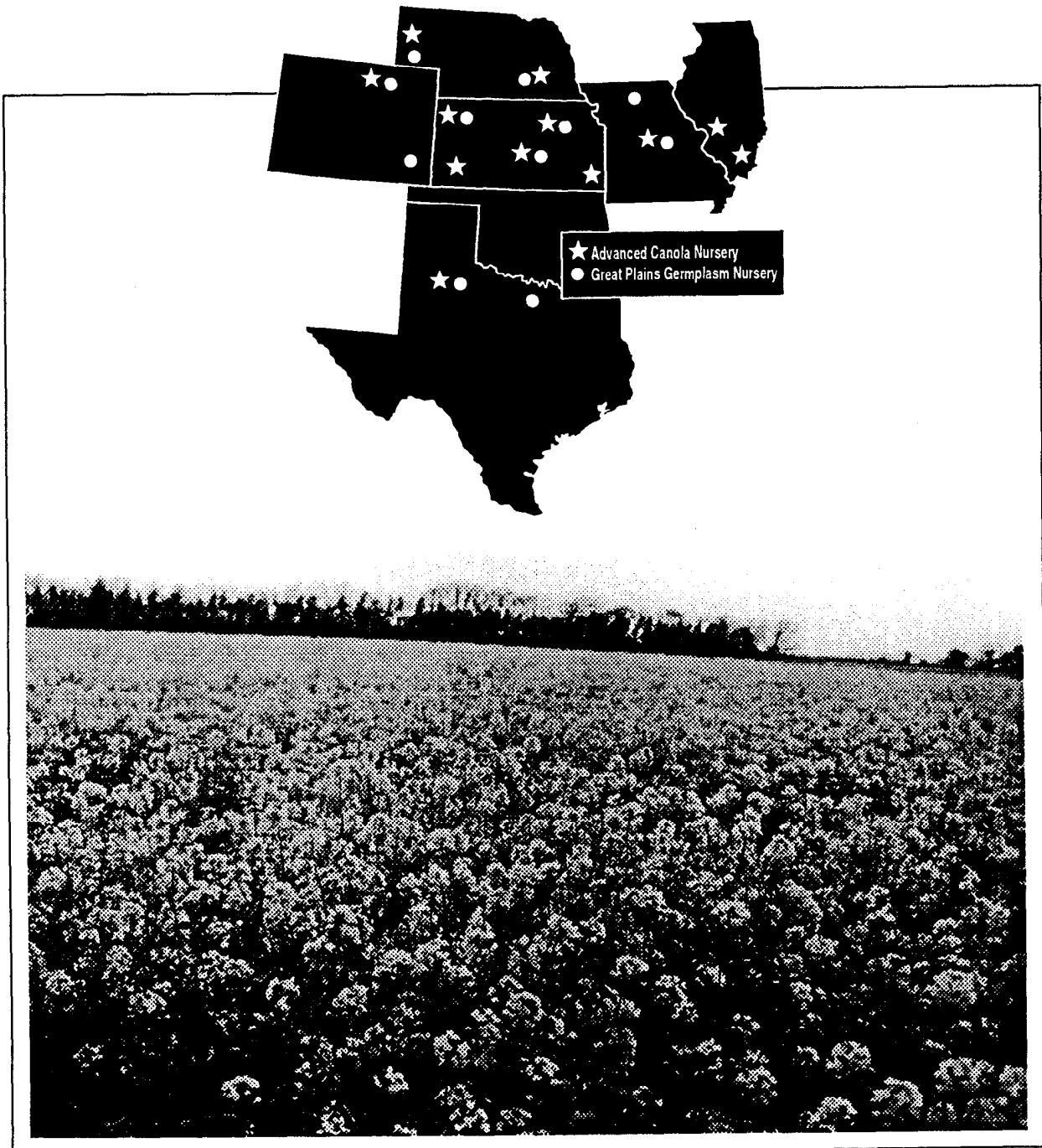


1995 GREAT PLAINS CANOLA RESEARCH



Report of Progress 763

Agricultural Experiment Station, Kansas State University, Marc A. Johnson, Director

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Trade names are used to identify products. No endorsement is intended, nor is any criticism implied of similar products not named.

INTRODUCTION

Canola is a specific crop developed from rapeseed. Canola also has been called double zero rapeseed because of the low contents of erucic acid (less than 2 percent in the oil) and glucosinolates (less than 30 micromoles per gram in the oil-free meal). Food and oil-processing industries have a high interest in canola, because it produces a high-quality oil that is lower in saturated fat than other sources of dietary fats. The meal remaining after oil extraction is used as a protein supplement by the livestock industry.

Rapeseed production was first reported in Europe in the 1600's. During the 1950's, 60's, and 70's, rapeseed varieties were developed in Canada that were low in erucic acid and glucosinolates, and the term canola was coined to describe these varieties. In 1986, canola oil was given GRAS status, and it began appearing on grocers' shelves in the United States. Canola oil consumption in the U.S. has gone from zero prior to 1986 to the equivalent of over 2 million acres of production in 1994. Seventy percent of this oil is imported from Canada. This represents an increase in consumption of 50% since 1992. Canola is one of the few new crops that possesses a substantial market before its production is established.

Canola-quality varieties of rapeseed have been developed from two species, *Brassica napus* and *B. rapa*. Both species have spring and winter types. In general, *B. napus* is later, higher yielding, more winter hardy, and easier to harvest than *B. rapa*. Nearly all canola grown in the U.S. is *B. napus*. Winter canola yields are generally 30% greater than yields of the spring types. This difference can even be more pronounced in areas similar to the Great Plains, where high temperatures in the early summer are common.

Winter canola is planted in late summer. The plants need to reach the 6 to 8 true-leaf stage and about 8 to 10 inches in height before freeze down to increase winter survival. Plants overwinter as rosettes and bolt early the next spring. Harvest takes place about the same time as winter wheat harvest in a given area.

Canola research began in the Great Plains in the late 1980's. Industrial rapeseed had been investigated prior to this, but because of the limited demand for this product, interest was low. Canola production was attempted in the late 1980's but was not successful. The lack of success was primarily due to the lack of adapted varieties, the lack of management recommendations for the area, and the lack of a local market for the crop. In 1992, a canola breeding project was established at Kansas State University to determine the potential of developing canola varieties that are adapted to the Great Plains region. Since that time, canola-quality lines have been selected and identified that are significant improvements over previously tested varieties. Advancements in production research have led to management recommendations consistent with the conditions of the region. An increased oil consumption has led to increased demand for canola seed and a market interest by oil processors.

1995 REGIONAL CANOLA TESTS

Objectives

The objectives of these tests were to evaluate germplasm over a wide range of environments. Two regional nurseries were coordinated from Kansas State University during the 1994-95 growing season. The Great Plains Regional Germplasm Evaluation Nursery (GPRN) was established to evaluate plant introduction lines for their potential use

and value in a breeding program. The Advanced Canola Nursery (ACN) was established to evaluate material that had been selected and advanced and has potential to become new released canola varieties for use in the Great Plains region. The wide diversity in environments has increased our knowledge and understanding of rapeseed germplasm for use in the Great Plains.

Procedures

The ACN was established at 12 locations in 6 states during the fall of 1994. This test included 7 released varieties as checks and 21 experimental lines originally selected at Hays and Colby, Kansas and Columbia, Missouri. Management guidelines were supplied to each cooperator, but past experience at that locality was used for final management decisions. Local management and site descriptions can be found in Table 1. All tests were planted in small plots (approximately 100 square feet) and replicated 3 times. This nursery was continued in 1995-96 and included the 12 experimental lines that performed best in 1994-95 and 11 released varieties as checks. It has been established at 19 locations in 8 states.

The GPRN included 5 canola-quality check varieties and 28 plant introduction (PI) lines that had previously demonstrated increased winter hardiness. The PI lines were collected from areas around the world where growing conditions resembled those in the Great Plains. These tests were established at 11 locations in 5 states (Table 1). As with the ACN, management guidelines were supplied, but local experience was used. These tests also were established in small plots with 3 replications. In 1995, these tests were established with the same entries at the same

locations, and a second year's results will be available.

1994-1995 Growing Conditions

Fall establishment was successful at all locations except one (Sidney, NE; GPRN). Fall growth was greater than normal, and plants at most locations went into the winter with excessive growth. The winter of 1994-95 was milder than normal for all locations involved in these tests. Spring stands were excellent at most locations. The GPRN at Lincoln, NE was the only test to suffer sufficient winterkill to be abandoned at winter's end. Ft. Collins, CO lost both tests in late spring because of a late spring freeze that was aggravated by extremely dry conditions. The April freeze that reduced wheat yields in western Kansas damaged developing branches, but most lines were able to compensate with secondary branching, so yield reduction was minimal. A freeze in Lubbock, TX during budding was responsible for later fertility problems, and seed set was reduced to almost nothing. Excessive rain in April and May waterlogged several locations, and yields were reduced severely. The GPRN at Manhattan, KS was attacked by crown rot and was not harvested because of severe lodging. Yields at Parsons, KS were reduced (about 50%) by intense straight-line winds 2 days before harvest.

ACKNOWLEDGMENTS

This work was funded in part by the National Canola Research Program, United States Department of Agriculture, Cooperative States Research Program; a Special Research Grant for canola research from the United States Department of Agriculture, Cooperative States Research Program; and the Kansas Agricultural Experiment Station.

Table 1. Site Descriptions for Locations of the 1994-95 Advanced Canola Nursery (ACN) and Great Plains Regional Nursery (GPRN).

Location and Cooperator	Test	Irrigation and Rainfall	Dates of Planting and Harvest	Soil Type and Previous Crop	Fertilizers Applied, lbs/a 1/	Seeding Rate and Row Spacing	Average Winter Survival
Parsons, KS Jim Long	ACN	none 47.7	09-Sep 02-Jul	Parson Silt Loam Wheat	F: 40 50 50 S: 0 0 0	7 lb/a 7 in	78%
Manhattan, KS Charlie Rife	ACN	none 37.9	06-Sep 10-Jul	Ivan Silt Loam Oats	F: 43 10 0 S: 80 0 0	5 lb/a 10 in	92%
Manhattan, KS Charlie Rife	GPRN	none 37.9	06-Sep not harvested	Ivan Silt Loam Oats	F: 43 10 0 S: 80 0 0	5 lb/a 10 in	69%
Hutchinson, KS Bill Heer	ACN	none 30.4	01-Sep 27-Jun	Ost Silt Loam Wheat	F: 75 40 0 S: 0 0 0	5 lb/a 10 in	100%
Hutchinson, KS Bill Heer	GPRN	none 30.4	01-Sep 27-Jun	Ost Silt Loam Wheat	F: 75 40 0 S: 0 0 0	5 lb/a 10 in	100%
Garden City, KS Merel Witt	ACN	none 24.2	12-Sep 14-Jul	Keith Silt Loam Fallow/wheat	F: 50 0 0 S: 0 0 0	9 lb/a 12 in	85%
Colby, KS Herb Sunderman	ACN	1.5 21.2	22-Aug 13-Jul	Keith Silt Loam Wheat	F: 50 0 0 S: 0 0 0	3 lb/a 12 in	99%
Colby, KS Herb Sunderman	GPRN	1.5 21.2	22-Aug 13-Jul	Keith Silt Loam Wheat	F: 50 0 0 S: 0 0 0	3 lb/a 12 in	95%
Columbia, MO Harry Minor	ACN	1.0 22.4	07-Sep 27-Jun	Mexico Silt Loam Wheat	F: 50 100 100 S: 50 0 0	7.5 lb/a 7.5 in	85%
Columbia, MO Harry Minor	GPRN	1.0 22.4	07-Sep 27-Jun	Mexico Silt Loam Wheat	F: 50 100 100 S: 50 0 0	7.5 lb/a 7.5 in	85%
Novelty, MO Harry Minor	GPRN	none 24.3	09-Sep 11-Jul	Putnam Silt Loam Wheat	F: 50 0 0 S: 50 0 0	7.5 lb/a 7.5 in	57%
Carbondale, IL Mike Schmidt	ACN	none 49.5	19-Sep 19-Jun	Stoy Silt Loam Wheat	F: 30 0 0 S: 120 0 0	5.5 lb/a 7.5 in	91%
Belleveille, IL Mike Schmidt	ACN	none 49.0	21-Sep 20-Jun	Ebbert Silt Loam Wheat	F: 30 0 0 S: 120 0 0	5.5 lb/a 7.5 in	77%
Lincoln, NE Lenis Nelson	ACN	none 22.1	02-Sep 14-Jul	Sharpsburg Silt Clay Loam Oats	F: 18 46 0 S: 42 0 0	5 lb/a 12 in	63%
Lincoln, NE Lenis Nelson	GPRN	none 22.1	02-Sep not harvested	Sharpsburg Silt Clay Loam Fallow	F: 18 46 0 S: 0 0 0	5 lb/a 12 in	22%
Scottsbluff, NE David Baltensperger	ACN	7.0 19.5	23-Aug 21-Jul	Tripp Fine Sandy Loam Wheat	F: 0 0 0 S: 0 0 0	5 lb/a 12 in	100%
Scottsbluff, NE David Baltensperger	GPRN	7.0 19.5	23-Aug not harvested	Tripp Fine Sandy Loam Wheat	F: 0 0 0 S: 0 0 0	5 lb/a 12 in	100%
Ft. Collins, CO Dwane Johnson	ACN	none 9.3	15-Sep not harvested	Nunn Clay Loam Pinto Beans	F: 0 0 0 S: 0 0 0	5 lb/a 12 in	25%
Ft. Collins, CO Dwane Johnson	GPRN	none 9.3	15-Sep not harvested	Nunn Clay Loam Pinto Beans	F: 0 0 0 S: 0 0 0	5 lb/a 12 in	18%
Walsh, CO Dwane Johnson	GPRN	none 28.1	05-Sep 17-Jul	Wiley Silt Loam Fallow/Wheat	F: 7 24 0 S: 0 0 0	10 lb/a 12 in	100%
Lubbock, TX Dick Auld	ACN	9.1 52	14-Sep not harvested	Amarillo Fine Sandy Loam Impoved Pasture - 5 yea	F: 52 0 0 S: 0 0 0	8 lb/a 10 in	100%
Lubbock, TX Dick Auld	GPRN	9.1 52	14-Sep not harvested	Amarillo Fine Sandy Loam Impoved Pasture - 5 yea	F: 52 0 0 S: 0 0 0	8 lb/a 10 in	100%
Munday, TX David Bordousky	GPRN	7.7 24.4	27-Sep 02-Jun	Miles Fine Sandy Loam Fallow/Cantaloupes	F: 37 0 0 S: 0 0 0	4.7 lb/a 10 in	100%

1/ F = fall applications and S = spring applications.

Table 2. Yield (lb/a) for 10 Locations of the 1994-95 Advanced Canola Nursery.

Line	Parsons KS	Manh. KS	Hutch. KS	Garden KS	Colby KS	Colum. MO	Carb. IL	Bellev. IL	Lincoln NE	Scotts. NE	Mean	Mean (%Avg)	Mean (-NES)
Ceres	779	665 *	1701 *	2047	1299 *	1592 *	2341 *	1341 *	613 *	2551	1493 *	127.7 *	1375 *
KS-M3580	1048 *	706 *	1682 *	1345	746	1072	2078 *	1574 *	783 *	3190	1422 *	121.7 *	1226 *
KayStar 11	672	455 *	1103	1368	1523 *	1602 *	2122 *	1304 *	326	3583	1406 *	120.2 *	1164
MO-503-1	1075 *	629 *	1553 *	1075	1033 *	1287 *	1572	1438 *	663 *	3144	1347 *	115.2 *	1147
KS-M3635	887 *	645 *	1878 *	1438	931	1183 *	1772	1169	479 *	2805	1319	112.8	1153
Liborius	726	492 *	1324	1029	1052 *	1280 *	1952 *	897	410	3741	1290	110.4	1018
KS-C3504	1156 *	469 *	1400 *	1385	961	1460 *	1831	1111	558 *	2516	1285	109.9	1148
MO-503-24	806 *	573 *	1629 *	1452	671	1320 *	1718	1368 *	612 *	2523	1267	108.4	1128
KS3579	833 *	711 *	1755 *	812	1064 *	1558 *	1594	1332 *	694 *	2296	1265	108.2	1150
KS-C3505	1048 *	465 *	1205	1553	1240 *	942	2375 *	1046	527 *	1994	1239	106.0	1156
MO-513-9	779	572 *	1667 *	1164	891	1434 *	1952 *	1223	492 *	2056	1223	104.6	1130
KS-C806	860 *	492 *	1955 *	1132	932	979	1657	1183	531 *	2494	1222	104.5	1080
MO-503-9	699	356	1412 *	1353	846	1082	1716	1217	369	2930	1198	102.5	1007
KS-C1701	1183 *	716 *	1344	1286	891	1171 *	1948 *	927	637 *	1858	1196	102.3	1122
MO-503-2	672	585 *	1905 *	1214	581	1570 *	1320	1202	300	2504	1185	101.4	1039
Glacier	753	358	1412 *	1687	784	1388 *	1901	864	441	2125	1171	100.2	1065
KS-C2504	1048 *	333	1219	703	962	927	2182 *	1210	484 *	2616	1168	99.9	1008
KS-M3346	726	473 *	1498 *	1373	867	820	1972 *	947	520 *	-----	1145	97.9	1022
KS-M3314	1102 *	460 *	1586 *	889	1291 *	1193 *	1688	1466 *	476 *	1007	1116	95.5	1128
KS-C3104	914 *	507 *	1340	986	662	547	1762	681	723 *	2624	1075	91.9	902
KS-M3311	887 *	564 *	1618 *	1360	1207 *	866	2251 *	1040	496 *	424	1071	91.6	1143
KS-C3208	914 *	395	785	1268	878	756	2163 *	996	709 *	1781	1064	91.1	985
Winfield	618	609 *	1918 *	1178	589	933	1316	1283 *	374	1555	1037	88.7	980
KS-M3403	941 *	431 *	1679 *	1265	363	872	1095	701	376	2559	1028	88.0	858
KS-C2403	833 *	506 *	1807 *	968	538	776	1441	1000	336	1964	1017	87.0	912
Bridger	806 *	155	1517 *	1076	342	1049	1148	622	427	2338	948	81.1	794
KS-M3723	753	437 *	1453 *	1044	467	612	1324	948	399	770	821	70.2	826
Cathy	0	76	1082	534	590	383	1114	888	235	2338	724	61.9	545
Mean	840	494	1515	1214	864	1095	1761	1106	500	2304	1169	100.0	1043
L.S.D. (.05)	392	288	604	NS	538	502	461	318	324	NS	172	14.7	171
C.V. (%)	29	36	24	43	38	28	19	21	40	40	29	29	31

* Upper L.S.D. group - Differences among those marked with an asterisk are not statistically significant.

Table 3. Winter Survival (% Survived) and Field Survival Index for 8 Locations of the 1994-95 Advanced Canola Nursery.

Line	Parsons KS	Manh. KS	Garden KS	Colby KS	Carb. IL	Bellev. IL	Lincoln NE	Ft Collins CO	Means	FSI 1/
KS3579	91.7 *	98.0 *	82.7	100.0 *	92.6 *	77.7 *	88.3 *	75.7 *	89.6 *	36.9
KS-C3504	90.0 *	95.3 *	93.3	100.0 *	91.6 *	80.0 *	75.0 *	56.1 *	86.8 *	31.7
KS-C3505	90.0 *	95.3 *	97.0	100.0 *	91.0 *	81.1 *	71.7 *	51.4	86.4 *	32.1
KS-M3580	90.0 *	96.0 *	91.0	100.0 *	87.4	76.4 *	76.7 *	22.0	82.2	28.4
KS-C806	88.3 *	89.7	95.0	100.0 *	88.1	77.2 *	73.3 *	25.7	81.9	27.4
MO-503-1	83.3 *	93.3 *	91.7	99.3 *	94.9 *	82.0 *	65.0	26.1	81.7	27.0
KS-C3104	85.0 *	95.3 *	88.3	99.3 *	93.3 *	78.9 *	75.0 *	19.4	81.6	22.8
KS-M3311	78.3 *	96.0 *	94.3	100.0 *	83.5	83.7 *	81.7 *	16.9	81.6	29.7
Ceres	81.7 *	92.0 *	94.3	100.0 *	92.9 *	64.7	68.3	31.5	80.6	26.9
KS-C1701	86.7 *	99.3 *	64.3	100.0 *	96.5 *	78.9 *	71.7 *	27.5	80.5	23.4
MO-513-9	88.3 *	93.7 *	87.7	100.0 *	92.7 *	74.1	61.7	22.7	80.1	26.9
KS-M3403	83.3 *	83.3	93.3	100.0 *	86.9	65.9	65.0	41.0	79.9	28.3
MO-503-24	81.7 *	92.7 *	97.0	100.0 *	89.6	84.2 *	56.7	15.9	79.7	23.3
KS-C2504	86.7 *	94.0 *	81.7	100.0 *	94.0 *	69.4	58.3	32.5	79.6	25.9
Winfield	83.3 *	94.3 *	93.3	100.0 *	74.9	75.0 *	53.3	37.6	79.1	26.0
KS-C3208	81.7 *	93.7 *	91.0	100.0 *	89.1	75.6 *	78.3 *	0.0	78.8	30.1
MO-503-9	86.7 *	92.7 *	66.0	100.0 *	92.7 *	85.1 *	68.3	16.8	78.7	22.3
Glacier	71.7	87.3	83.3	100.0 *	98.0 *	77.6 *	60.0	28.0	78.4	21.1
KS-M3635	80.0 *	96.0 *	94.3	99.3 *	89.1	81.7 *	58.3	6.0	78.3	22.8
KS-C2403	85.0 *	95.7 *	69.3	99.3 *	89.6	74.0	61.7	26.4	77.9	22.6
KS-M3723	71.7	88.7	83.3	100.0 *	91.5 *	84.5 *	58.3	19.0	77.4	19.2
MO-503-2	70.0	95.0 *	93.3	100.0 *	96.5 *	80.2 *	50.0	2.3	76.4	19.5
KS-M3346	68.3	86.7	93.3	100.0 *	90.8 *	81.9 *	46.7	15.1	75.9	20.0
Bridger	71.7	89.7	91.0	93.3	91.1 *	66.3	61.7	13.4	75.3	17.9
KS-M3314	81.7 *	96.3 *	61.0	100.0 *	90.3 *	75.4 *	50.0	15.6	74.5	20.4
Liborius	76.7 *	92.5 *	61.7	100.0 *	91.1 *	66.0	55.0	18.0	73.4	16.7
KayStar 11	46.7	85.0	77.7	100.0 *	91.4 *	69.5	40.0	25.8	70.7	13.8
Cathy	5.0	79.3	56.7	91.7	85.7	86.7 *	30.0	16.8	61.3	-0.0
Mean	78.0	92.4	84.5	99.4	90.6	76.9	62.9	25.2	78.9	----
LSD (.05)	16.9	8.4	NS	4.3	8.3	12.3	19.1	22.1	5.4	----
CV (%)	13.3	5.6	25.6	2.6	6.5	11.6	18.6	42.7	12.8	----

Note: Hutchinson, KS; Scottsbluff, NE; and Lubbock, TX had 100% survival for all lines.

1/ FSI = Field Survival Index. A measure of relative hardiness over environments where differential winter kill occurred.

Table 4. 50% Bloom Dates (Days from April 1) for 7 Locations of the 1994-95 Advanced Canola Nursery.

Line	Parsons KS	Manh. KS	Hutch. KS	Garden KS	Colby KS	Carb. IL	Lincoln NE	Mean
KS3579	-2.0 e	6.7 e	2.7 e	34.0	24.7 e	0.7	35.0 e	14.5 e
KS-C2504	1.7	9.0	4.3 e	34.3	28.0	-2.3 e	37.3	16.0
Bridger	3.3	11.7	5.3 e	33.3	27.3	-3.3 e	39.7	16.8
Winfield	4.3	10.3	5.0 e	34.0	26.0 e	3.3	38.7	17.4
KS-C2403	4.3	11.7	8.7	33.5	25.3 e	2.3	38.0	17.7
KS-C806	3.7	10.0	11.7	33.0	25.3 e	3.0	39.7	18.0
MO-503-2	5.7 I	13.0	10.0	33.0	25.7 e	3.0	39.7	18.6
KS-M3346	6.0 I	13.0	10.3	33.7	28.0	0.7	39.3	18.7
MO-503-1	6.0 I	12.3	9.3	33.3	26.0 e	4.0	42.0 I	19.0
MO-513-9	6.0 I	13.3	10.0	33.3	25.0 e	4.3	42.0 I	19.1
KS-M3314	6.3 I	13.3	11.0	33.0	27.3	3.3	40.3	19.2
KS-M3311	6.7 I	13.0	11.0	32.3	25.0 e	5.3	41.7 I	19.3
KS-M3580	5.0 I	11.7	13.3 I	33.0	25.7 e	5.0	41.7 I	19.3
KS-C3104	5.3 I	14.0	14.0 I	33.7	27.3	3.7	38.3	19.5
MO-503-24	7.7 I	13.3	11.7	33.3	25.0 e	4.3	41.0 I	19.5
MO-503-9	6.3 I	13.7	10.7	33.0	25.3 e	5.7	42.0 I	19.5
KS-M3723	6.7 I	14.3	12.7 I	34.3	27.3	2.3	39.0	19.5
KS-C1701	7.0 I	13.0	10.7	33.5	27.0	4.7	41.0 I	19.5
Cathy	6.3 I	13.3	13.0 I	34.3	27.0	1.7	41.7 I	19.6
KS-C3208	6.0 I	13.3	14.3 I	33.7	28.0	4.0	38.3	19.7
KS-M3403	5.0 I	14.3	12.7 I	32.3	27.3	5.7	41.3 I	19.8
KS-M3635	7.3 I	14.0	12.0 I	33.7	25.3 e	5.7	42.7 I	20.1
Ceres	6.0 I	15.0	14.3 I	32.7	25.3 e	8.0 I	42.0 I	20.5
Glacier	6.0 I	17.0 I	16.7 I	33.0	25.3 e	5.7	42.0 I	20.8
KS-C3504	6.3 I	16.0 I	15.3 I	32.7	27.3	7.0	42.3 I	21.0 I
KayStar 11	6.7 I	16.7 I	15.3 I	33.3	27.7	6.3	41.3 I	21.0 I
Liborius	7.3 I	15.0	16.3 I	33.5	27.3	8.0 I	41.7 I	21.3 I
KS-C3505	7.7 I	15.0	14.7 I	33.7	30.0 I	9.7 I	42.7 I	21.9 I
Mean	5.5	13.1	11.3	33.4	26.5	4.0	40.4	19.2
LSD (.05)	2.8	1.5	4.8	NS	1.6	2.3	2.2	1.0
CV (%)	30.5	7.2	25.9	2.5	3.7	35.8	3.4	8.3

Note: Values marked "e" are not statistically different from the earliest value, and those marked "I" are not statistically different from the latest value.

Table 5. Plant Height (in) for 8 Locations of the 1994-95 Advanced Canola Nursery.

Line	Manh. KS	Garden KS	Colby KS	Colum. MO	Carb. IL	Bellev. IL	Lincoln NE	Lubbock TX	Means
Cathy	42s	27s	40s	39s	47	45s	49s	34	40s
KS3579	45s	30s	46	38s	42s	45s	56	31	42s
KS-C806	43s	32s	46	39s	44s	46	50s	33	42s
Bridger	40s	35	43s	40s	43s	45s	54	34	42s
KS-C2504	44s	29s	46	39s	45s	47	53s	32	42s
KS-M3723	41s	32s	46	40s	44s	41s	56	34	42s
KS-C2403	47t	31s	44s	41s	46	46	55	32	43
Winfield	49t	33s	44s	42s	45s	47	54	34	43
KS-M3314	46t	29s	46	41s	49	49	57	32	44
KS-M3311	50t	35	46	43	46	45s	56	30	44
KS-M3403	42s	36t	49	42s	47	47	59	36	45
KS-C3104	42s	35	50	43	48	49	62t	32	45
KS-C3208	46t	33s	50	41s	50	49	61t	33	45
KS-M3346	49t	36t	48	41s	49	47	55	38	45
KS-M3580	47t	33s	50	45t	47	50t	59	35	46
MO-513-9	49t	33s	51	46t	46	50t	61t	31	46
Ceres	50t	36t	49	42s	49	50t	64t	31	46
MO-503-2	52t	35	50	46t	47	50t	59	33	46
MO-503-1	50t	34	54t	44t	47	48	63t	35	47
MO-503-24	49t	38t	48	45t	48	49	65t	33	47
KS-M3635	47t	38t	53t	43	48	52t	59	34	47
KS-C1701	50t	33s	52t	45t	50	49	65t	32	47
Liborius	51t	31s	55t	43	50	52t	62t	35	47
KayStar 11	52t	36t	56t	47t	50	46s	62t	32	47
MO-503-9	47t	36t	52t	43	48	54t	62t	37	47
Glacier	51t	37t	55t	48t	51	50t	61t	38	49t
KS-C3505	48t	42t	55t	42s	53t	52t	64t	36	49t
KS-C3504	50t	35	54t	47t	55t	54t	65t	35	49t
Mean	47	34	49	43	48	48	59	34	47
L.S.D.(.05)	6	6	4	4	4	5	5	7	2
C.V.(%)	8.1	11.6	4.7	6.3	5.7	6.8	4.6	12.2	6.7

Note: Those values marked "s" are not statistically different from the shortest plant height, and those marked "t" are not statistically different from the tallest plant height.

Table 6. Shattering (%) for 5 Locations and Lodging (%) for 5 Locations of the 1994-95 Advanced Canola Nursery.

Line	Shattering						Lodging					
	Manh. KS	Garden KS	Colby KS	Carb. IL	Lincoln NE	Means	Manh. KS	Colby KS	Carb. IL	Bellev. IL	Lincoln NE	Means
Bridger	1.7	1.3	20.0	3.3	15.0	8.3	60.0	66.7	2.2	3.3	54.2 *	37.3
Cathy	0.0	0.0	10.0	6.7	12.5	5.8	63.3	56.7	2.5	2.5	59.2	36.8
Ceres	0.0	0.7	1.7 *	3.3	16.7	4.5	1.7 *	0.0 *	1.2 *	1.5 *	35.0 *	7.9 *
Glacier	4.0	1.3	3.3 *	6.7	13.3	5.7	30.0	0.0 *	1.5 *	1.8 *	56.7	18.0
KayStar 11	7.3	1.3	1.7 *	1.7	16.7	5.7	5.0 *	0.0 *	1.3 *	1.8 *	43.3 *	10.3 *
Liborius	1.0	0.0	3.3 *	6.7	19.2	6.0	2.5 *	6.7 *	1.0 *	1.3 *	31.7 *	8.6 *
Winfield	1.7	0.0	3.3 *	8.3	15.0	5.7	26.7	0.0 *	1.8 *	2.2 *	60.8	18.3
KS-C806	1.7	0.0	1.7 *	6.7	15.0	5.0	6.7 *	0.0 *	1.8 *	1.8 *	59.2	13.9 *
KS-C1701	0.7	0.0	1.7 *	1.7	19.2	4.6	0.0 *	0.0 *	1.3 *	2.2 *	23.3 *	5.4 *
KS-C2403	1.7	0.3	3.3 *	8.3	11.7	5.1	5.0 *	10.0 *	2.5	2.0 *	72.5	18.4
KS-C2504	2.3	0.7	1.7 *	10.0	15.0	5.9	18.3	46.7	1.3 *	2.3	47.5 *	23.2
KS-C3104	5.7	0.3	5.0 *	8.3	14.2	6.7	18.3	13.3 *	1.0 *	2.2	26.7 *	12.3 *
KS-C3208	3.3	0.3	0.0 *	5.0	11.7	4.1	10.0 *	6.7 *	1.2 *	2.2 *	31.7 *	10.3 *
KS-C3504	6.7	0.7	3.3 *	15.0	11.7	7.5	5.0 *	16.7 *	1.3 *	2.3	48.3 *	14.7 *
KS-C3505	1.7	0.3	3.3 *	13.3	12.5	6.2	3.3 *	1.7 *	1.2 *	3.0	30.8 *	8.0 *
KS-M3311	2.3	0.3	0.0 *	5.0	15.0	4.5	1.7 *	1.7 *	1.5 *	2.2 *	37.5 *	8.9 *
KS-M3314	0.0	0.7	8.3	11.7	10.0	6.1	21.7	3.3 *	1.7 *	1.7 *	45.0 *	14.7 *
KS-M3346	1.7	0.3	0.0 *	5.0	12.5	3.9	5.0 *	3.3 *	1.7 *	1.8 *	35.8 *	9.5 *
KS-M3403	3.3	0.0	3.3 *	11.7	15.8	6.8	18.3	6.7 *	1.5 *	3.0	44.2 *	14.7 *
KS3579	0.0	0.0	1.7 *	13.3	14.2	5.8	1.7 *	8.3 *	1.8 *	3.0	35.8 *	10.1 *
KS-M3580	2.3	0.3	0.0 *	8.3	17.5	5.7	1.7 *	0.0 *	1.2 *	1.8 *	55.0	11.9 *
KS-M3635	2.3	0.3	3.3 *	13.3	14.2	6.7	18.3	3.3 *	1.5 *	2.3	24.2 *	9.9 *
KS-M3723	1.7	0.0	15.0	13.3	14.2	8.8	28.3	50.0	3.0	3.3	40.0 *	24.9
MO-503-1	4.0	0.7	0.0 *	21.7	19.2	9.1	16.7	0.0 *	1.8 *	1.7 *	33.3 *	10.7 *
MO-503-2	2.3	1.3	0.0 *	6.7	21.7	6.4	15.0	0.0 *	2.2	2.5	56.7	15.3 *
MO-503-9	1.7	0.7	5.0 *	15.0	17.5	8.0	8.3 *	3.3 *	1.3 *	2.3	63.3	15.7 *
MO-503-24	3.3	1.0	5.0 *	6.7	12.5	5.7	11.7 *	16.7 *	1.7 *	1.8 *	12.5 *	8.9 *
MO-513-9	5.0	0.3	1.7 *	15.0	16.7	7.7	10.0 *	0.0 *	2.0	2.7	43.3 *	11.6 *
Mean	2.5	0.5	3.8	9.0	15.0	6.2	14.8	11.5	1.6	2.2	43.1	14.7
L.S.D. (.05)	NS	NS	7.4	NS	NS	NS	29.0	27.4	0.8	0.9	41.9	10.8
C.V. (%)	128.2	141.0	119.6	97.8	27.5	87.0	120.2	146.0	31.2	28.3	48.0	102.0

* Upper L.S.D. group - Differences among those marked with an asterisk are not statistically significant.

Table 7. Moisture (%) for 9 Locations of the 1994-95 Advanced Canola Nursery.

Line	Manh. KS	Hutch. KS	Garden KS	Colby KS	Colum. MO	Carb. IL	Bellev. IL	Lincoln NE	Scotts. NE	Mean
Cathy	9.0 *	9.7 *	8.0 *	5.7 *	5.9	8.8 *	9.5	10.4	17.3	9.4 *
Winfield	8.1 *	11.6 *	7.4 *	6.8 *	5.7	8.6 *	9.2	10.3	18.7	9.6 *
KS3579	8.9 *	10.8 *	8.3 *	5.9 *	5.3	8.8 *	9.1	10.8	18.9	9.6 *
KS-M3723	10.4	12.9 *	7.5 *	6.9 *	6.1	9.0	9.0	10.3	16.3	9.8 *
KS-M3346	9.6 *	13.4 *	7.7 *	9.0 *	5.9	8.8 *	9.0	11.0	14.0	9.8 *
MO-503-2	9.7 *	14.3	7.7 *	6.2 *	5.0	9.0	9.2	11.0	16.8	9.9 *
KS-M3580	9.1 *	15.0	6.9 *	6.5 *	5.3	8.7 *	9.1	12.4	15.6	9.9 *
KS-C806	9.2 *	14.7	7.8 *	7.6 *	5.9	9.1	9.1	11.0	14.4	9.9 *
MO-503-24	10.8	14.7	7.8 *	5.8 *	5.7	8.7 *	9.2	8.7	18.4	10.0 *
KS-C3104	9.0 *	13.7 *	7.7 *	8.5 *	6.1	9.1	9.6	13.0	13.8	10.0 *
Bridger	9.6 *	13.6 *	7.2 *	6.9 *	5.2	9.1	9.0	10.9	19.4	10.1 *
KS-M3403	9.8	14.2	8.5 *	6.1 *	5.5	8.8 *	8.9	14.0	16.5	10.3 *
KS-C2403	8.7 *	17.7	8.9 *	5.6 *	5.9	9.1	9.3	12.0	16.0	10.4
KS-C2504	9.1 *	11.1 *	9.3 *	11.3	5.3	8.9 *	9.3	10.9	18.2	10.4
KS-C3208	9.0 *	9.3 *	8.1 *	10.2	5.9	9.3	9.4	13.4	19.1	10.4
MO-503-9	9.6 *	15.2	7.8 *	7.1 *	5.9	8.6 *	9.3	11.4	19.3	10.5
MO-503-1	7.9 *	13.8 *	9.5 *	10.3	5.3	8.8 *	8.8	12.1	18.3	10.5
MO-513-9	9.9	16.8	10.6	5.9 *	5.5	8.7 *	9.2	10.8	17.8	10.6
Glacier	9.3 *	14.4	9.7 *	9.5 *	5.5	8.9 *	9.7	11.5	17.7	10.7
KS-M3635	9.3 *	17.5	7.4 *	9.0 *	5.3	8.8 *	9.6	12.7	17.5	10.8
KS-M3311	8.3 *	18.6	7.3 *	6.7 *	5.1	8.7 *	9.0	14.6	19.2	10.8
KS-C1701	10.6	14.5	9.3 *	8.1 *	5.7	9.0	9.1	11.8	20.7	11.0
Liborius	7.8 *	14.2	13.6	10.1	5.9	8.7 *	9.3	9.9	19.2	11.0
KS-C3505	8.2 *	15.8	8.2 *	12.0	5.3	9.2	6.2	13.6	22.1	11.2
KS-M3314	9.1 *	13.4 *	9.8	12.5	5.7	8.9 *	9.3	12.9	20.8	11.4
KayStar 11	9.8	12.6 *	10.4	14.2	5.2	8.9 *	9.9	12.6	19.0	11.4
KS-C3504	10.4	15.3	8.7 *	10.3	4.4	9.6	9.4	14.2	20.5	11.4
Ceres	11.2	17.0	10.1	9.8 *	5.5	9.2	9.5	14.6	18.4	11.7
Mean	9.3	14.1	8.6	8.4	5.5	8.9	9.2	11.9	18.0	10.4
L.S.D. (.05)	1.9	4.6	2.8	4.3	NS	0.3	NS	NS	NS	1.0
C.V. (%)	12.3	19.8	20.0	31.4	11.1	2.5	9.4	25.2	11.3	17.1

* Upper L.S.D. group - Differences among those marked with an asterisk are not statistically significant.

Table 8. Test Weights (lb/bu) for 6 Locations and Total Oil (%) Content for 7 Locations of the 1994-95 Advanced Canola Nursery.

Line	Test Weights							Oil Content							
	Manh. KS	Hutch. KS	Garden KS	Colby KS	Lincoln NE	Scotts. NE	Means	Manh. KS	Hutch. KS	Garden KS	Colby KS	Colum. MO	Lincoln NE	Scotts. NE	Means
Bridger	41.3	43.6	39.3	43.2	34.5	48.7	41.8	31.8	36.7 *	36.1	37.7	37.4	29.0	38.9 *	35.4 *
Cathy	41.7	44.5	40.0	40.4	34.7	48.8	41.7	32.2	33.1	32.1	36.7	36.0	25.8	38.0 *	33.4
Ceres	44.1	42.6	43.0	49.2	30.9	49.1	43.1 *	33.8 *	35.1 *	34.3	33.7	39.1 *	27.0	37.5 *	34.3
Glacier	39.3	43.7	45.3	54.8	30.7	48.2	43.7 *	32.0	34.8 *	35.2	37.5	38.5 *	25.5	36.7	34.3
KayStar 11	44.8	42.8	40.4	55.6	37.8	48.8	45.0 *	34.6 *	35.5 *	35.1	38.3	39.3 *	27.1	38.1 *	35.4 *
Liborius	46.0	43.3	40.5	54.8	34.2	48.3	44.5 *	33.6 *	36.3 *	34.8	38.6	39.8 *	28.6	38.0 *	35.7 *
Winfield	39.1	43.3	38.4	43.6	33.5	47.9	41.0	35.1 *	36.8 *	37.1	39.0	39.2 *	29.8	38.5 *	36.5 *
KS-C806	35.8	45.9	34.8	46.4	28.5	50.3	40.3	31.4	33.7	29.7	34.4	35.6	24.9	37.3 *	32.4
KS-C1701	36.9	40.8	43.2	52.0	28.6	47.5	41.5	32.8 *	34.6 *	34.8	37.5	37.9	25.9	38.0 *	34.5
KS-C2403	41.9	45.0	40.3	44.0	27.3	48.4	41.1	33.2 *	36.8 *	35.6	38.4	36.3	26.2	38.1 *	34.9 *
KS-C2504	40.6	40.6	41.8	45.6	28.5	49.1	41.0	30.9	33.3	32.5	36.5	36.6	26.5	37.4 *	33.4
KS-C3104	43.3	42.8	41.4	49.6	37.8	50.2	44.2 *	31.6	33.9	34.8	38.1	36.1	28.0	38.7 *	34.5
KS-C3208	42.4	38.5	42.1	49.6	30.4	48.4	41.9	31.9	31.7	33.7	37.6	36.5	27.9	37.1	33.8
KS-C3504	41.6	42.9	39.0	53.6	29.7	47.9	42.4	31.5	34.0	34.1	37.4	36.8	27.6	38.2 *	34.2
KS-C3505	40.2	43.4	38.4	54.8	28.8	57.8	43.9 *	31.6	34.2 *	30.0	37.1	35.7	26.5	37.8 *	33.3
KS-M3311	40.8	40.7	43.7	46.0	26.4	42.2	40.0	32.5	34.0	36.1	38.4	37.3	27.5	38.9 *	35.0 *
KS-M3314	43.4	41.7	39.9	49.6	29.8	47.3	42.0	32.9 *	34.2 *	33.9	36.0	35.6	27.1	38.7 *	34.1
KS-M3346	42.5	42.4	40.8	48.0	25.7	50.0	41.6	32.7 *	34.2 *	34.9	38.2	36.4	26.3	----- *	34.4
KS-M3403	42.5	42.1	38.7	49.2	30.1	50.2	42.2	30.0	32.3	31.7	37.0	35.1	24.7	36.1	32.4
KS3579	39.3	42.6	41.0	46.4	30.5	48.4	41.4	31.4	33.4	33.3	34.1	36.4	27.7	36.7	33.3
KS-M3580	42.4	44.1	44.7	50.0	28.3	49.8	43.2 *	31.4	34.7 *	32.9	37.3	36.8	26.7	37.3 *	33.9
KS-M3635	40.1	45.1	42.2	53.2	27.3	48.4	42.7	32.4	33.2	34.4	36.8	37.1	26.8	37.5 *	34.0
KS-M3723	42.1	42.5	39.4	46.4	29.0	47.1	41.1	32.7 *	34.1 *	35.7	37.4	36.2	24.9	38.3 *	34.2
MO-503-1	42.8	40.9	43.1	53.6	30.0	48.6	43.2 *	29.8	33.7	30.8	37.3	38.0	27.8	37.7 *	33.6
MO-503-2	42.3	45.7	42.7	49.6	28.4	49.0	42.9	34.0 *	36.0 *	35.5	37.9	38.6 *	25.8	38.7 *	35.2 *
MO-503-9	37.7	41.7	40.3	52.4	26.5	48.1	41.1	32.0	34.5 *	32.4	37.4	37.8	24.9	36.4	33.6
MO-503-24	40.4	41.2	41.9	48.0	34.3	48.9	42.4	32.5	35.5 *	34.8	37.4	38.8 *	29.2	36.7	35.0 *
MO-513-9	40.0	45.4	39.6	51.2	30.7	49.1	42.7	31.9	35.7 *	33.1	37.9	38.3 *	28.3	37.7 *	34.7 *
Mean	41.3	42.9	40.9	49.3	30.4	48.8	42.3	32.3	34.5	33.9	37.2	37.3	26.9	37.7	34.3
L.S.D. (.05)	NS	NS	NS	NS	NS	NS	2.0	2.5	2.7	---	NS	1.5	NS	1.6	1.8
C.V. (%)	10.0	7.3	8.7	3.7	15.8	4.9	7.3	4.7	4.8	---	4.9	2.4	9.0	1.4	8.2

* Upper L.S.D. group - Differences among those marked with an asterisk are not statistically significant.

Table 9. Yield (lb/ac) for 6 Locations of the 1994-95 Great Plains Regional Germplasm Nursery.

PI Number	Origin 1/	Name	Hutch. KS	Colby KS	Colum. MO	Novilty MO	Walsh CO	Munday TX	Means (lb/a) 2/	Means (%Avg) 2/
-----	Germany	Ceres	1188 *	1223 *	1508 *	1249 *	360	1296	1293 *	202.0 *
PI531283	E Germany	Linglandor	1006	449	558	1256 *	160	1886 *	1031	161.1
PI469737	E Korea	Borowski	1514 *	573	833	523	320	1613 *	1011	158.0
-----	Rumania	KStar 11	1116	858	984	673	192	1388 *	1004	156.9
-----	Sweedeen	Glacier	836	475	796	1085 *	96	1215	881	137.7
PI502304	E Russia	AR-256	1123 *	459	585	627	80	1383 *	835	130.5
PI469799	E France	France 11	1203 *	798	493	678	232	802	795	124.2
PI535878	E Poland	Start	1107	257	286	512	248	1500 *	733	114.5
PI469892	E Korea	Mulchower	1085	846	324	306	272	1066	725	113.3
PI535849	E Poland	Skrzeszowicki	1108	332	272	300	112	1446 *	692	108.1
PI531277	E Germany	Danmar	855	418	472	271	136	1255	654	102.2
PI531275	E Germany	BNW 1 61/83	1120	455	356	312	216	1015	651	101.8
PI470052	E Korea	Tribicska	907	358	383	210	80	1371 *	646	100.9
PI531284	E Germany	Liratrop	772	317	401	281	232	1440 *	642	100.3
PI531274	E Netherland	Barkant	871	539	417	257	384	1085	634	99.0
PI531276	E Germany	BNW 1 62/83	855	485	284	227	208	1268	624	97.5
PI535850	E France	Valdor	713	256	92	248	224	1452 *	552	86.2
PI311729	E Poland	Gorczański	378	256	265	477	144	1376 *	550	86.0
-----	Idaho	Cascade	479	271	508	555	384	903	543	84.9
PI470005	E Poland	Poland 3	633	312	307	542	456	890	537	83.9
PI458935	E Sweden	Brink	812	179	75	754	488	855	535	83.6
PI384536	E Sweden	Norde	733	278	246	171	104	1222	530	82.8
PI470056	E Korea	Weibulls Margo	766	176	172	223	128	1306	529	82.6
PI531286	E Germany	Marinus	931	375	260	173	784	878	523	81.8
PI399418	E Czech	Trebicska	749	538	137	124	224	1031	516	80.6
PI531288	E Hungary	Ujfertodi	723	223	227	314	464	1014	500	78.2
PI470057	E Korea	Wielkopolki	808	360	313	257	192	759	499	78.0
PI531279	E Hungary	Gk Savaria	512	342	309	209	144	947	464	72.4
PI470009	E Korea	Primer	923	276	75	121	360	843	448	69.9
PI470007	E Poland	Poland 5	622	280	233	90	208	1002	446	69.6
-----	Idaho	Bridger	713	177	217	272	584	782	432	67.5
PI305279	E Sweden	-----	677	352	278	236	88	359	380	59.4
PI469884	E Korea	Lembkes	465	185	61	0	128	799	302	47.2
Means			858	414	386	410	255	1135	640	100.0
LSD (.05)			391	284	227	407	NS	556	173	27.0
CV(%)			27.9	42.0	36.0	60.8	---	30.0	37.3	37.3

* Upper L.S.D. group - Differences among those marked with an asterisk are not statistically significant.

1/ Origin obtained from plant introduction lists. Some doubt exists as to the true origin of some PI lines listed from Korea.

2/ Means do not include the data from Walsh, CO.

Table 10. Fall Stand Rating for 8 Locations and Winter Survival (%) for 4 Locations of the 1994-95 Great Plains Regional Germplasm Nursery.

Line	Fall Stand Rating 1/									Winter Survival				
	Manh. KS	Hutch. KS	Colby KS	Lincoln NE	Ft. Coll. CO	Walsh CO	Lubb. TX	Mund. TX	Means	Manh. KS	Colby KS	Lincoln NE	Ft. Coll. CO	Means
PI305279	9.3	6.0 *	8.3	9.0	4.1	10.0	9.6 *	7.7 *	8.0 *	76.7 *	100.0 *	30.0	14.5	55.3 *
PI311729	8.3	5.0 *	9.0	9.0	5.0 *	10.0	9.6 *	7.0	7.9 *	61.7	82.5	25.0	18.2	46.8
PI384536	8.7	3.0	8.3	9.0	5.0 *	10.0	9.8 *	7.0	7.6 *	75.0 *	98.3 *	30.7	18.8	55.7 *
PI399418	8.3	4.3 *	8.0	9.0	5.8 *	10.0	9.8 *	7.3	7.8 *	55.0	99.6 *	15.0	40.0	52.4
PI458935	9.3	2.7	8.0	9.0	3.9	10.0	9.5	7.0	7.4	83.3 *	99.6 *	30.0	11.7	56.1 *
PI469737	9.0	3.0	8.0	9.0	3.8	10.0	9.8 *	8.7 *	7.7 *	46.7	91.4 *	3.3	0.0	35.4
PI469799	8.7	4.7 *	8.3	9.0	3.8	9.0	9.2	6.7	7.4	80.0 *	100.0 *	16.7	0.0	49.2
PI469884	8.3	4.0	8.3	9.0	4.4	8.0	10.0 *	7.7 *	7.5 *	63.3	81.1	28.3	10.6	45.9
PI469892	8.3	4.3 *	8.0	8.5	3.6	9.0	9.8 *	7.0	7.3	73.3 *	99.6 *	28.3	0.0	50.3
PI470005	8.7	2.7	8.0	8.7	4.2	9.0	9.8 *	7.3	7.3	70.0 *	99.6 *	35.0	4.2	52.2
PI470007	8.3	2.7	8.0	9.0	5.0 *	10.0	9.6 *	7.7 *	7.5 *	45.0	92.8 *	7.3	20.3	41.4
PI470009	8.0	3.7	8.0	9.0	5.8 *	10.0	10.0 *	8.0 *	7.8 *	43.3	71.9	25.7	63.0 *	51.0
PI470052	8.5	4.3 *	8.3	9.0	4.5	9.0	9.8 *	7.7 *	7.6 *	60.0	81.8	10.0	20.0	43.0
PI470056	8.7	4.7 *	7.7	9.0	4.4	10.0	9.6 *	8.0 *	7.7 *	51.7	93.3 *	23.3	6.7	43.8
PI470057	8.7	3.0	8.3	9.0	3.2	9.0	9.8 *	7.3	7.3	60.0	96.2 *	12.3	0.0	42.1
PI502304	8.3	6.0 *	8.7	9.0	4.8	8.0	9.6 *	7.0	7.7 *	61.7	98.3 *	7.0	36.1	50.8
PI531274	8.3	3.0	7.7	9.0	3.9	8.0	9.3	8.3 *	7.2	90.0 *	100.0 *	37.5	0.0	56.9 *
PI531275	8.7	4.0	8.3	9.0	5.2 *	10.0	9.8 *	8.0 *	7.9 *	83.3 *	99.6 *	21.7	0.0	51.2
PI531276	8.7	3.0	7.0	9.0	3.8	10.0	9.8 *	7.3	7.3	56.7	98.0 *	31.7	39.4	56.4 *
PI531277	8.7	3.0	8.0	9.0	4.5	9.0	10.0 *	7.7 *	7.5 *	68.3	95.1 *	10.0	0.0	43.4
PI531279	9.3	4.3 *	7.7	8.7	5.3 *	9.0	9.8 *	7.3	7.7 *	80.0 *	100.0 *	18.3	0.0	49.6
PI531283	8.7	3.3	7.7	9.0	2.9	10.0	9.6 *	8.7 *	7.5 *	76.7 *	99.6 *	10.0	8.3	48.6
PI531284	8.0	4.7 *	8.7	8.7	3.9	10.0	10.0 *	9.0 *	7.9 *	68.3	73.6	3.3	14.8	40.0
PI531286	8.3	3.3	8.0	9.0	4.8	7.0	9.8 *	6.7	7.1	50.0	99.6 *	35.0	0.0	46.1
PI531288	8.7	2.7	7.3	8.7	4.4	9.0	9.5	7.3	7.2	78.3 *	100.0 *	35.0	7.0	55.1 *
PI535849	8.3	3.7	8.0	9.0	4.8	10.0	9.8 *	8.3 *	7.7 *	75.0 *	100.0 *	30.0	26.7	57.9 *
PI535850	8.7	4.0	7.7	9.0	6.4 *	10.0	9.6 *	8.7 *	8.0 *	51.7	95.1 *	20.7	36.2	50.9
PI535878	9.0	2.3	7.7	9.0	4.5	10.0	10.0 *	7.7 *	7.5 *	80.0 *	99.6 *	15.0	75.9 *	67.6 *
Bridger	8.7	3.0	8.0	8.7	7.0 *	10.0	9.6 *	6.7	7.7 *	75.0 *	95.8 *	21.7	57.9 *	62.6 *
Cascade	6.7	1.7	6.7	8.3	4.4	10.0	9.6 *	6.0	6.7	76.7 *	96.2 *	41.7	23.3	59.5 *
Ceres	7.7	1.7	7.3	8.3	5.5 *	10.0	9.6 *	7.3	7.2	83.3 *	100.0 *	9.7	5.7	49.7
Glacier	6.7	1.7	7.3	8.7	3.8	10.0	9.3	7.7 *	6.9	83.3 *	98.1 *	27.3	44.4 *	63.3 *
KStar 11	9.3	2.3	7.7	9.0	4.8	10.0	9.8 *	8.3 *	7.7 *	75.0 *	100.0 *	26.7	0.0	50.4
Means	8.5	3.5	7.9	8.9	4.6	9.5	9.7	7.6	7.5	68.4	95.0	21.9	18.3	50.9
LSD (.05)	NS	1.8	NS	NS	2.0	NS	0.5	1.5	0.5	21.5	16.7	NS	31.6	13.1
CV(%)	12.2	31.9	9.0	3.4	27.1	---	3.1	12.3	13.8	19.3	10.7	90.8	105.9	31.8

1/ Fall Stand Rating: 10 = complete stand; 0 = no stand.

Table 11. Bloom Dates (50%) for 6 Locations and Plant Heights (in) for 6 Locations of the 1994-95 Great Plains Regional Germplasm Nursey.

Line	50% Bloom Date (days from April 1)						Means	Plant Height (in)						Means
	Manh. KS	Hutch. KS	Colby KS	Ft. Coll. CO	Walsh CO	Mund. TX		Colby KS	Collum. MO	Noviity MO	Walsh CO	Lubb. TX	Mund. TX	
PI305279	10 e	13	26 e	47 l	40	-8 e	21	41	35 s	44	31	48	51 s	42 s
PI311729	12	12	27	44 el	41	-10 e	21	41	30 s	45	33	38	54 t	40 s
PI384536	13 l	16 l	26 e	44 el	40	-7	22	50 t	40 t	44	30	41	50 s	43 t
PI399418	14 l	14 l	26 e	47 l	39	-5 l	22 l	47	35 s	47	36	39	54 t	43 t
PI458935	8 e	11	27	47 l	39	-9 e	20	36 s	32 s	50	36	42	51 s	41 s
PI469737	10 e	4 e	28	45 l	40	-10 e	20 e	35 s	36	41	34	40	50 s	39 s
PI469799	14 l	17 l	25 e	44 el	35	-4 l	22	50 t	42 t	50	31	41	54 t	45 t
PI469884	11	11	27	44 el	38	-10 e	20	40	38 t	47	29	42	54 t	42 s
PI469892	10 e	4 e	26 e	48 l	41	-10 e	20 e	39 s	32 s	41	35	42	50 s	40 s
PI470005	9 e	15 l	25 e	44 el	37	-10 e	20 e	42	41 t	47	37	42	51 s	43 t
PI470007	11 e	13	26 e	44 el	37	-10 e	20	41	40 t	45	32	45	57 t	43 t
PI470009	12	10	28	47 l	38	-10 e	21	43	32 s	43	36	42	52 s	41 s
PI470052	15 l	18 l	31 l	43 e	38	-10 e	22 l	41	37	42	31	45	56 t	42 s
PI470056	12	8 e	27	47 l	27	-10 e	18 e	41	37	36	32	47	51 s	41 s
PI470057	12	15 l	27	41 e	39	-10 e	21	41	38 t	38	33	46	55 t	42 s
PI502304	15 l	15 l	26 e	43 e	34	-7	21	46	41 t	48	27	45	56 t	44 t
PI531274	14 l	17 l	28	43 e	26	-7	20	53 t	41 t	52	35	41	56 t	46 t
PI531275	14 l	17 l	28	47 l	26	-5 l	21	50 t	39 t	52	31	38	56 t	44 t
PI531276	15 l	18 l	31 l	41 e	43	-7	24 l	44	38 t	44	38	43	54 t	44 t
PI531277	14 l	17 l	28	43 e	41	-8 e	23 l	43	40 t	46	33	42	52 s	43 t
PI531279	11 e	13 l	26 e	41 e	38	-10 e	20	44	37	40	34	43	51 s	41 s
PI531283	15 l	16 l	28	43 e	37	-5 l	22 l	44	39 t	49	29	49	57 t	44 t
PI531284	15 l	18 l	28	40 e	27	-4 l	21	41	39 t	39	33	47	59 t	43 t
PI531286	13 l	15 l	26 e	41 e	36	-7	21	44	34 s	50	35	44	54 t	44 t
PI531288	11	13	27	40 e	39	-9 e	20	42	36	44	37	39	48 s	41 s
PI535849	13 l	15 l	27	40 e	34	-7	20	44	36	43	33	50	60 t	44 t
PI535850	13	13 l	29	43 e	43	-9 e	22	41	34 s	49	36	40	58 t	43 t
PI535878	14 l	17 l	28	41 e	43	-8 e	23 l	46	37	47	29	46	54 t	43 t
Bridger	11 e	8 e	28	44 el	36	-10 e	19 e	39 s	38 t	43	35	39	47 s	40 s
Cascade	9 e	10	27	47 l	40	-10 e	20	40	36	46	33	39	49 s	40 s
Ceres	11	15 l	25 e	44 el	42	-4 l	22 l	48 t	42 t	45	33	42	54 t	44 t
Glacier	16 l	18 l	27	41 e	37	-7	22	46	43 t	47	29	43	53 s	43 t
KStar 11	14 l	17 l	27	40 e	39	-4 l	22 l	51 t	41 t	50	34	43	56 t	46 t
Means	12	14	27	44	37	-8	21	43	37	45	33	43	53	43
LSD (.05)	3	5	1	5	NS	2	2	5	6	NS	NS	NS	7	3
CV(%)	1.7	2.9	0.7	2.2	----	1.7	2.0	6.9	9.2	13.3	----	11.8	7.5	10

Note: Values marked "e" are not statistically different from the earliest value, and those marked "l" are not statistically different from the latest.
 Note: Values marked "s" are not statistically different from the shortest plant height, and those marked "t" are not statistically different from the tallest.

Table 12. Lodging (%) and Shattering (%) for 2 Locations of the 1994-95 Great Plains Regional Germplasm Nursery.

Line	Lodging			Shattering		
	Colby KS	Munday TX	Means	Colby KS	Munday TX	Means
PI305279	70	10	40	30	13	22 *
PI311729	95	18	57	30	12	21 *
PI384536	53	7	30	27 *	20	23 *
PI399418	60	10	35	25 *	17	21 *
PI458935	100	18	59	45	17	31
PI469737	77	3	40	17 *	18	18 *
PI469799	27 *	3	15 *	18 *	13	16 *
PI469884	100	8	54	30	13	22 *
PI469892	47	12	29	7 *	15	11 *
PI470005	50	18	34	8 *	20	14 *
PI470007	77	5	41	17 *	17	17 *
PI470009	93	17	55	45	17	31
PI470052	83	10	47	25 *	12	18 *
PI470056	93	5	49	7 *	15	11 *
PI470057	83	5	44	30	13	22 *
PI502304	27 *	5	16 *	10 *	20	15 *
PI531274	10 *	13	12 *	12 *	13	13 *
PI531275	43 *	5	24	20 *	18	19 *
PI531276	60	10	35	22 *	13	18 *
PI531277	53	10	32	7 *	12	9 *
PI531279	63	18	41	13 *	13	13 *
PI531283	63	5	34	27 *	15	21 *
PI531284	77	8	43	8 *	13	11 *
PI531286	87	5	46	18 *	15	17 *
PI531288	90	13	52	13 *	17	15 *
PI535849	63	5	34	20 *	17	18 *
PI535850	100	8	54	50	17	33
PI535878	77	10	43	40	17	28
Bridger	87	7	47	13 *	20	17 *
Cascade	50	20	35	5 *	15	10 *
Ceres	0 *	2	1 *	3 *	15	9 *
Glacier	57	0	28	25 *	15	20 *
KStar 11	3 *	2	3 *	12 *	17	14 *
Means	64	9	37	21	16	18
LSD (.05)	43	NS	22	25	NS	18
CV(%)	41	89	53	73	33	62

* Upper L.S.D. group - Differences among those marked with an asterisk are not statistically significant.

Table 13. Moisture (%) and Test Weights (lb/bu) for 3 Locations of the 1994-95 Great Plains Regional Germplasm Nursery.

Line	Moisture (%)				Test Weight (lb/bu)			
	Hutch. KS	Colby KS	Munday TX	Means	Hutch. KS	Colby KS	Munday TX	Means
PI305279	9.5	8.2	4.9	7.5	47.9 *	37.7	43.0	42.9
PI311729	10.2	11.3	5.1	8.9	45.8	34.8	48.8 *	43.1
PI384536	6.9	7.5	4.8	6.4	49.0 *	40.9	49.3 *	46.4 *
PI399418	8.0	10.3	5.0	7.8	48.3 *	40.5	47.3 *	45.4 *
PI458935	6.4	8.2	4.7	6.4	49.6 *	34.0	46.2 *	43.3
PI469737	9.7	11.9	5.2	8.9	47.7	39.2	47.7 *	44.8 *
PI469799	10.9	9.5	4.6	8.3	46.6	42.6	45.8	45.0 *
PI469884	6.3	9.4	5.0	6.9	47.2	36.6	46.7 *	43.5
PI469892	11.1	9.1	5.1	8.4	47.3	38.8	47.5 *	44.5 *
PI470005	9.1	9.6	5.3	8.0	48.2 *	38.8	46.8 *	44.6 *
PI470007	7.6	10.2	5.0	7.6	49.4 *	35.6	48.0 *	44.3 *
PI470009	8.5	9.4	4.9	7.6	48.7 *	39.4	44.8	44.3 *
PI470052	7.9	15.0	5.3	9.4	48.3 *	33.1	46.0 *	42.5
PI470056	7.9	8.5	4.7	7.0	48.7 *	35.4	46.5 *	43.5
PI470057	7.0	12.4	4.8	8.1	49.9 *	34.7	46.3 *	43.6
PI502304	8.2	9.5	4.9	7.6	48.8 *	39.3	47.8 *	45.3 *
PI531274	11.4	12.3	4.8	9.5	48.1 *	39.2	47.8 *	45.0 *
PI531275	9.8	8.9	5.1	7.9	49.7 *	43.7	47.3 *	46.9 *
PI531276	9.4	8.6	5.3	7.8	49.6 *	38.3	48.3 *	45.4 *
PI531277	9.0	9.8	4.9	7.9	49.5 *	40.4	48.2 *	46.0 *
PI531279	10.3	13.0	5.3	9.5	45.3	38.3	47.5 *	43.7
PI531283	6.6	11.0	5.3	7.6	49.7 *	39.0	49.3 *	46.0 *
PI531284	12.3	10.4	5.1	9.3	47.6	39.5	47.8 *	45.0 *
PI531286	7.6	7.7	3.5	6.3	50.4 *	38.3	43.8	44.2
PI531288	6.7	8.5	4.8	6.6	48.6 *	39.1	45.8	44.5 *
PI535849	7.8	8.6	5.0	7.2	49.2 *	37.2	48.2 *	44.8 *
PI535850	7.3	10.7	5.0	7.6	49.4 *	37.7	47.5 *	44.8 *
PI535878	8.5	7.7	5.3	7.2	48.8 *	37.9	49.0 *	45.2 *
Bridger	8.7	8.2	5.2	7.4	47.4	36.7	45.0	43.0
Cascade	7.6	29.8	4.9	14.1	45.7	41.2	44.3	43.7
Ceres	9.8	13.1	5.2	9.3	49.4 *	41.5	45.2	45.4 *
Glacier	8.6	9.1	5.1	7.6	48.5 *	39.2	47.0 *	44.9 *
KStar 11	7.9	10.9	5.4	8.1	49.8 *	42.7	46.7 *	46.4 *
Means	8.6	10.5	5.0	8.1	48.4	38.5	46.9	44.6
LSD (.05)	NS	NS	NS	NS	2.6	NS	3.3	2.5
CV(%)	25.8	63.4	10.1	50.7	3.3	9.7	4.3	5.9

* Upper L.S.D. group - Differences among those marked with an asterisk are not statistically significant.

Table 14. Total Oil Content (%) for 4 Locations of the 1994-95 Great Plains Regional Germplasm Nurseries.

Line	Hutchinson KS	Colby KS	Novelty MO	Columbia MO	Means
PI502304	36.1*	36.8	40.2*	39.9*	38.2*
KStar 11	35.7*	37.2	38.6*	39.1*	37.7*
PI469799	34.23	37.8	39.2*	39.3*	37.6*
Ceres	34.7*	35.6	39.2*	39.3*	37.2*
PI305279	35.3*	36.1	37.4	38.0*	36.7
PI470052	34.8*	35.6	38.1*	37.8	36.6
PI535849	34.5*	36.4	38.8*	36.5	36.6
PI469737	34.3	35.8	38.6*	37.5	36.6
PI469892	35.2*	36.8	36.6	37.5	36.5
Glacier	35.2*	35.0	37.7	37.9	36.5
PI470005	34.7*	35.9	37.9	36.8	36.3
Cascade	35.6*	35.6	37.4	36.3	36.2
PI311729	34.4*	35.9	36.1	37.5	36.0
PI531286	35.0*	35.6	35.9	36.9	35.9
PI470057	35.3*	35.4	35.5	37.1	35.8
PI384536	35.3*	36.1	34.8	37.2	35.8
PI531288	35.2*	35.3	35.8	36.8	35.8
PI535878	34.4*	35.3	36.8	36.7	35.8
PI531277	33.8	35.8	35.7	37.7	35.8
PI470056	34.7*	35.4	37.2	35.3	35.7
PI535850	34.5*	35.3	36.6	36.3	35.7
PI531284	33.7	35.6	35.4	37.9	35.6
Bridger	34.1	34.4	37.7	36.2	35.6
PI458935	34.5*	34.6	38.0	34.8	35.5
PI531283	33.8	34.4	37.0	37.1	35.4
PI531279	33.6	35.0	36.3	36.4	35.3
PI531275	34.5*	32.1	37.3	36.9	35.2
PI531274	33.0	34.6	35.9	37.1	35.1
PI531276	33.6	35.0	34.6	36.9	35.0
PI399418	33.9	34.8	34.5	36.2	34.9
PI470007	34.0	34.4	35.3	34.8	34.6
PI469884	34.1	35.4	35.2	33.0	34.4
PI470009	32.9	34.1	33.8	36.4	34.3
Mean	34.5	35.4	36.8	37.0	35.9
LSD(.05)	1.7	NS	2.1	1.9	1.0
CV (%)	3.0	4.4	3.3	3.1	3.5

* Upper L.S.D. group - Differences among those marked with an asterisk are not statistic significant.

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