Results of the 2000 Public and Private Soybean Variety Performance Trials

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Minnesota Agricultural Experiment Station scientists annually conduct these tests of adapted public and private soybean varieties. Companies are charged a fee for each variety they enter and these fees are used 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 variety in the next growing season.

Tables 1 to 3 present data from the regular public and private variety tests that are conducted annually at various locations within the northern, central and southern production zones. The map shows test locations and zone boundaries. All of these tests were planted between May 1 and May 25 at planting rates of 160,000 plants/acre. Preplant and postemergence herbicides were used as necessary for good weed control. Row spacings were 30 inches at Becker and Fairmont and 10 inches at Pottsdam and Waltham. Plot combines were used to harvest the yield from all plots

Tables 4 and 5 provide results of the very early (northern Minnesota) and special southeastern Minnesota Public Variety tests. These locations were added to the program to provide data for environments not represented by the other location tests.

Tables 6 to 8 provide results from specific tests of available Roundup Ready® varieties adapted to the northern, central, and southern production zones. Planting was accomplished as described above, except that the only herbicide used was two applications of labeled rates of Roundup®.

Table 9 provides results from the special performance tests of soybean cyst nematode resistant varieties in "infested" field sites near Lamberton, Waseca, Fairmont and Waltham and "non-infested" field sites near Fairmont, Lamberton, and Waseca. Planting techniques were the same as the regular performance tests.

Tables 10 to 13 provide results from the special variety performance tests conducted in white mold infested fields at various locations in Minnesota.

Tables 14 and 15 provide performance and characteristics data from special-use soybean variety tests conducted at several locations. These tests were conducted to provide reliable data for growers who are interested in producing these types of soybeans, which are typically grown under contract.

Table 16 provides important varietal characteristics of publicly developed varieties entered in the 2000 tests.

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

Relative Maturity and Calendar Dates of Maturity:
Soybeans respond to changing day length, so the actual calendar date of maturity is affected by latitude. Each soybean variety has a narrow range of north-south adaptation. Soybean yield and quality are assured if a variety arrives at physiological maturity before a season ending freeze occurs. This date is determined visually by noting the actual date when 95 percent of the pods show their genetically programmed mature color. These dates for 2000 are provided in the tables. Maturity dates in 2000 after September 25 are estimates because widespread frost occurred. Harvest dates are typically 7 to 14 days later, depending upon drying conditions.

Relative maturity ratings are also provided for each variety in the tables. These ratings consist of a number for the maturity group designation (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 variety Agassiz indicated as 0.0, making it the earliest group 0 variety, while Hendricks, with a 0.9 rating, is the latest. These values for public varieties are developed after observing them for several years in many locations. Relative maturity ratings for private varieties in these tables were provided by their owners, and were developed in a similar manner.

Yield:
Because maturity is a very important attribute, varieties are arranged in the tables in order of their actual 2000 calendar date of maturity and not yield performance.

Later maturing varieties can usually be expected to have higher yields than earlier maturing types. If you wish to correctly compare yields, do so only between varieties with similar calendar dates of maturity, usually within 3 to 5 days. More reliable comparisons can be made using variety yields from several consecutive years. All yield determinations were made from replicated tests harvested with a plot combine.

LSD values associated with the data in these tables are measures of variability within the trials. If a yield difference between two varieties within a single column exceeds this LSD value you can assume that the higher yielding variety was truly better yielding. A 20 percent level of significance is used in all these tables. This means that yield differences exceeding the stated LSD value are real 80 percent of the time.

Chlorosis:
These ratings are based on how much of the leaf area was yellowing in tests conducted on high lime (high pH) soils near Granite Falls and Foxhome in 2000. Comparing chlorosis scores of varieties permits you to estimate how well they perform relative to each other. Actual chlorosis ratings can vary depending on the specific site and year of test. **Chlorosis symptoms for all varieties in these 2000 tests were much more severe than in previous years.** Specific scores and evaluation dates from the 2000 test at both locations are provided at the following web site www.mnsoybean.org.

Some universities and companies use numerical scores rather than word descriptors to describe chlorosis tolerance. A comparison of these systems follows:

Numerical Score		Rating
1-5 scale	1-9 scale	
1 to 2	1 to 2.5	Tolerant (T)
2.1 to3	2.6 to 5	Moderately Tolerant (MT)
3.1 to 4	5.1 to 7.5	Moderately Susceptible
4.1 to 5	7.5 to 9	(MS)
		Susceptible (S)

Protein and Oil:
Protein and oil values were determined on mature seed using near infrared reflectance analysis equipment. The table values are for the 2000 season only, absolute values of protein and oil can vary from year to year. Protein and oil values are expressed on a 13 percent moisture basis. This formula converts the protein and oil values to another moisture basis:

$$\frac{\text{100-desired moisture}}{87} \quad \mathbf{X} \quad \text{protein or oil value given in the table}$$

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

$$APV = 60\left[Po\,(X) + \frac{Pm}{.44}\,(Y)\right]$$

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:
$$* \frac{\text{price of meal \$/ton}}{2000} = \text{\$/pound}$$

Phytophthora:
Phytophthora root rot can cause significant yield reductions if susceptible varieties are planted in poorly drained, infested fields. There are several known races of this fungus, so it is important to

know which are present in your field. Genes can be incorporated into varieties to provide resistance to specific races of this disease.

Genes for resistance to various races of Phytophthora root rot

Gene	Races
Rps1-a	1, 2, 10, 11, 13, 15-18, 24, 26, 27
Rps1-b	1, 3-9, 13-15, 17, 18, 21, 22
Rps1-c	1-3, 6-11, 13, 15, 17, 21, 23, 24, 26
Rps1-k	1-11, 13-15, 17, 18, 21, 22, 24, 26
Rps3	1-5, 8, 9, 11, 13, 14, 16, 18, 23, 25
Rps4	1-4, 10, 12-16, 18-21, 25
Rps6	1-4, 10, 12, 14-16, 18-21, 25

Some published information refers to Phytophthora "tolerance" or "field resistance," which is not race-specific and should not be confused with race specific resistance. Reliable tests for tolerance have not yet been developed.

The data tables in this report indicate which Phytophthora gene or genes is/are present in each variety. The above listing will tell you which genes provide resistance to the various races.

Soybean Cyst Nematode:

Soybean Cyst Nematode (SCN) was first identified in Minnesota in 1978 and is now known to occur in many Minnesota counties where the soybean is grown. Both the area of infestation and numbers 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, 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 its impact on yield.

Yield performance results of susceptible, moderately resistant, and resistant varieties planted in infested and non-infested fields in southern Minnesota are provided in Table 9.

Additional information on procedures for testing your fields for SCN can be obtained from your county extension office or the Soybean Nematology Lab at the Southern Research and Outreach Center in Waseca, MN 56093.

Management information is available from your county extension office or from the Minnesota Soybean Research and Promotion Council, 360 Pierce Avenue, Suite 110, North Mankato, MN 56003, 1-888-896-9678, www.mnsoybean.org

White Mold:

White Mold, also known as Sclerotinia Stem Rot, has developed with increasing frequency in Minnesota soybean fields. Planting less susceptible varieties, in wider row spacings, and at lower populations are the most effective methods of reducing disease severity. Accurate ratings for soybean variety resistance to white mold are difficult to obtain because both infection and disease development are dependent on weather conditions during and after flowering. Because of this variability, a variety's performance can change significantly among locations and years depending on the interaction of plant development, precipitation, and temperature. Growers concerned about variety performance in the presence of white mold should plant varieties that show consistently less white mold in several years of testing.

In 2000, adapted soybean varieties were evaluated under field conditions in the three soybean maturity zones in Minnesota; Southern, Central, and Northern. Disease development was promoted by irrigation, inoculation of fields with sclerotia, and rotation with a crop susceptible to white mold. Significant white mold developed at four of the seven locations. Tests were conducted by J. E. Kurle, Department of Plant Pathology, University of Minnesota. Data collected consisted of ratings of white mold incidence (percentage of plants infected), lodging severity, and yield. **Varieties were ranked in order of increasing susceptibility to white mold.**

Additional white mold management information is available from Minnesota Soybean Research and Promotion Council, 360 Pierce Avenue, Suite 110, North Mankato, MN 56003, 1-888-896-9678, www.mnsoybean.org.

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 varieties, or longer rotations, assist in the management of this disease. IA 1006, Freeborn, Granite, Faribault, Archer, and IA2008R are available public varieties with resistance to BSR. 2063RR, LO292, 1174WM, and L1309CN are the privately developed varieties reported to be resistant to BSR.

Some information refers to "tolerance" or "field resistance." Reliable tests for tolerance or field resistance have not yet been developed.

Special Use Varieties:
Recently there has been increased interest in producing soybeans with special characteristics important to specialty food product manufacturers. Soybean scientists previously developed some of these special-use varieties, which were general releases, but more recently have been releasing some of them under exclusive contracts to specific companies who will then contract with growers for their production.

Tables 14 and 15 present the most recent data available on the performance and characteristics of several of these special use varieties. If you are interested in further information about these varieties, contact the owner/developer or exclusive marketing company.

PUBLICLY DEVELOPED VARIETIES
Important characteristics of the publicly developed varieties entered in 2000 tests is presented in table 16.

PRIVATELY DEVELOPED VARIETIES
Contact addresses and brand names for privately developed varieties entered in these tests are:

Agri-Tel GrainBox 808, Beause Jour, MB, Roe OCO
AgriPro Seeds (AP), P.O. Box 250, Brookings, SD 57006-0250
Albert Lea Seed House (Viking), P.O. Box, 127, 1414 W. Main, Albert Lea, MN 56007
Anderson Seeds (Anderson), RR 3 Box 94, St. Peter, MN 56082
CroPlan Genetics (CroPlan), P.O. Box 64406 MS7455, St. Paul, MN 55164
Crow's Hybrid Corn Co, Box 306, Milford, IL 60953
Dahlco Seeds (Dahlco), 14730 15th St. S.W., Cokato, MN 55321
Dahlman Seeds (Dahlman), 73504 200th St., Dassel, MN 55325
Dairyland Seed Co., Inc. (Dairyland), 3570 Highway H, P.O. Box 958 West Bend, WI 53095
Dennis Ewing Farm Seed (Yield King), 6131 North Fork Road, Ames, IA 50010
Farm Advantage, 1275 Hwy 69, Belmond, IA 50421
Garst Seed Co. (Garst), 2369 330th Street, Box 500, Slater, IA 50244
Gold Country Seed, Inc. (Gold Country), 16506 Hwy. 15 N, P.O. Box 604, Hutchinson, MN 55350
Golden Harvest Seeds (Golden Harvest), P.O. Box A, Waterloo, NE 68069
Great Lakes Hybrids, Inc. (Great Lakes), 9915 W. M-21, Ovid, MI 48866
Hyland Seeds (Hyland) Div. of W.G. Thompson and Sons, Ltd., P.O. Box 130, 145 Marlborough St., Blenheim, Ontario N0P 1A0 Canada
Hy-Vigor Seeds, R.R.1, Paullina, IA 51046
Jung Seed Genetics (Jung), 341 S. High St., Randolph, WI 53956
Kaltenberg Seeds (Kaltenberg), 5506 State Hwy 19, Waunakee, WI 53597
Kruger Seed Company (Kruger), Highway 20 East, Box A, Dike, IA 50624
KSC/Challenger (KSC/Challenger), Box A, Dike, IA 50624
Latham Brothers Farm (Latham), 131 180th St., Alexander, IA 50420
Latham Seed Company (Latham), 131 180th St., Alexander, IA 50420
LG Seeds (LG), 710 N Main St., Suite 201, River Falls, WI 54022

Mallard Seed Co., (Mallard) P.O. Box 637, Plainview, MN 55964
Midwest Seed Genetics (MW Genetics), P.O. Box 518, Carroll, IA 51401
Monsanto Global Seed Group, (Dekalb, Asgrow), 3100 Sycamore Road, Dekalb, IL 60115
Mycogen Seeds, 9330 Zionsville RD, Indianapolis, IN 46268
Mustang Seed, Box 466, Madison, SD 57042
NorthStar Genetics (NS), Box 40, Wanamingo, MN 55983
Novartis Seeds (NK), 7500 Olson Memorial Hwy, Golden Valley, MN
Pioneer Hi-Bred Int'l, Inc. (Pioneer), 130 SE Willmar Ave., Willmar, MN 56201
Prairie Brand Research (PBR), 15 X Ave., Story City, IA 50248
Prairie Brand Seed Company (Prairie Brand), 15 X Ave., Story City, IA 50248
Profiseed, Inc. (Profiseed), 1691 Highway 65, Hampton, IA 50441
Ramy International, Ltd. (Ramy), 1329 N. Riverfront Drive, Mankato, MN
Renk Seed Co., (Renk) 6800 Wilburn Rd., Sun Prairie, WI 53590
Sand Seed Service, Inc. (Sands), 4765 Highway 143, Marcus, IA 51035
Sansgaard Seed Farms, Inc. (Sansgaard), 15 X Avenue, Story City, IA 50248
Stine Seed Co., 2225 Laredo Trail, Adel, IA 50003
Stine Seed Farm, 2225 Laredo Trail (Stine), Adel, IA 50003
Terning Seeds, 15365 60th St. SW, Cakato, MN 55321
Thompson Agronomics, Inc., 40321 130th Avenue (Thompson), Leland, IA 50453
Thompson Seeds, Inc., 40321 130th Ave. (Thompson), Leland, IA 50453
Top Farm Hybrids (Top Farm), P.O. Box 850, Cokato, MN 55321
Trelay Seeds (High Cycle), 11623 State Road 80, Livingston, WI 53544
UAP Seeds (UAP), Box 55, Kasota, MN 56050
United Suppliers Inc, (U.S. Seeds) 30473 260th St., P.O. box 538, Eldora, IA 50627
Wensman Seed Company (Wensman), P.O. Box 190, Wadena, MN 56482
Ziller Seed Co., Inc. (Ziller), 76374 380th St, Bird Island, MN 55310