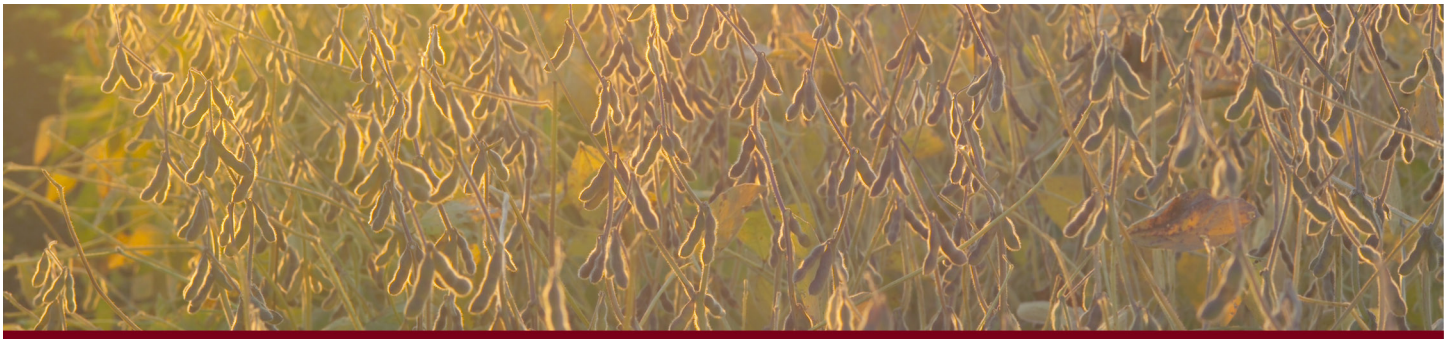

2024 Soybean Field Crop Trials Results

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 *soybeans.umn.edu* and *varietytrials.umn.edu/soybean*.

As ever, it is hard to generalize about the weather for the growing season across the whole state, but for the most part 2024 presented significant challenges for soybean growers. The growing season started with excessive precipitation, causing flooding and overly saturated soils in many parts of the state. After this wet start, some parts of the state (especially southwest MN) experienced dry conditions, affecting seed fill.

Our project was able to get all of our testing locations planted in between rainfall events in May except for Moorhead due to excessively wet conditions until past the middle of June. Perley was planted mid-June, later than ideal. Waseca was largely lost due to an extremely heavy precipitation event that washed out our plots. We achieved a good stand establishment, and the moisture available in the soil from the spring rainfalls helped our fields get off to a quick start. Our iron deficiency chlorosis (IDC) nursery in Crookston failed to provide strong symptoms this year, limiting its usefulness in comparing varieties.

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. Most trials were planted between

Locations of 2024 soybean trials.

May 8 and May 29 (with the exception of Perley mentioned above). Planting rates are listed in the table below, which varied according to latitudinal zone.

Herbicides were used as necessary for good weed control. Row spacings were 24 inches at Crookston and 30 inches at all other locations. Plots consisted of

Location	Planting date	Seeding rate / acre	Harvest date	Latitude	Longitude	Soil type	Drainage	Previous crop
Becker	14-May	152,500	5-Oct	45.34677	-93.85242	Mosford sandy loam	Good to excellent	Corn
Crookston	29-May	204,000	8-Oct	47.819986	-96.627273	Clay loam	Poor	Wheat
Perley	14-June	156,600	11-Oct	47.070288	-96.690597	Clay loam	Average	Corn
Lamberton	16-May	145,200	04-Oct	44.23334	-95.30453	Loam	Good	Corn
Morris	17-May	152,500	08-Oct	45.597917	-95.909083	Clay loam	Good	Corn
Roseau	15-May	163,100	11-Oct	48.87504	-95.81134	Silt loam	Average	Wheat
Rosemount	8-May	152,500	16-Oct	44.707076	-93.101168	Waukegan silt loam	Good	Corn
Sleepy Eye	15-May	145,200	18-Oct	44.215876	-94.663833	Clay	Good	Corn
Thief River Falls	15-May	163,100	10-Oct	48.12095	-96.24711	Clay	Average	Wheat
Waseca	20-May	145,200	18-Oct	44.07391	-93.52658	Nicollet clay loam	Good	Corn

four rows twelve feet in length. The two center rows were harvested for yield data collection. Each location included three replications arranged in a randomized complete block design. 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 displays results from greenhouse tests conducted by the Nematology Laboratory at the University of Minnesota Southern Research and Outreach Center in Waseca, MN. All submitted entries were grown in soil inoculated with an HG type 7 (race 6) population of soybean cyst nematode in 2024.

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 2024. The type of seed treatment, as provided by the originator, is designated as follows:

AC&IL = Acceleron and Ilevo; CMA = CruiserMaxx APX; CMAS = CruiserMaxxAPX + Saltro; LumG&IL = LumiGEN and Ilevo; OPVI = Obvious Plus, Poncho/Votivo+ILeVO; OPVRI = Obvius Plus, Poncho/Votiva, Relenya, ILEVO; PS+ = Peterson Select+,

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); GT = glyphosate tolerant; XF = Xtendflex (dicamba, glyphosate and glufosinate 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 2024 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 2024 calendar date of maturity for where maturity date data was available.

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 in this report, but data for individual locations can be found at *varietytrials.umn.edu/soybean*.

The yield information is presented as a percentage 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 yield values 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 variation. 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 at two sites in 2024: one in Crookston and one north of Crookston. Scores were combined across sites using a statistical analysis.

Comparing chlorosis scores of entries allows one 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 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.

Rating	
1 to 2	Resistant
2.1 to 3	Moderately Resistant
3.1 to 4	Moderately Susceptible
4.1 to 5	Susceptible

Unfortunately, our 2024 IDC nurseries did not produce strong symptoms. Only relative differences between entries can be used to gauge relatively resistant and susceptible varieties.

Protein and Oil

Protein and oil values were determined from mature seed using near-infrared reflectance spectroscopy. **The tabled values are for the 2024 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.

$$\frac{\textit{100-desired moisture}}{87} \; X \; \textit{protein or oil value give in the table}$$

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

$$APV = 60[Po\ (X) + \frac{Pm}{0.44}\ (Y)]$$

Where:

APV= Approximate value of a bushel of soybeans

Po= Soybean oil price (in $/lbs)

Pm= price of 44% meal (in $/lbs) *

X= oil content at 13% moisture (in decimals)

Y= protein content at 13% moisture (in decimals)

And:

$$\frac{\text{* price of meal (\$/ton)}}{2000} = \text{\$/lbs}$$

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.

The source for SCN resistance for each entry was provided by the originator. In **Table 11** 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 = (# of cysts on entry/# of cysts on Lee 74) x100. If the FI was < 10%, an entry was considered R. If the FI was 10 – 30%, it was considered MR. If the FI was 30-60%, 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 web site *soybeans.umn.edu* or from the Minnesota Soybean Research and Promotion Council, 1-507-388-1635, *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. Some information refers to "tolerance" or "field resistance." Reliable tests for tolerance or field resistance have not yet been developed.

Soybean Aphid

Soybean Aphid (SA) outbreaks can greatly reduce yields if foliar insecticide treatments are not applied in a timely manner. To prevent economic loss, producers should apply foliar insecticides when aphid densities reach 250 aphids per plant. Insecticide applications are not necessary below this threshold and producers should avoid treatments when not needed in order to prevent the loss of beneficial predator insects and to minimize chances for development of aphid populations resistant to commonly used insecticides. Varietal sources of resistance do exist and there are a limited number of commercial options available. Genetic resistance, however, can easily be overcome by different SA biotypes present on the landscape. Varieties with resistance "stacks" (for example *Rag1*+*Rag2*) can provide more durable resistance. Nevertheless, even single-gene forms of SA resistance can help reduce chances of infestation and resulting yield loss. Through the support of the Minnesota Invasive Terrestrial Plants and Pests Center (MITPPC) and the Minnesota Soybean Research and Promotion Council, the University of Minnesota Soybean Breeding Project, in collaboration with the laboratory of Dr. Bob Koch, has developed several commercially available varieties with SA resistance. Examples include M15-105140 (*Rag1*+*Rag2*), Blue River 14Y4A (*Rag1*), and Blue River 19B4A (*Rag2*). Funding for MITPPC comes from the Environmental and Natural Resources Trust Fund (ENTRF).

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 web site *mncia.org* or telephone number 612-625-7766.

Test Plot Research

Michael Leiseth, David Bundy, Gary Reid, Tom Hoverstad, Travis Vollmer, Scott Alm, Joel Tallaksen and Donn Vellekson supervised test plot establishment and management.

Special thanks are due to Chris Goblirsch of Riverton Research Inc. for planting, managing, and harvesting the Perley location.

We appreciate our farm cooperators who provided access to on-farm land. The farm cooperators in 2024 were Gabriel Carlson (Thief River Falls), Rob Goblirsch (Sleepy Eye), and Eric Magnusson (Roseau).

Names and email addresses of seed company representatives that entered varieties into the 2024 trials.

Company	*Rep Name*	*Contact Email*
Albert Lea Seed/Viking Seed	Jake Hansen	jake@alseed.com
Anderson Seeds	Kelsey (Anderson) Henke	kelsey.anderson528@gmail.com
BASF/MS Technologies	Nick Weidenbenner	nick.weidenbenner@basf.com
Benson Hill	Ryan Buescher	rbuescher@bensonhill.com
Brushvale Seed, Inc.	Travis Meyer	travis@brushvaleseed.com
Minnesota Ag Experiment Station (Minnesota AES)	Carl Anfinson	carl.anfinson@mncia.org
Peterson Farms Seed	Alex Amderson	alex@petersonfarmsseed.com
Proseed, Inc.	Karmen Hardy	karmen.hardy@proseed.net
Richland IFC, Inc.	Paul Meindl	paul@richlandifc.com

Table 1. Performance and characteristics of transgenic, conventional and special-purpose soybean entries evaluated in the far northern zone. Trials were conducted in Crookston, Thief River Falls, and Roseau.

Entry	Originator	Maturity Rating	Maturity Date	Yield % of Mean		% of Mean		Phyto. Gene	Chlorosis Score	Seed Treat.	Trans. Trait
				2023	2024	Protein	Oil				
EL 50-063N	Proseed	00.6	9/10		92	101	101	Rps1k+Rps3a	1.6	CMA	E3
XF30-062	Proseed	00.6	9/10		95	92	103	Rps1c	1.5	CMA	XF
ND Rolette	ND AES	00.9	9/13		93	99	101	Rps1k	1.5	None	CV
HANA	Peterson Farms Seed	0.9	9/14	79	94	110	94	S	1.9	PS+	CV
PC 50-099	Proseed	00.9	9/14		87	104	95	Rps1c	2.5	CMA	CV
MN0095	MAES	00.9	9/15		99	99	103	Rps1a	1.1	None	CV
XF 40-12	Proseed	0.1	9/15	105	105	97	101	Rps1c	1.0	CMA	XF
M16-110086	MAES	00.9	9/16		97	101	101	Rps6	1.3	None	CV
XF30-092N	Proseed	00.9	9/16	108	101	96	105	Rps1c	1.9	CMA	XF
ND18-20092(GT SCN)	ND AES	0.1	9/16		96	102	100	Rps1c	1.1	None	GT
XO 0094E	MS Technologies	00.9	9/17	108	104	100	98	Rps3a	1.3	OPVRI	E3
EL 40-093N	Proseed	00.9	9/17	100	105	99	100	Rps3a	1.3	CMA	E3
EL 50-13N	Proseed	0.1	9/17		112	101	101	Rps3a	1.1	CMA	E3
EL 50-33N	Proseed	0.3	9/19		110	98	102	Rps3a	1.6	CMA	E3
XO 0234E	MS Technologies	0.2	9/20	108	109	102	97	Rps3a	1.6	OPVRI	E3
Mean			9/15	43 bu/a	39 bu/a	33.7%	18.2%		1.5		
LSD 25%			0.8d	7%	4%	1%	1%		0.3		

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.
Maturity date data collected from all locations.

Table 2. Performance and characteristics of transgenic, conventional and special-purpose soybean entries evaluated in the northern zone. Trials were conducted in Crookston and Perley. Moorhead was not planted due to excessive rain and wet condition.

Entry	Originator	Maturity Rating	Maturity Date	Yield % of Mean 2023	Yield % of Mean 2024	% of Mean Protein	% of Mean Oil	Phyto. Gene	Chlorosis Score	Seed Treat.	Trans. Trait
ND Rolette	ND AES	00.9	9/19		80	100	101	Rps1k+Rps3a	1.0	None	CV
M16-110086	MAES	00.9	9/20		87	99	102	Rps6	1.1	None	CV
ND18-20092(GT SCN)	ND AES	0.1	9/21		81	103	98	Rps1c	1.1	None	GT
XO 0094E	MS Technologies	00.9	9/21		92	99	99	Rps3a	1.4	OPVRI	E3
AG03XF2	Asgrow	0.3	9/22		103	99	97	Rps1c	1.3	AC&IL	XF
XF 40-12	Proseed	0.1	9/23		106	98	97	Rps1c	1.4	CMA	XF
XO 0234E	MS Technologies	0.2	9/24		102	101	99	Rps3a	1.5	OPVRI	E3
EL 50-13N	Proseed	0.1	9/24		111	101	101	Rps3a	1.1	CMA	E3
EL 50-33N	Proseed	0.3	9/25		109	99	100	Rps3a	1.5	CMA	E3
S04K9	Syngenta	0.4	9/25	94	98	112	93	-	1.4	None	CV
M15-105140	MAES	0.6	9/26	95	100	100	101	Rps1c+Rps3a	1.1	None	CV
XO 0554E	MS Technologies	0.5	9/28	107	104	98	105	Rps1k+Rps3a	1.4	OPVRI	E3
Viking | Blue River 0821N	Albert Lea Seed House	0.8	9/29	102	114	97	100	S	1.6	None	CV
XO 0731E	MS Technologies	0.7	9/30		110	100	99	Rps1c+Rps3a	1.4	OPVRI	E3
XO 0993E	MS Technologies	0.9	9/30	93	103	97	104	Rps3a	1.8	OPVRI	E3
Mean			9/24	52 bu/a	43 bu/a	34.0%	18.8%		1.3		
LSD 25%			1.0d	3%	5%	2%	3%		0.3		

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”
Maturity date data collected from all locations.

Table 3. Performance and characteristics of transgenic, conventional and special-purpose soybean entries evaluated in the central zone. Trials were conducted in Becker, Morris, and Rosemount.

Entry	Originator	Maturity Rating	Maturity Date	Yield % of Mean 2023	Yield % of Mean 2024	% of Mean Protein	% of Mean Oil	Phyto. Gene	Chlorosis Score	Seed Treat.	Trans. Trait
Viking | Blue River 0821N	Albert Lea Seed House	0.8	9/17	97	95	100	99	S	2.0	None	CV
XO 0554E	MS Technologies	0.5	9/17		91	100	102	Rps1k+Rps3a	2.0	OPVRI	E3
Viking | Blue River 1223N	Albert Lea Seed House	1.2	9/18	108	96	95	103	S	2.5	None	CV
XO 0731E	MS Technologies	0.7	9/19		98	100	98	Rps1c+Rps3a	1.8	OPVRI	E3
XO 0993E	MS Technologies	0.9	9/20	100	98	98	104	Rps3a	2.3	OPVRI	E3
P11A97E	Pioneer	1.1	9/20		92	104	107	-	1.0	LumG&IL	E3
NK11-A4E3	Syngenta	1.1	9/20		107	96	104	Rps1k+Rps3a	2.8	CMAS	E3
Viking | Blue River 12A2	Albert Lea Seed House	1.2	9/21		85	101	97	S	2.0	None	CV
XO 1095E	MS Technologies	1.0	9/21		103	103	98	Rps1c	2.3	OPVRI	E3
AG13XF3	Asgrow	1.3	9/22		100	100	94	Rps1c	1.8	AC&IL	XF
XO 1404E	MS Technologies	1.4	9/23	105	98	103	97	Rps1c	1.5	OPVRI	E3
NK15-G9E3S	Syngenta	1.5	9/23		109	95	103	Rps1k	2.5	CMAS	E3
XO 1225E	MS Technologies	1.2	9/24		93	103	97	Rps1c+Rps3a	2.3	OPVRI	E3
XO 1372E	MS Technologies	1.3	9/24	93	98	97	104	S	2.8	OPVRI	E3
XO 1545E	MS Technologies	1.5	9/24		105	104	92	Rps1c+Rps3a	1.5	OPVRI	E3
XO 1632E	MS Technologies	1.6	9/24	107	109	103	100	Rps3a	1.5	OPVRI	E3
P14A12E	Pioneer	1.4	9/24		107	101	101	-	1.0	LumG&IL	E3
Viking | Blue River 15B5	Albert Lea Seed House	1.5	9/25		115	99	100	Rps1a	1.8	None	CV
Mean			9/21	70 bu/a	41 bu/a	34.2%	19.2%		2.0		
LSD 25%			1.1d	6%	4%	2%	2%		0.6		

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”
Maturity date data collected from all locations.

Table 4. Performance and characteristics of transgenic, conventional and special-purpose soybean entries evaluated in the southern zone. Trials were conducted in Lamberton, Waseca, and Sleepy Eye.

Entry	Originator	Maturity Rating	Maturity Date	Yield % of Mean 2023	Yield % of Mean 2024	% of Mean Protein	% of Mean Oil	Phyto. Gene	Chlorosis Score	Seed Treat.	Trans. Trait
A154E3	Anderson Seeds	1.5	9/19		107	106	92	Rps1c+Rps3a	2.5	None	E3
XO 1225E	MS Technologies	1.2	9/19		92	100	100	Rps1c+Rps3a	1.4	OPVRI	E3
XO 1545E	MS Technologies	1.5	9/19		98	104	93	Rps1c+Rps3a	1.8	OPVRI	E3
XO 1632E	MS Technologies	1.6	9/19	100	106	100	100	Rps3a	2.0	OPVRI	E3
XO 1822E	MS Technologies	1.8	9/19	105	105	101	98	Rps3a	2.9	OPVRI	E3
NK15-G9E3S	Syngenta	1.5	9/19		91	93	104	Rps1k	2.1	CMAS	E3
XO 1372E	MS Technologies	1.3	9/20		110	97	105	S	2.0	OPVRI	E3
XO 1404E	MS Technologies	1.4	9/20	104	102	98	100	Rps1c	1.4	OPVRI	E3
M14-122031	MAES	1.8	9/20		104	98	101	-	1.9	None	CV
A174E3	Anderson Seeds	1.7	9/21		104	108	94	Rps1c	2.3	None	E3
MN1905CN	MAES	1.9	9/21		98	100	103	S	2.0	None	CV
Viking | Blue River 15B5	Albert Lea Seed House	1.5	9/22		97	97	105	Rps1a	2.1	None	CV
Viking | Blue River 1718N	Albert Lea Seed House	1.7	9/22	102	109	97	105	Rps1k	1.8	None	CV
e17y993	Benson Hill	1.7	9/22		100	99	99	S	2.8	CMAS	CV
XO 1761E	MS Technologies	1.7	9/22		99	96	102	Rps1k	2.3	OPVRI	E3
MN1807CN	MAES	1.8	9/22	85	100	97	101	S	1.9	None	CV
A184E3	Anderson Seeds	1.8	9/23		97	96	102	Rps1k	1.8	None	E3
A1923XF	Anderson Seeds	1.9	9/23	112	91	97	105	S	2.5	None	E3
e21y989	Benson Hill	2.1	9/23		95	107	94	Rps1c	2.6	CMAS	CV
XO 2181E	MS Technologies	2.1	9/23	100	100	96	105	Rps1k	2.0	OPVRI	E3
P18A73E	Pioneer	1.8	9/23		109	98	103	Rps1k	2.3	LumG&IL	E3
Viking | Blue River 2022N	Albert Lea Seed House	2.0	9/24	101	105	98	104	Rps1k	1.9	None	CV
A203E3	Anderson Seeds	2.0	9/24	103	97	101	100	Rps1c+Rps3a	1.8	None	E3
BH22Q201	Benson Hill	2.2	9/24		95	113	95	S	1.5	CMAS	CV
e1993	Benson Hill	1.9	9/24		91	95	100	Rps1k	1.9	CMAS	CV
XO 1971E	MS Technologies	1.9	9/24	100	97	95	103	S	2.1	OPVRI	E3
AG19XF3	Asgrow	1.9	9/24	104	95	99	101	Rps1c	1.5	None	XF
Viking | Blue River 23B5	Albert Lea Seed House	2.3	9/25		107	101	101	Rps1c	1.8	None	CV
BH23H228	Benson Hill	2.3	9/25		104	102	97	S	2.3	CMAS	CV
XO 2282E	MS Technologies	2.2	9/25	94	95	99	98	S	2.0	OPVRI	E3
BH23Q217	Benson Hill	2.3	9/26		91	109	92	S	1.6	CMAS	CV
Viking | Blue River 2418N	Albert Lea Seed House	2.4	9/27	99	110	101	97	Rps1c	1.5	None	CV
Mean			9/22	78 bu/a	45 bu/a	34.1%	19.3%		2.0		
LSD 25%			0.8d	3%	5%	4%	4%		0.4		

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”
Maturity date data collected from all locations.

Table 5. Characteristics of special-purpose soybean entries evaluated in the northern zone. Trials were conducted in Crookston and Perley. Moorhead was not planted due to excessive rain and wet condition.

Entry	Originator	Maturity Rating	Maturity Date	Special Characteristics	Hilum Color	Phyto. Gene	Seeds/lb	Trans. Trait
HANA	Peterson Farms Seed	0.9	9/19	Food-Other	Yellow	S	3,030	CV
M10-159-1007	MAES	0.1	9/19	Natto	Yellow	Rps1a	5,682	CV
MN0507CN	MAES	0.5	9/20	Soymilk	Yellow	Rps1a	2,738	CV
M15-236022	MAES	0.2	9/20	Natto	Yellow	Rps1a	4,941	CV
MN0103SP	MAES	0.1	9/20	Natto	Yellow	Rps1a	5,754	CV
MK009	Richland IFC	00.9	9/21	Natto	Yellow	S	5,828	CV
M17-234001	MAES	0.2	9/21	Natto	Yellow	-	4,941	CV
M17-160067	MAES	0.2	9/22	Natto	Yellow	S	4,058	CV
M18-206008	MAES	0.2	9/22	Natto	Yellow	-	4,941	CV
MK0249	Richland IFC	0.2	9/23	Natto	Yellow	S	4,545	CV
M10-159-4011	MAES	0.3	9/23	Natto	Yellow	Rps1c	5,981	CV
M18-210043	MAES	0.5	9/24	Natto	Yellow	-	4,329	CV
PC 50-59	Proseed	0.5	9/25	Food-Other	Yellow	Rps3a	2,165	CV
M13-172108	MAES	0.5	9/25	Natto	Yellow	S	4,836	CV
SB0512	SB&B	0.5	9/25	Natto	Yellow	-	5,285	CV
M18-208-1020	MAES	0.6	9/26	Natto	Yellow	-	4,132	CV
MK0603	Richland IFC	0.6	9/27	Sprouts	Yellow	S	5,285	CV
MK808CN	Richland IFC	0.8	9/27	Natto	Yellow	Rps1c	3,135	CV
PC 50-89	Proseed	0.8	9/29	Food-Other	Yellow	Rps1c+Rps3a	2,405	CV

– indicates “not specified”

Table 6. Performance and characteristics of special-purpose soybean entries evaluated in the northern zone. Trials were conducted in Crookston and Perley. Moorhead was not planted due to excessive rain and wet condition.

Entry	Originator	Maturity Date	% of Mean			Chlorosis Score
			Yield	Protein	Oil	
HANA	Peterson Farms Seed	9/19	99	110	96	1.8
M10-159-1007	MAES	9/19	101	101	101	1.0
MN0507CN	MAES	9/20	100	102	106	1.5
M15-236022	MAES	9/20	84	99	104	1.4
MN0103SP	MAES	9/20	80	98	102	1.5
MK009	Richland IFC	9/21	80	96	98	1.3
M17-234001	MAES	9/21	85	98	108	1.8
M17-160067	MAES	9/22	86	104	98	1.8
M18-206008	MAES	9/22	105	99	100	1.3
MK0249	Richland IFC	9/23	89	93	104	1.0
M10-159-4011	MAES	9/23	94	98	101	1.3
M18-210043	MAES	9/24	87	101	95	1.4
PC 50-59	Proseed	9/25	137	106	94	1.4
M13-172108	MAES	9/25	110	99	102	1.1
SB0512	SB&B	9/25	88	100	92	1.3
M18-208-1020	MAES	9/26	118	98	104	1.0
MK0603	Richland IFC	9/27	96	98	93	1.3
MK808CN	Richland IFC	9/27	120	95	106	1.8
PC 50-89	Proseed	9/29	135	102	97	1.5
Mean		9/23	33 bu/a	35.0%	18.2%	1.4
LSD 25%		1.0d	9%	1%	1%	0.3

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.
Maturity date data collected from all locations.

Table 7. Characteristics of special-purpose soybean entries evaluated in the central zone. Trials were conducted in Becker, Morris, and Rosemount.

Entry	Originator	Maturity Rating	Maturity Date	Special Characteristics	Hilum Color	Phyto. Gene	Seeds/lb	Trans. Trait
MK41	Richland IFC	1.1	9/09	Tofu	Yellow	S	2,627	CV
AYA	Peterson Farms Seed	0.7	9/10	Food-Other	Yellow	Rps3a	2,367	CV
M16-160077	MAES	0.8	9/11	Natto	Yellow	-	5,543	CV
MK0603	Richland IFC	0.6	9/12	Sprouts	Yellow	S	5,348	CV
M15-236026	MAES	0.6	9/13	Natto	Yellow	Rps1a	4,329	CV
BS0622	Brushvale Seed, Inc.	0.6	9/14	Natto	Yellow	S	5,165	CV
MN-Decker	Richland IFC	1.0	9/14	Black	Black	S	3,030	CV
M10-159-2022	MAES	1.0	9/14	Natto	Yellow	Rps1a	6,402	CV
MK9102	Richland IFC	1.2	9/15	Black	Black	S	2,185	CV
M17-152020	MAES	1.1	9/15	Soymilk	Mixed	-	2,643	CV
M17-220023	MAES	0.8	9/15	Natto	Yellow	-	4,456	CV
BS1121	Brushvale Seed, Inc.	1.1	9/16	Natto	Yellow	S	5,165	CV
BS91615	Brushvale Seed, Inc.	1.2	9/16	Soymilk	Yellow	S	2,772	CV
MK1023	Richland IFC	1.0	9/16	Natto	Yellow	S	5,285	CV
MK808CN	Richland IFC	0.8	9/16	Natto	Yellow	Rps1c	3,092	CV
M18-169009	MAES	0.7	9/16	Natto	Yellow	-	4,686	CV
M18-202046	MAES	0.8	9/16	Natto	Yellow	-	3,953	CV
WILMA	Peterson Farms Seed	1.0	9/17	Food-Other	Yellow	Rps1c+Rps3a	2,554	CV
M17-148028	MAES	1.0	9/17	Soymilk	Mixed	-	2,392	CV
M16-160032	MAES	1.0	9/17	Natto	Yellow	-	5,165	CV
M15-221092	MAES	1.2	9/18	Soymilk	Yellow	S	3,179	CV
M17-126047	MAES	1.0	9/18	Tofu	Yellow	-	2,755	CV
M18-208-2002	MAES	1.2	9/18	Natto	Yellow	-	4,058	CV
MK1423	Richland IFC	1.4	9/19	Natto	Yellow	S	5,107	CV
M14-250018	MAES	1.4	9/19	Tofu	Yellow	S	2,296	CV
M18-228055	MAES	1.5	9/19	Soymilk	Yellow	-	2,643	CV
Skyline	Sevita International	1.1	9/19	Soymilk	Yellow	Rps1c+Rps3a	2,658	CV
P15A20	Pioneer	1.5	9/20	Food-Other	Yellow	Rps1c	2,539	CV
M13-251003	MAES	1.4	9/21	Soymilk	Yellow	S	2,755	CV
MK146	Richland IFC	1.1	9/21	Tofu	Yellow	S	2,612	CV
MK373	Richland IFC	2.0	9/26	Tofu	Yellow	S	2,165	CV

– indicates “not specified”

Table 8. Performance and characteristics of special-purpose soybean entries evaluated in the central zone. Trials were conducted in Becker, Morris, and Rosemount.

Entry	Originator	Maturity Date	% of Mean			Chlorosis Score
			Yield	Protein	Oil	
MK41	Richland IFC	9/09	110	104	96	1.9
AYA	Peterson Farms Seed	9/10	79	105	97	1.9
M16-160077	MAES	9/11	74	99	98	1.4
MK0603	Richland IFC	9/12	80	100	91	1.1
M15-236026	MAES	9/13	87	99	102	1.3
BS0622	Brushvale Seed, Inc.	9/14	99	93	104	2.1
MN-Decker	Richland IFC	9/14	75	103	96	1.1
M10-159-2022	MAES	9/14	85	98	97	1.3
MK9102	Richland IFC	9/15	89	102	101	1.3
M17-152020	MAES	9/15	115	100	105	1.8
M17-220023	MAES	9/15	88	100	97	2.3
BS1121	Brushvale Seed, Inc.	9/16	97	95	100	2.8
BS91615	Brushvale Seed, Inc.	9/16	122	100	103	2.0
MK1023	Richland IFC	9/16	74	95	99	2.0
MK808CN	Richland IFC	9/16	113	95	106	1.4
M18-169009	MAES	9/16	96	99	101	1.5
M18-202046	MAES	9/16	94	100	101	1.4
WILMA	Peterson Farms Seed	9/17	113	100	99	1.9
M17-148028	MAES	9/17	113	97	103	1.9
M16-160032	MAES	9/17	81	97	103	1.0
M15-221092	MAES	9/18	115	103	99	1.0
M17-126047	MAES	9/18	113	106	97	1.1
M18-208-2002	MAES	9/18	99	99	101	1.4
MK1423	Richland IFC	9/19	85	91	104	2.0
M14-250018	MAES	9/19	108	106	100	1.4
M18-228055	MAES	9/19	122	101	99	2.5
Skyline	Sevita International	9/19	99	106	102	2.3
P15A20	Pioneer	9/20	127	100	102	1.8
M13-251003	MAES	9/21	131	99	101	1.4
MK146	Richland IFC	9/21	111	104	101	2.1
MK373	Richland IFC	9/26	107	103	95	1.1
Mean		9/16	30 bu/a	35.6%	18%	1.7
LSD 25%		1.3d	6%	1%	1%	0.3

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.
Maturity date data collected from all locations.

Table 9. Characteristics of special-purpose soybean entries evaluated in the southern zone. Trials were conducted in Lamberton and Sleepy Eye. Waseca location was lost due to flooding.

Entry	Originator	Maturity Rating	Maturity Date	Special Characteristics	Hilum Color	Phyto. Gene	Seeds/lb	Trans.Trait
MK41	Richland IFC	1.1	9/08	Tofu	Yellow	S	2,612	CV
M17-124036	MAES	1.7	9/16	Tofu	Yellow	-	2,690	CV
M17-253029	MAES	1.5	9/17	Tofu	Yellow	-	2,273	CV
M18-208-1027	MAES	1.5	9/17	Natto	Yellow	-	3,247	CV
P15A20	Pioneer	1.5	9/18	Food-other	Yellow	Rps1c	2,444	CV
P18A82	Pioneer	1.8	9/18	Food-other	Yellow	-	2,380	CV
MK1423	Richland IFC	1.4	9/19	Natto	Yellow	S	4,941	CV
M18-214-2014	MAES	1.5	9/19	Natto	Yellow	-	4,500	CV
MK146	Richland IFC	1.1	9/20	Tofu	Yellow	S	2,568	CV
M13-251003	MAES	1.4	9/20	Soymilk	Yellow	S	2,841	CV
M13-172117	MAES	1.8	9/20	Natto	Yellow	Rps1a	4,638	CV
M18-202034	MAES	1.6	9/20	Natto	Yellow	-	5,165	CV
M18-202041	MAES	1.6	9/20	Natto	Yellow	-	4,456	CV
M18-209068	MAES	1.6	9/20	Natto	Yellow	-	4,058	CV
MN1905CN	MAES	1.9	9/21	Soymilk	Yellow	S	2,722	CV
M13-266011	MAES	1.6	9/21	Soymilk	Yellow	S	2,380	CV
M17-227057	MAES	1.8	9/21	Natto	Yellow	-	4,836	CV
M18-169085	MAES	1.8	9/21	Natto	Yellow	-	4,413	CV
e17y993	Benson Hill	1.7	9/22	Tofu	Yellow	S	2,755	CV
M18-205033	MAES	1.5	9/22	Natto	Yellow	-	4,591	CV
e1993	Benson Hill	1.9	9/23	Gen. Purpose	Imperfect Black	Rps1k	2,319	CV
BS1940	Brushvale Seed, Inc.	1.9	9/23	Tofu	Yellow	S	2,583	CV
M17-160103	MAES	1.8	9/23	Natto	Yellow	-	4,735	CV
BH22Q201	Benson Hill	2.2	9/24	Soymilk	Brown	S	2,789	CV
BH23H228	Benson Hill	2.3	9/24	Tofu	Yellow	S	2,597	CV
e21y989	Benson Hill	2.1	9/24	Tofu	Yellow	Rps1c	2,674	CV
BH23Q217	Benson Hill	2.3	9/25	Soymilk	Brown	S	2,841	CV
Candor	Sevita International	1.9	9/25	Tofu	Yellow	S	1,811	CV
MK373	Richland IFC	2.0	9/27	Tofu	Yellow	S	2,057	CV

– indicates “not specified”

Table 10. Performance and characteristics of special-purpose soybean entries evaluated in the southern zone. Trials were conducted in Lamberton and Sleepy Eye. Waseca location was lost due to flooding.

Entry	Originator	Maturity Date	% of Mean			Chlorosis Score
			Yield	Protein	Oil	
MK41	Richland IFC	9/08	97	103	95	1.8
M17-124036	MAES	9/16	94	107	95	1.8
M17-253029	MAES	9/17	100	106	102	2.3
M18-208-1027	MAES	9/17	86	100	94	1.4
P15A20	Pioneer	9/18	122	97	103	1.5
P18A82	Pioneer	9/18	122	102	103	2.0
MK1423	Richland IFC	9/19	77	88	105	1.6
M18-214-2014	MAES	9/19	90	95	105	2.0
MK146	Richland IFC	9/20	98	104	100	1.6
M13-251003	MAES	9/20	109	98	101	1.3
M13-172117	MAES	9/20	91	96	100	1.4
M18-202034	MAES	9/20	83	97	103	1.3
M18-202041	MAES	9/20	93	96	102	1.3
M18-209068	MAES	9/20	98	96	103	1.4
MN1905CN	MAES	9/21	108	96	109	1.4
M13-266011	MAES	9/21	101	100	98	1.0
M17-227057	MAES	9/21	90	99	98	1.6
M18-169085	MAES	9/21	93	96	104	1.6
e17y993	Benson Hill	9/22	102	100	99	1.6
M18-205033	MAES	9/22	92	98	105	1.4
e1993	Benson Hill	9/23	105	96	100	1.3
BS1940	Brushvale Seed, Inc.	9/23	128	99	102	1.8
M17-160103	MAES	9/23	83	100	98	1.5
BH22Q201	Benson Hill	9/24	102	113	94	1.8
BH23H228	Benson Hill	9/24	111	99	100	2.1
e21y989	Benson Hill	9/24	104	104	100	2.4
BH23Q217	Benson Hill	9/25	104	108	94	1.3
Candor	Sevita International	9/25	112	105	95	2.3
MK373	Richland IFC	9/27	106	102	93	1.3
Mean		9/20	41 bu/a	34.5%	18.4%	1.6
LSD 25%		1.7d	6%	1%	1%	0.3

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.
Maturity date data collected from all locations.

Table 11. Results of soybean cyst nematode greenhouse bioassay performed on soybean entries grown in 2024.

Entry	Originator	SCN Resistance Source[1]	Greenhouse Test HG Type 7 (Race 6) FI	SCN Rating[2]
A174E3	Anderson Seeds	PI 88788	13.6	MR
A1923XF	Anderson Seeds	PI 88788	13.1	MR
A203E3	Anderson Seeds	PI 88788	35.4	MS
BH22Q201	Benson Hill	PI 88788	21.1	MR
BH23Q217	Benson Hill	PI 88788	22.7	MR
BS0622	Brushvale Seed, Inc.	PI 88788	7.8	R
BS91615	Brushvale Seed, Inc.	PI 88788	19.4	MR
e17y993	Benson Hill	PI 88788	16.5	MR
e1993	Benson Hill	PI 88788	14.9	MR
e21y989	Benson Hill	PI 88788	15.0	MR
EL 40-093N	Proseed	PI 88788	24.0	MR
EL 50-063N	Proseed	PI 88788	11.8	MR
EL 50-13N	Proseed	PI 88788	16.2	MR
EL 50-33N	Proseed	PI 88788	13.3	MR
M15-236026	MAES	PI 88788	23.3	MR
M17-148028	MAES	PI 88788	10.1	R
M17-152020	MAES	PI 88788	8.3	R
M17-227057	MAES	PI 88788	10.3	R
MK146	Richland IFC	PI 88788	19.7	MR
MK41	Richland IFC	PI 88788	39.4	MS
MK808CN	Richland IFC	PI 88788	5.9	R
Viking | Blue River 0821N	Albert Lea Seed House	PI 88788	8.8	R
Viking | Blue River 1223N	Albert Lea Seed House	PI 88788	12.9	MR
Viking | Blue River 15B5	Albert Lea Seed House	Peking	25.1	MR
Viking | Blue River 1718N	Albert Lea Seed House	PI 88788	26.6	MR
Viking | Blue River 2022N	Albert Lea Seed House	PI 88788	15.5	MR
Viking | Blue River 23B5	Albert Lea Seed House	Peking	4.7	R
Viking | Blue River 2418N	Albert Lea Seed House	PI 88788	14.5	MR
XF 40-12	Proseed	PI 88788	12.0	MR
XF30-092N	Proseed	PI 88788	10.3	R
XO 0094E	MS Technologies	PI 88788	0.2	R
XO 0234E	MS Technologies	PI 88788	0.5	R
XO 0554E	MS Technologies	PI 88788	0.1	R
XO 0731E	MS Technologies	PI 88788	0.1	R
XO 0993E	MS Technologies	Peking	0.1	R
XO 1095E	MS Technologies	PI 88788	0.4	R
XO 1225E	MS Technologies	PI 88788	0.2	R
XO 1372E	MS Technologies	PI 88788	0.1	R
XO 1404E	MS Technologies	PI 88788	0.2	R
XO 1545E	MS Technologies	Peking	0.8	R
XO 1632E	MS Technologies	PI 88788	0.1	R
XO 1761E	MS Technologies	PI 88788	0.1	R
XO 1822E	MS Technologies	PI 88788	0.4	R
XO 1971E	MS Technologies	PI 88788	0.0	R
XO 2181E	MS Technologies	PI 88788	0.1	R
XO 2282E	MS Technologies	PI 88788	0.1	R

[1] Resistance source provided by originator. NS - indicates SCN source not specified by provider.
[2] SCN 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.