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Published November, 2001

REGISTRATIONS OF CULTIVARS

Registration of 'Lacey' Barley

'Lacey' a six-rowed spring barley (*Hordeum vulgare* L.) (Reg. no. CV-290, PI 613603), was developed by the Minnesota Agricultural Experiment Station and released in February 2000. It was developed in a program to obtain low soluble protein in a Midwest malting barley. Lacey, whose experimental designation was M98, has the pedigree M44/'Excel'/2/M46/M44/3/M44/Excel/2/'Stander'. M44 and M46 were cultivar candidates in the Minnesota barley program. M44 has the pedigree 'Nordic'/'Manker'/3/'Morex'/2/Manker/63Ab2987-32, and M46 originated from the cross Nordic/Manker/2/'Robust'. Breeding line 63Ab2987-32 was developed in the USDA-ARS barley breeding program at Aberdeen, ID. The final cross leading to Lacey was made in 1993. Because Lacey's pedigree is composed primarily of Minnesota germplasm, it is expected to be best adapted to the barley-growing area of the upper Midwest USA and possibly in neighboring regions of Canada.

Lacey was developed using the pedigree method coupled with single-seed descent. It originated from a single plant taken arbitrarily from an F_5 line visually selected for desirable height, straw strength, and resistance to leaf diseases. No selection was applied in the F_2 through F_4 generations with the F_3 and F_4 generations being advanced in the greenhouse. Replicated agronomic and disease testing began in Minnesota in 1996 and regional testing in 1998. Micro-malting evaluations began in 1996, industry pilot malting and brewing quality evaluations in 1997, and industry plant scale malting and brewing quality evaluations in 1999. Low soluble protein was identified in the first micro-malting evaluation in 1996, and this trait and high grain yield were the primary basis for interest in the line.

Lacey is intended to replace the varieties Robust (Rasmusson and Wilcoxson, 1983) and Stander (Rasmusson et al., 1993) that are currently popular in the Midwest. Robust, released by the Minnesota Agricultural Experiment Station (MAES) in 1983, is currently the six-rowed industry standard for malt quality. Stander, released by the MAES in 1993, has significant yield and lodging improvements over Robust, but has been reported by industry as having a soluble protein level that is too high by current standards. Lacey is similar to both Robust and Stander as it has smooth awns, covered kernels, short rachillas hairs, and white aleurone. The spike is medium-lax, medium-long, and semi-erect. Lacey is about 6 cm shorter than Robust and similar to Robust in heading date and maturity.

Lacey's malting quality traits, determined in collaboration with the USDA Cereal Crops Research Unit at Madison, WI, and industry testing in cooperation with the American Malting Barley Association, appear to be similar to Robust, the industry six-rowed quality standard. The following quality comparisons are based on data from 13 separate evaluations made from 1996 to 1999. For the malting quality trait of most interest, soluble protein, the values were 5.6, 5.6, and 6.7%, respectively, for Lacey, Robust, and Stander. Diastatic power is similar to Robust, but Lacey is 18% higher in alpha-amylase and yields 0.5% more malt extract. Lacey is currently being evaluated for both malting and brewing quality in industry tests coordinated by the American Malting Barley Association.

Lacey was 16% higher yielding than Robust and 3% higher than Stander in Minnesota (1996–1999). In Midwestern regional trials (1998–1999), Lacey was 12 and 4% higher yielding than Robust and Stander, respectively. Percentage plump kernels of Lacey is similar to Robust and Stander. In seven Minnesota trials where lodging occurred, the respective lodging percentages were 33% for Lacey and 42% for Robust. It is not as resistant to lodging as Stander.

Lacey possesses the "ND B112" gene for resistance to spot blotch [caused by *Bipolaris sorokiniana* (Sacc.) Shoemaker]. It has the *Rpg1* (T) gene for resistance to stem rust [caused by *Puccinia graminis* (Pers.: Pers.) var. *tritici*] which conditions resistance to current races of stem rust, except race QCC. It is susceptible to loose smut [caused by *Ustilago tritici* (Pers.) Rostr.] and Fusarium head blight [caused by *Fusarium graminearum* Schwabe].

Breeder seed is maintained by the Minnesota Agricultural Experiment Station, St. Paul, MN 55108. U.S. Plant Variety Protection of Lacey is pending (PVP Application no. 200000228). Limited samples of seed for research purposes are available upon request from the corresponding author for at least five years.

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E.L. Schiefelbein, and J.V. Wiersma

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D.C. Rasmusson, K.P. Smith, and E.L. Schiefelbein, Dep. of Agronomy and Plant Genetics, R. Dill-Macky, Dep. of Plant Pathology, Univ. of Minnesota, St. Paul, MN 55108; and J.V. Wiersma, Northwest Exp. Stn., Crookston, MN. Registration by CSSA. Accepted 31 May 2001. *Corresponding author (rasmu002@tc.umn.edu).

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Registration of 'Peregrine' Barley

'Peregrine', a spring six-rowed hulless feed barley (*Hordeum vulgare* L.) (Reg. no. CV-284, PI 611140), was released in April 1999 by the Field Crop Development Centre of Alberta Agriculture, Food and Rural Development, Lacombe, Alberta, Canada (Canadian Reg. no. 4912). Peregrine is a semi-dwarf cultivar well adapted to western Canada where lodging is a limiting factor for production.

It was derived from the cross H12-4816/R181//M69.77-SHI.R.KCI.NO.87/CEL-5106 made in 1986. The first two lines are parents of the cultivar Samson (Helm et al., 1986). The second cross was made to a line derived from a barley population (M69.77- SHI.R.KCI.No.87/CEL 5106) introduced in 1983 from the International Maize and Wheat Improvement Centre (CIMMYT), Mexico. Seed from F_1 plants grown at Lacombe, were bulked to form the F_2 generation which was grown at Lacombe in 1987. Subsequent generations were advanced using a modified bulk breeding method alternately at El Centro, CA, during the winter and Lacombe, during the summer. Head selections were made subsequently in the F_9 generation to produce F_{10} head-rows that were grown in 1992 at Lacombe. A single F_{10} head-row that became Peregrine was selected at Lacombe and was entered in yield trials from 1993 to 1996. Selection was based on grain yield, test weight, protein content, straw strength, threshability, and resistance to foliar diseases. Breeder seed of Peregrine was derived from a bulk of 198 uniform F_{16} head rows selected randomly from a $F_{10:15}$ bulk.

Peregrine is a rough awned, semi-dwarf barley, with a green coleoptile color and semi-erect juvenile growth habit. Leaves are wide and long with glabrous green sheaths and blades.

The flag leaves are wide, medium long, and erect. The auricle is white with a waxy sheath. Stems are short, with an average thickness of 2–3 mm. Culms generally have four nodes, a v-shaped collar, a slightly undulated neck, and an exsertion above the base of the flag leaf blade of 3–10 cm. Spikes of Peregrine are semi-dense, short, and semi-erect. Glume awns are rough with purplish tips. Rachillas are short with long hairs. Lemma awns are rough and long with purplish tips. The basal marking of the lemma has a transverse crease. The lemmas have few barbs on the laterals veins. Kernels of Peregrine are hulless, medium long, and medium wide with a white aleurone.

Peregrine was tested as H86004008N in Alberta yield trials from 1993 to 1996 and as HB504 in the Western Cooperative Hulless Barley Test (WCHBT) of the Canadian Prairie Registration Recommending Committee from 1997 to 1998. In 51 station-years of the WCHBT grown in Manitoba, Saskatchewan, and Alberta, Peregrine had an average yield of 5454 kg ha^{-1}, which was 95% of the six-rowed hulless check 'Falcon'. In the same test, in 48 station-years, Peregrine had a mean test weight of 74.5 kg hL^{-1} compared with 73.5 kg hL^{-1} for Falcon. The mean 1000 kernel weight of Peregrine was 30.8 g compared with 32.3 g for Falcon. Peregrine had a plant height of 65 cm, compared with 71 cm for Falcon. Peregrine has excellent resistance to lodging. In 15 station-years of the WCHBT, Peregrine had a lodging resistance score of 1.6 on a scale of 0–9 (where 0 = erect, 9 = fully lodged), compared with 2.8 for Falcon. Peregrine is superior to Falcon in straw strength and loss of spikes at maturity. Under high fertility production, if not swathed properly, Falcon yields can be reduced due to head breakage.

In the Western Cooperative Hulless Barley Test, Peregrine had an intermediate field reaction to barley leaf scald (caused by *Rhynchosporium secalis* (Oudem.) J.J. Davis). In the nine tests where scald ratings were taken, on a scale of 0 to 9 (where 0 is least affected), Peregrine averaged 4.8 compared with 2.9 for Falcon. Peregrine is susceptible to loose smut (caused by *Ustilago nuda* (Jens.) Rostr.), false loose smut (caused by *Ustilago nigra* Tapke), and covered smut (caused by *Ustilago hordei* (Pers.) Lagerh.) Peregrine is susceptible to septoria leaf blotch (caused by *Septoria passerinii* Sacc.). Ratings for net blotch (caused by *Pyrenophora teres* Drechs.) were superior to the checks, 'Condor' and Falcon, for inoculated Winnipeg net blotch biotypes 102b and 858b. Rates for Peregrine were inferior to the same checks when inoculated with biotype 857c. In two trials of the WCHBT, Peregrine showed intermediate reaction to spot blotch (caused by *Cochliobolus sativus* (Ito and Kurib). In these tests, Peregrine had an average score of 1.7, on a scale of 0 to 9 (where 0 is least affected), compared with 3.2 for Falcon.

Breeder seed of Peregrine is maintained by the Field Crop Development Ctr., Alberta Agriculture, Food and Rural Development, Lacombe, AB. Distribution rights were granted to Progressive Seeds Ltd., #155 4752 Ross Street, Red Deer, AB. T4N 1X2, Canada. Application has been made in Canada for plant breeders' rights.

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Acknowledgments

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Alberta Agriculture, Field Crop Development Ctr., 5030-50th St., Lacombe, AB, Canada T4L 1W8. Registration by CSSA. Accepted 31 May 2001. *Corresponding author (manuel.cortez@agric.gov.ab.ca).

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Registration of 'Heris' Barley

'Heris', a two-rowed spring barley (*Hordeum vulgare* L.) (Reg. no. CV-285, PI 614939), was released for production in the Czech Republic in April 1998. It was developed by Plant Select Ltd., Hrubčice, Czech Republic, within a program that develops malting barley with resistance to the most widely-spread fungal diseases. Heris was derived from the cross HE-4436/CE-431 and tested under the experimental designation HE-6260 in the State Variety Trials of the Czech Republic from 1995 to 1997. The parental line HE-4436 was selected at Plant Select Ltd., and CE-431 is a selection from the CEZEA, Co. Ltd., Čejč, Czech Republic. The line HE-4436 was derived from the cross HE-3380/KM-H-1295-81 and CE-431 from the cross 'Zefir'/KM-I-890/74. The lines KM-H-1295-81 and KM-I-860-74 were derived from composite crosses. They were developed by the Agricultural Research Institute Kroměříž, as parental stocks possessing disease resistance. The stock KM-H-1295-81 contains Ab-1105 and 'Forrajera' in its pedigree and the stock KM-I-860-74 contains barley mutant Risø 6018.

The cross was made in the field in 1989. The F_1 through F_3 generations were advanced in a growth room in 1989–1990. No selection was made in these generations and all harvested seed was sown again. Individual plants were selected in the F_3 generation in the growth room. The $F_{3:4}$ generation was sown in field plots of ~1 m^2 in size. Individual plants were again selected in this generation. The cultivar Heris was derived in 1991 as a single $F_{4:5}$ line selection (field plots of ~1 m^2 in size). The $F_{4:6}$ lines were evaluated in a non-replicated performance test conducted at Hrubčice in 10 m^2 plots. In 1993, the $F_{4:7}$ lines were evaluated in performance tests at Branišovice, Hrubčice, and Bystřice nad Pernštejnem (4 replications, 10 m^2 plots). The $F_{4:8}$ line was evaluated in the same way in performance tests at six places (three places were those already mentioned plus Kroměříž, Stupice, and Uhřetice). Beginning in the $F_{4:6}$ generation evaluation for resistance to powdery mildew (caused by *Erysiphe graminis* DC. f. sp. *hordei* Em. Marchal), leaf rust (caused by *Puccinia hordei* Otth), and net blotch (caused by *Pyrenophora teres* Drechs.) was made at two locations (Hrubčice and Bystřice and Pernštejnem) in the field followed by evaluation for resistance to powdery mildew in the greenhouse. Malting quality (N content and extract in malt dry weight) was tested each year beginning with the harvested progeny of the $F_{4:6}$ generation. In 1995, Heris (HE-6260) was included in the State Variety Trials of the Czech Republic. Three-year tests showed that Heris did not reach a required level of a complex of eight examined malting quality parameters. Therefore, it was registered as a non-malting cultivar. Heris produces above-average yields in all five growing regions (maize, sugar beet, cereal, potato, and forage crops). The highest yield was obtained under drier conditions.

Heris is mid-early and 80 cm tall. Its resistance to lodging and stem breaking after overripening is good. The kernel is large with high thousand-kernel weight, and its kernel plumpness fraction (>2.5 mm) is high (88%). Heris does not require fungicide treatments and performs well under diverse growing conditions. Heris possesses good resistance to all fungal diseases of barley prevalent in the Czech Republic. It exhibits high resistance to powdery mildew and leaf rust, and resistance

to net blotch and leaf scald (caused by *Rhynchosporium secalis* Oudem, Davis). Among 47 barley genotypes tested for resistance to barley yellow dwarf virus, Heris ranked second for resistance to this virus (Vacke et al., 1997). Resistance to powdery mildew in Heris is controlled by the recessive gene *mlo* (Dreiseitl and Jørgensen, 2000) and resistance to leaf rust is conferred by *Rph7* (Dreiseitl and Steffenson, 2000). The gene *mlo* in Heris might be derived from Ab 1105 (Brückner, 1974) or from Risø 6018 (Jørgensen, 1994); i.e., it is the *mlo11* or *mlo6* gene (Jørgensen, 1994). The gene *Rph7* in Heris was derived from Forrajera (Nover and Lehmann, 1974). The presence of *Rph7* was confirmed using a newly developed molecular marker (Brunner et al., 2000). Heris is the one of first European cultivars in which the gene *Rph7* has been identified and obviously the first registered cultivar possessing a combination of the resistant genes: *Rph7* against leaf rust and *mlo* against powdery mildew. At the present time, this combination makes Heris fully resistant to both powdery mildew and leaf rust in Europe. Breeder seed is maintained by Plant Select Ltd., Hrubčice, Czech Republic. The seed of Heris is distributed by Cebeco Seeds, Ltd., Sazečská 8, CZ-108 25, Prague 10, Czech Republic.

A. Dreiseitl* and P. Svačina

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A. Dreiseitl, Dep. of Integrated Control, Agricultural Research Institute Kroměříž Ltd., Havlíčkova 2787, CZ-767 01 Kroměříž, Czech Republic; and P. Svačina, Plant Select Ltd., Hrubčice, CZ-798 21 Bedihošť, Czech Republic. Registered by CSSA. Accepted 31 May 2001. *Corresponding author (dreiseitl@vukrom.cz).

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Registration of 'Finaska' Barley

'Finaska', a six-rowed spring barley (*Hordeum vulgare* L.) (Reg. no. CV-286, PI 613155) was developed by the Alaska Agricultural and Forestry Experiment Station. It was released for commercial production by the Alaska Agricultural and Forestry Experiment Station in May 2000. Prior to release, Finaska was tested as Jo1632/Jo1599-44. The name Finaska is derived from the words Finland and Alaska to recognize the cooperation between Finnish and Alaskan plant breeding programs that resulted in the release of this cultivar.

Finaska originated as a double-haploid line from the cross Jo1632/Jo1599. Both of these lines were developed at the Plant Breeding Institute of the Jokioinen Agricultural Research Centre (now Boreal Plant Breeding Ltd.) in Jokioinen, Finland. Jo1632 is high yielding and early maturing, with average to above-average tillering capacity, kernels/spike, and kernel weight. Jo1599 is later maturing, and characterized by its dense spike, low kernel weight, and high number of kernels/spike.

Finaska possesses an exceptional combination of high grain yield, early maturity, lodging resistance, and good feed quality. In four years of tests conducted in Alaska from 1996 to 1999 at Palmer, Fairbanks, and Delta Junction, Finaska yielded an average of 4922 kg ha^{-1}, which was 9% more than 'Otal' (Taylor et al., 1995). Otal is currently the most widely grown barley cultivar in Alaska. Finaska matured in 89 d, which was one day earlier than Otal. Average height of Finaska was 69 cm, which was 13 cm shorter than Otal. The shorter plant height of Finaska contributed to its improved lodging resistance compared with Otal. Average test weight of Finaska was 59.1 kg hL^{-1}, which was 4.5% lower than Otal. Lower test weight is sometimes associated with poor grain quality in short-season environments, especially when full kernel filling is not achieved due to frost damage or late-developing tillers. However, Finaska had plump kernels, with an average 1000-kernel weight of 44.4 g, which was 3.5% higher than Otal. Average grain protein of Finaska was 13.1%, which was 1.2% lower than Otal. Neutral detergent fiber (NDF) and acid detergent fiber (ADF) were less than Otal (4.8% and 10.5%, respectively), indicating Finaska's desirable characteristics as a feed barley.

No significant levels of common diseases of barley, including barley leaf scald [caused by *Rhynchosporium secalis* (Oudem). J.J. Davis], net blotch (caused by *Pyrenophora teres* Drechs.), or smut (caused by *Ustilago* spp.) were observed for Finaska, although incidence of these diseases is generally low or non-existent under Alaska growing conditions.

Spikes of Finaska are six-rowed, rough awned, medium length, and lax to medium density, with kernels overlapping at the tip. Lemma awns are long and rough, and glumes are about half the length of the lemma. Kernels are midsize with yellow aleurone. The rachilla is long with short hairs. Lateral veins are slightly toothed, and lemmas are wrinkled. The basal rachis internode is short and straight.

Breeder seed of Finaska is maintained by the Alaska Agricultural and Forestry Experiment Station, Palmer, Alaska, and can be obtained upon request. Finaska is not protected by Plant Variety Protection. Researchers using this cultivar are requested to acknowledge its source as the Alaska Agricultural and Forestry Experiment Station.

S.M. Dofing and C.W. Knight

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S.M. Dofing, Pioneer Hi-Bred International, 21888 N. 950th Rd., Adair, IL, 61411; and C.W. Knight, Agric. and Forestry Exp. Stn., University of Alaska Fairbanks, Fairbanks, AK 99775. Registered by CSSA. Accepted 31 May 2001. *Corresponding author.

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Registration of 'Niska' Barley

'Niska' is a spring six-rowed semi-dwarf feed barley (*Hordeum vulgare* L.) (Reg. no. CV-287, PI 611139). It was

released in May 1999 by the Field Crop Development Centre of Alberta Agriculture Food and Rural Development, Lacombe, Alberta, Canada (Canadian Reg. no. 4934). Niska was derived from the cross CQ-CM/'Apan'//RM508/3/'DL69'/'Hiproly' made in the summer of 1983 at Lacombe. The first two crosses were made at the International Maize and Wheat Improvement Centre (CIMMYT) in 1975 and introduced as F_2 populations to Lacombe in 1976. DL69/Hiproly is a single cross made at Lacombe in 1975. DL69 is a semi-dwarf six-rowed cultivar from India, and Hiproly is a two-rowed cultivar with high lysine and protein content from Ethiopia. Seed from F_1 plants grown in the greenhouse were bulked to form the F_2 generation that was grown at Lacombe in 1984. Subsequent generations were advanced by a modified bulk breeding method. Head selections were made subsequently in the F_7 generation on the basis of plant type to produce F_8 head-row lines that were grown in 1991 at Lacombe. Head selections on the basis of plant type were made for line development. A single F_9 head row that became Niska was selected at Lacombe and entered in yield trials from 1992 to 1996. Selection was based on grain yield, test weight, protein content, straw strength, threshability, and resistance to foliar diseases.

Niska is a smooth awned semi-dwarf barley with a green coleoptile color and erect juvenile growth habit. Leaves are green, wide, and long with glabrous green sheaths and blades. The flag leaves are green, wide, medium long, and semi-erect. The auricle is white with a waxy sheath. Stems are short, with an average peduncle thickness of 2–3 mm. Culms generally have four nodes, an open collar, a slightly undulated neck, and an exsertion above the base of the flag leaf blade of 3–10 cm. Spikes of Niska are semi-dense, short, and semi-erect. Glume awns are semi-smooth with purplish tips. Rachillas are long with long hairs. Lemma awns are smooth and long with purplish tips. The basal marking of the lemma has a transverse crease. The lemma has few barbs on the laterals veins. Kernels of Niska are covered, medium long, and medium wide with a yellow aleurone.

Niska was tested as H83030002 in Alberta yield trials from 1992 to 1996 and as SD513 in the Western Semi-Dwarf Barley Cooperative Test (WSDBCT) of the Canadian Prairie Registration Recommending Committee for grain from 1996 to 1998. In 50 location-year of the WSDBCT grown in Manitoba, Saskatchewan, and Alberta, Niska had an average yield of 7234 kg ha^{-1}, which was 107% of 'CDC Earl', 99% of 'Tukwa', and 109% of 'Kasota'. These checks are the most popular six-rowed, semi-dwarfs cultivars grown in western Canada. In the same tests (47 location-year), Niska had a mean test weight of 61.7 kg hL^{-1} compared with 59.6 kg hL^{-1} for CDC Earl, 61.2 kg hL^{-1} for Tukwa, and 60.8 kg hL^{-1} for Kasota. The mean 1000 kernel weight of Niska was 36.0 g compared with 34.9 g for CDC Earl, 33.8 g for Tukwa, and 33.7 g for Kasota. Niska had a plant height of 78 cm compared with 76 cm for CDC Earl, 81 cm for Tukwa, and 79 cm for Kasota. Niska is 1 d later in maturity than CDC Earl, 2d later than Tukwa, and 5 d later than Kasota.

Niska has an intermediate field reaction to barley leaf scald (caused by *Rhynchosporium secalis* (Oudem.) J.J. Davis). In seven tests where scald reaction was measured, on a scale of 0 to 9 (where 0 is least affected), Niska averaged 3.0 compared with 3.0 for CDC Earl, 3.0 for Tukwa, and 2.0 for Kasota. Niska is moderately resistant to the spot form of net blotch (caused by *Cohliobolus sativum*). It is susceptible to loose smut (caused by *Ustilago nuda* (Jens.) Rostr.) and to septoria leaf blotch (caused by *Septoria passerinii* Sacc.). It is resistant to covered smut (caused by *Ustilago hordei* (Pers.) Lagerth) and to false loose smut (caused by *Ustilago nigra* Tapke).

Breeder seed of Niska is being maintained by the Field Crop Development Centre of Alberta Agriculture, Food and Rural Development, Lacombe, AB. Distribution Rights were granted to Canterra Seeds Ltd., 43 Scarfield Blvd. Winnipeg, MB. R3Y 1G4 Canada. Application has been made in Canada for plant breeders' rights.

James H. Helm, Manuel J. Cortez,* Patricia Juskiw, Donald F. Salmon, and William M. Stewart

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Alberta Agriculture, Field Crop Development Ctr., 5030-50 St., Lacombe, AB, Canada T4L 1W8. Registration by CSSA. Accepted 31 May 2001. *Corresponding author (manuel.cortez@gov.ab.ca).

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Registration of 'Bear' Barley

'Bear', a two-rowed spring hulless barley (*Hordeum vulgare* L.) (Reg. no. CV-288, PI 614008), was developed by the barley improvement team at the Washington State University (WSU) Agricultural Research Center and jointly released with the Idaho Agricultural Experiment Station in 1997. It was selected at Pullman, WA from a 1983 cross of 'Scout'/WA8893-78. Scout is a spring two-rowed hulless cultivar developed at the Crop Development Centre, University of Saskatchewan, Saskatoon, SK, Canada from the cross 'Centennial'/'Fergus'//Hulless 'Betzes' (Rossnagel et al., 1983). WA8893-78 is a selection from the cross 'Klages'*2/WA8537-68, both spring two-rowed types. Bear was developed using a bulk pedigree method. A single spike was selected from an F_3 bulk population. A single F_5 spike-row was selected in 1987 and designated WA11045-87. WA11045-87 was advanced in replicated trials with the primary selection criteria being high relative grain yield and improved test weight and lodging resistance compared with Scout. Bear is the first hulless cultivar released by Washington State University. Its anticipated uses are as a feed grain for non-ruminants and as a food grain for human consumption on a domestic and export market basis.

Bear is a two-rowed, mid-season, medium height spring feed/food barley. It has relatively long, lax, slightly nodding spikes. The awns are long and rough. The glumes have short hairs. The kernels thresh free (are hulless), and therefore have no adhering rachillas. The kernels are relatively small (similar to two-rowed hulless 'Condor'), have a narrow crease, and taper slightly more at the distal end. The aluerone is colorless. The radicals on Bear kernels protrude more than is typical for hulless barley. This can lead to embryo damage and reduced stand establishment. Therefore, care in threshing and cleaning is important to maintain high quality viable seed of Bear.

Bear (WA11045-87) was tested in comparison with other hulless cultivars for five years at Pullman, WA (1991–1995) and in 1994 and 1995 at various locations in Washington and Idaho. Yield of Bear was 4.7 Mg ha^{-1} or 117% of Scout and 113% of Condor over the five years of trials at Pullman and 4.1 Mg ha^{-1} or 105% of Condor and 91% of 'Gallatin' (two-rowed hulled check) over 13 eastern Washington locations in 1995. Bear yielded 5.2 Mg ha^{-1} or 136% of Condor and 100% of Scout and 'Phoenix' (two-rowed hulless) over four location-years in 1994–1995 in northern Idaho. Bear yielded 6.0 Mg ha^{-1} or 117% of 'Merlin' (two-rowed hulless) and 129% of 'Shonkin' (two-rowed hulless) over six locations in 1995 in southern Idaho. The test weight of Bear has ranged from 73.5 to 77.4 kg hL^{-1} (57–60 lb bu^{-1}); typically slightly lower than

Condor and slightly higher than Scout. The plant height of Bear (84 cm) is in between that of Condor (78 cm) and Scout (95 cm). Relatively little lodging has been observed, but Bear and Condor have medium to high lodging resistance, which is a little greater than that of Scout. Few disease symptoms have been noted on Bear, but it is susceptible to loose smut [caused by *Ustilago tritici* (Pers.) Rostr.] and barley stripe rust (caused by *Puccinia striiformis* West. f. sp. *hordei* Eriksson).

Nutritional quality of Bear is very good compared with hulled and other hulless barleys based on swine trials conducted by the WSU Department of Animal Sciences. Low acid detergent fiber (ADF) content in grain is a key indicator of high feed quality for non-ruminants. In a starter pig performance trial, ADF content was 4.0% for Bear and 5.7, 5.2, and 6.9 for Condor, 'Falcon' (six-rowed hulless), and 'Baronesse' (two-rowed hulled), respectively. Average daily gains were 0.50, 0.43, 0.50, and 0.44 kg for Bear, Condor, Falcon, and Baronesse, respectively. Feed/gain ratios were 1.77, 1.83, 1.63, and 1.82 for Bear, Condor, Falcon, and Baronesse, respectively. Bear was rated excellent compared with hulled two- and six-rowed types based on mobile nylon bag dry matter digestibility and digestible energy data from growing pigs.

Breeder and Foundation seed stocks are maintained by the Foundation Seed Program of the Washington State Crop Improvement Association located at Washington State University, Pullman, WA 99164-6420. Seed production under certification will proceed from Breeder through Foundation, Registered, and Certified seed classes. Small quantities of seed for research purposes can be obtained from the corresponding author. There are no plans to apply for U.S. Plant Variety Protection.

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Registration of 'Washford' Barley

'Washford', a six-rowed spring hooded forage barley (*Hordeum vulgare* L.) (Reg. no. CV-289, PI 614009), was developed by the barley improvement team at the Washington State University Agricultural Research Center and jointly released with the Idaho Agricultural Experiment Station in 1997. It was selected at Pullman, WA in 1988 as a single row derived from a single F_4 spike from a 1984 cross of 'Belford'/'Columbia'. Belford is a six-rowed hooded forage type selected from a cross of 'Beldi Giant'/'Horsford' and released in 1943 by the Washington Agricultural Research Center. Columbia is a six-rowed semi-dwarf awned grain type selected from a cross of 'Gus'/'Kombar' and released in 1983 by Western Plant Breeders. Washford was developed with a combination bulk/pedigree system with the primary selection criteria being lodging resistance, mid to late maturity, and high forage and grain yield compared with the state's standard forage cultivar Belford. Washford is expected to supplant Belford and to be used primarily for hay production, but also for grazing, haylage, and silage for ruminant livestock.

Washford is a six-rowed, hooded, mid-late maturing, mid-tall, and moderately lodging resistant feed barley. Hoods replace the lemma awns. The glumes have short hairs. The moderately large tapering covered kernels with colorless aluerone have prominent lemma veins, short rachilla hairs, and a narrow to broad crease. Few disease symptoms have been noted on Washford. However, it is susceptible to loose smut [caused by *Ustilago tritici* (Pers.) Rostr.] and barley stripe rust (caused by *Puccinia striiformis* West. f. sp. *hordei* Eriksson).

Washford was tested under the line designation WA7999-88 for six years at Pullman (1989, 1991–1995) as representative of the cereal forage producing area in eastern Washington. Harvested at the grain soft dough stage, Washford produced 13% (25 vs. 22 t ha^{-1}) and 15% (8.7 vs. 7.6 t ha^{-1}) more forage than Belford based on wet and air dry weight, respectively. It also produced 24% on wet weight basis and 15% on air dry weight basis more forage than 'Stepford', another forage cultivar. Washford produced 22% (3870 vs. 3185 kg ha^{-1}) and 12% (3870 vs. 3519 kg ha^{-1}) higher grain yields than Belford and Stepford, respectively. Washford consistently exceeded Belford and Stepford in all yield comparisons. Washford was about 8% shorter than Belford (92 vs. 100 cm), and it had greater lodging resistance than Belford (4 vs. 16% lodged). Stepford was in between Washford and Belford for height and lodging. In 15 other western USA cereal forage tests (1995–1997), Washford exceeded or equaled the highest yielding forage barleys at 10 of 11 Montana location-years, one of three Wyoming location-years, and one of one Oregon location-year. At the Oregon site, Washford was 12% lodged while Belford was 57% lodged. Forage quality evaluations of agronomic trial samples conducted at the Department of Animal Sciences at Washington State University indicated that Washford and Belford were comparable in quality. For forage harvested at the grain soft dough stage, acid detergent fiber was 28.3 and 27.0%, protein content was 9.5 and 10.4%, and in vitro dry matter disappearance was 62.9 and 63.5% for Washford and Belford, respectively.

Breeder and Foundation seed stocks are maintained by the Foundation Seed Program of the Washington State Crop Improvement Association located on the Washington State University campus, Pullman, WA 99164-6420. Seed production under certification will proceed from Breeder through Foundation, Registered, and Certified seed classes. Small quantities of seed for research purposes can be obtained from the corresponding author.

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Registration of 'GA 161' Cotton

'GA 161' cotton (*Gossypium hirsutum* L) (Reg. no. CV-117, PI 612959) was developed by the Georgia Agricultural Experiment Station (GAES) and released in 1999. Exclusive marketing rights were granted in 2000 to Phytogen Seed Co., LLC, Leland, MS after a bid offering conducted by the University of Georgia Research Foundation, Inc. GA 161 is a smooth-leaf cultivar with an excellent combination of yield potential, fiber quality and adaptation throughout the southeastern U.S. (Lubbers et al., 2000).

GA 161 was tested in Official Cultivar Trials from 1996 to 1998 by the GAES under the experimental designation GA 92-161. Since 1999, Phytogen Seed Co. tested GA 161 as PSCGA 161.

The pedigree of GA 161 is 81-29/'Coker315'//79-13/'Deltapine 90'/3/Aub-244RNR/4/M-725RNR/5/PD6208. Lines 81-29 and 79-13 are root-knot nematode resistant types of unknown parentage obtained from R.L. Shepherd. Coker 315 has the pedigree 'Coker 310'/Coker 8103, while Deltapine 90 was derived from the cross DP6516/DP6582 (Calhoun et al., 1997). Aub-244RNR (Shepherd, 1987) derives from the cross Aub-634RNR/'Stoneville 213', while M-725RNR (Shepherd et al., 1996) has the pedigree Aub-634RNR/3*'Coker 310'. PD6208 (Culp et al., 1985) was derived from the cross of PD9363/PD9240. GA 161 is from the bulk increase of a single F_5 plant selection from the complex cross. All crosses, selection, and testing were conducted by S.H. Baker.

Averaged over 10 location-years from the 1996 and 1997 Georgia (Raymer et al., 1996, 1997) and South Carolina (May et al., 1996, 1997) Official Cultivar Trials, GA 161 produced equivalent lint yields and lint fractions compared with 'HS-46'. The advantage of GA 161 over HS-46 is 4% longer upper half mean (UHM) fiber length and 1.3% higher fiber length uniformity index (UI), desirable traits for rotor yarn manufacture (El-Mogahzy, 1998). Compared with 'NuCotn33B' over 17 location-years from the 1999 High Quality Regional Cotton Variety Test (Rayburn, 1999) and the 1999 to 2000 Georgia (Day et al., 1999, 2000) and South Carolina (Jones et al., 2000; May et al., 1999) Official Cultivar trials, GA 161 produced similar lint yields, lint fractions, and micronaire readings, but had 5% longer UHM, 12% higher fiber bundle strength, and 12% stronger yarn tenacity. Compared with the popular cultivar Deltapine 458BR over 13 location-years in the 1999 to 2000 North Carolina (Bowman, 1999, 2000) and Georgia Official Cotton Cultivar Trials, GA 161 produced similar lint yields, lint fractions, and micronaire readings, but had 5% longer UHM, slightly higher (0.7%) UI, and 9% higher fiber bundle strength.

Compared with HS-46, 'NuCotn 35B', and 'Deltapine 5690', GA 161 has similar normal shaped leaves, low leaf trichome density, but has pubescent stems. Seed index of GA 161 averages greater than 10 grams (Rayburn et al., 1999), possibly contributing to its excellent seedling vigor.

GA 161 is moderately resistant to fusarium wilt [caused by *Fusarium oxysporum* Schlechtend.:Fr. f. sp. *vasinfectum* (Atk.) W.C. Snyder & H.N. Hans.], based on the 1997 National Cotton Fusarium Wilt Test (Glass and Gazaway, 1997). GA 161 has a low level of resistance to root-knot nematodes (*Meloidogyne incognita*), as two greenhouse trials (Davis and Baker, 1997, 1998) found it to support numerically higher, but not statistically different, levels of reproduction compared with the moderately resistant check cultivar LA 887 (Jones et al., 1991).

Breeder seed of GA 161 will be maintained by Phytogen Seed Co., LLC. Small quantities (25 g) can be obtained from Phytogen Seed Co., P.O. Box 27, Leland, MS, 38756. Application for Plant Variety Protection (Application no. 200000149) has been made by the University of Georgia Research Foundation, Inc.

O.L. May,* R.F. Davis, and S.H. Baker

Acknowledgments

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Registration of 'Endeavor' Tall Fescue

'Endeavor' tall fescue (*Festuca arundinacea* Schreb.) (Reg. no. CV-90, PI 606762) was released by Pure Seed Testing, Inc., Hubbard, OR, in September 1999. Endeavor was developed by Pure Seed Testing as part of a breeding program to develop tall fescue cultivars with improved resistance to brown patch (caused by *Rhizoctonia solani* Kühn). The first Certified seed was produced in 2000. Endeavor was tested under the experimental designation PST-5R94E.

Plants used to develop Endeavor were selected for brown patch resistance and summer turf performance in turf trials near Rolesville, NC. These plants were also selected for early maturity of the maternal lines. Tall fescue plants selected from 10 turf plots near Rolesville were used to establish an isolated 3050-plant nursery, designated 5R94E, during the fall of 1995 near Hubbard. Approximately two-thirds of the population was removed from this nursery during the spring of 1996, prior to anthesis, to increase uniformity of plant type and maturity. Selection criteria for the remaining plants were early maturity, bright-green color, medium-to-low growth habit, freedom from stem rust (caused by *Puccinia graminis* Pers.:Pers.), and high number of reproductive tillers. The remaining plants were allowed to interpollinate. Seed harvested from 863 plants in the summer of 1996 was bulked to constitute the first Breeder seed of Endeavor. The 10 progeny turf plots that provided the original germplasm for Endeavor trace their maternal origins to the following sources: two from 'Coyote'; two from a plant collected from Holly Springs Country Club, Holly Springs, MS, during the spring of 1976; one from 'Coronado' (Rose-Fricker et al., 1999); one from 'Rebel' (Funk et al., 1981); one from 'Rebel Jr.' (Hurley et al., 1992); one from 'Virtue'; one from a plant collected on the campus of the University of Georgia; and one from a plant collected from an old turf in Atlanta, GA.

Endeavor is an early-maturity, medium-dark green tall fescue that has a rapid establishment rate from seed, improved summer quality, and resistance to brown patch. It was developed for turf uses including lawns, sports turfs, and golf course roughs. Based on performance at Rolesville, Endeavor should be well suited for turf in regions that have warm, humid summers. Endeavor should perform well as a monostand, in blends with other turf-type tall fescues, or in mixtures with up to 5% Kentucky bluegrass (*Poa pratensis* L.).

Seed production of Endeavor is limited to three generations of increase from Breeder seed: one each of Foundation, Registered, and Certified. Pure Seed Testing, Inc. maintains Breeder seed of Endeavor in Oregon. U.S. Plant Variety Protection of Endeavor has been applied for (PVP Certificate no. 9900117).

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Registration of 'Olympic Gold' Tall Fescue

'Olympic Gold' tall fescue (*Festuca arundinacea* Schreb.) (Reg. no. CV-89, PI 606753) was released by Pure Seed Testing, Inc., Hubbard, OR, in September 1999. Olympic Gold was developed by Pure Seed Testing as part of a breeding program to develop tall fescue cultivars with improved resistance to brown patch (caused by *Rhizoctonia solani* Kühn). The first Certified seed was produced in 2000. Olympic Gold was tested under the experimental designation PST-5E5.

Plants used to develop Olympic Gold were initially selected for brown patch resistance and summer performance in turf trials near Rolesville, NC. These plants were used to establish an isolated 6240-plant nursery, designated 5R4, during the fall of 1993 near Hubbard. Approximately two-thirds of the population was removed from this nursery during the spring of 1994, prior to anthesis, to increase uniformity of plant type and maturity. Remaining plants were allowed to interpollinate. Seed was harvested during the summer of 1994 and bulked by maternal line. This seed was used to establish progeny turf plots near Rolesville, Hubbard, and Adelphia, NJ during the fall of 1994.

During June 1995, twenty nine phenotypically similar plants were selected prior to anthesis from the 5R4 nursery. Selection criteria for these plants were early maturity, good spring turf performance in progeny turf trials, bright-green color, and freedom from disease. These 29 plants were transferred to an isolated crossing block, designated 5E5, near Hubbard. The plants were allowed to interpollinate and seed was harvested during the summer of 1995.

In total, Olympic Gold traces approximately 59% of its origin to germplasm used in the breeding and development of 'Olympic' (Meyer et al., 1982) tall fescue. The 29 parents in the 5E5 polycross trace their maternal origin to the following sources: sixteen plants from 'Rebel' (Funk et al., 1981), which is closely related to Olympic; five plants from 'Tomahawk' (Rose-Fricker et al., 1999b), which traces its origin to Olympic and Rebel; three plants from 'Coronado' (Rose-Fricker et al., 1999c), which traces its origin to Rebel; three plants from 'Apache II' (Rose-Fricker et al., 1999a); one plant from 'Safari' (Rose-Fricker et al., 1995); and one plant collected at Holly Springs Country Club in Holly Springs, MS during 1976.

Seed harvested from the 5E5 crossing block was used to establish an isolated 3584-plant nursery near Hubbard during the fall of 1995. Plants were removed from this nursery, prior to anthesis, to increase population uniformity. Selection criteria were early maturity, bright-green color, medium-low plant height, and freedom from stem rust (*Puccinia graminis* Pers.:Pers.). Remaining plants were allowed to interpollinate. During the summer of 1996, 707 plants were harvested to provide the first Breeder seed of Olympic Gold.

Olympic Gold is an early maturity, medium-dark green tall fescue that has shown good turf quality in trials throughout the USA (Morris and Shearman, 1998). Olympic Gold has good summer turf performance. It has shown good resistance to brown patch, stem rust, leaf spot [caused by *Drechslera dictyoides* (Drechs.) Shoemaker], and gray leaf spot [caused by *Pyricularia grisea* (Cooke) Sacc.] (Fraser, 1997; Morris and Shearman, 1998) and moderate resistance to pythium blight [caused by *Pythium aphanidermatum* (Edson) Fitzp.].

Olympic Gold was developed for turf uses including lawns, golf course roughs, and sports fields. It should perform well in areas where tall fescue is adapted, particularly in regions that have hot, humid summers. Olympic Gold may be planted as a monostand, in blends with other turf-type tall fescues, or in mixtures with up to 5% by weight of Kentucky bluegrass (*Poa pratensis* L.).

Seed propagation of Olympic Gold tall fescue is limited to three generations of increase from Breeder seed: one generation each of Foundation, Registered, and Certified. Pure Seed Testing, Inc. maintains Breeder seed of Olympic Gold in Oregon. U.S. Plant Variety Protection of Olympic Gold has been applied for (PVP Certificate no. 9900106).

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Registration of 'Red River' Crabgrass

'Red River' crabgrass [*Digitaria ciliaris* (Retz) Koel.] (Reg. no. CV-210, PI 537575) is a high yielding forage and conservation type cultivar developed and officially released in 1988 by the Samuel Roberts Noble Foundation, Agricultural Division, Ardmore, OK. Red River was tested under experimental designations RR greentop and RR874. It was named from the collection location of the parent plant, which was found on the upland sandy soils immediately north of the Red River in southern Oklahoma near 33.53°N latitude and 96.16°W longitude.

Red River crabgrass originated from a single naturalized plant selection. There was no artificial selection involved. It is self-fertile but capable of cross pollination. During the process of seed increase after the release, the seed production locations were isolated from other crabgrass areas, and the soil was treated with a soil fumigant before planting to minimize other plant contamination. Red River was compared with 23 other naturalized selections from regions of Oklahoma and Missouri for a total of nine-station years of research. Since release, it has been further compared with 17 additional selections from Delaware, Louisiana, New Mexico, New Zealand, Russia, and additional Oklahoma selections. Seed of the fifth generation from the parent Red River crabgrass plant was space planted in a greenhouse study to test for plant type uniformity. There was only minute variation within about one percent of the population. Further tests revealed that those plants were not superior to Red River crabgrass; there was essentially no evidence of outcrossing at this time. Red River has remained a top choice for a crabgrass forage cultivar. Selections were compared for: early-season production, total forage production, seasonal forage distribution, late forage production, leafiness, seed production, growth habit, stoloniferous characteristics, and forage quality.

Red River is the first known cultivar of crabgrass, an annual digitgrass; consequently, comparison with other cultivars is not possible. Red River is characteristic of the robust, tall ecotypes of *D. ciliaris*, which have innumerable ecotypes or morphotypes within the species. It is both an annually planted grass and a reseeding annual that can simulate perennial forage production. The leaf and sheath are pilose to varying degrees. The seeds are approximately 1 mm wide and 3 mm long. Seedhead and seed color at maturity is tan. Some seed bracts may be minutely light purple under some environmental stresses. Many other ecotypes have darker purple seedhead parts and seed bracts. This color differentiation distinguishes Red River cultivar from some other ecotypes. A major seed characteristic that is used to ascertain the *D. ciliaris* species as unique to all other species in the USA is that the lemma does not have small spicules on the ribs, whereas *D. sanguinalis* (L.) Scop, its most similar relative, does have spicules on the lemma ribs.

The ecotype selections of crabgrass varied enormously for most attributes that were evaluated (Dalrymple, 1984; Dalrymple, et al., 1999). Forage yields ranged from less than 1000 kg ha^{-1} for low-yielding ecotypes to more than 10 000 kg ha for Red River. Red River was compared with a composite selection from a known long lived crabgrass pasture; It yielded 20% more forage than the control composite selection in 6 yr of testing. It also yielded up to 66% more than another composite selection of a known long lived pasture. Red River produced a 9-yr annual average of 9530 kg ha^{-1} dry matter from a wide range of growing conditions and was the highest yielding selection during the 9-yr evaluation period. It is taller than most ecotypes, having freestanding forage of up to 70 cm in height and was one of the earliest forage producers and maturing selections. Red River had good seasonal forage distribution if growing conditions were adequate. It remained physiologically active and productive throughout the growing season and was generally the highest yielding selection late in the season. Visual leafiness was excellent and leaf width was approximately 1 cm. Seed production is adequate for perpetuation of the cultivar with yields ranging upward to more than 100 kg ha^{-1}. Growth habit is erect to semi-prostrate and sodforming with abundant stolons, which can reach 90 cm long or more in one regrowth period of one to two months if soil surface space is available. Forage palatability is high. Crude protein and IVDDM percentages were similar to other ecotypes, and Red River produced greater yield of IVDDM.

The region of geographic adaptation in the USA ranges from the subtropical areas of Florida and the humid to semi arid southeastern to south-central USA from about 28°N latitude and 87°W longitude northward and westward to about 40°N latitude and 100°W longitude. This area encompasses part or all of the twenty-one most southeastern states from Nebraska, south and east to the Gulf and Atlantic coasts and to similar climates worldwide. The region of adaptation extends westward to California under irrigation and below about 35°N latitude. Red River has been grown in Mexico under irrigation and in New Zealand and South Africa under dryland conditions.

The Noble Foundation and the Oklahoma Crop Improvement Association maintain Breeder seed. Foundation, Registered, and Certified seed is produced by private growers under the rules and inspections of the Oklahoma Crop Improvement

Association, Stillwater, OK, and is available from their listed growers. Red River crabgrass is not protected under the U.S. Plant Variety Protection Act.

R.L. Dalrymple

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Registration of 'Axcella' Annual Ryegrass

'Axcella' (Reg. no. CV-211, PI 614844) annual ryegrass (*Lolium multiflorum* Lam.) was developed by the Texas Agricultural Experiment Station (TAES) as a cool-season turfgrass. Axcella was tested under the experimental designation Turf 92 and released by TAES in 2000. Axcella is a diploid ($2n = 2x = 14$).

Annual ryegrass is often used as a winter lawn grass in the southern USA, and during the spring months mowing of such a lawn is laborious and time consuming. A slow-growing annual ryegrass would be useful to a homeowner. Consequently, a program to select for leafy, dwarf-type plants was initiated. In 1991, 18 plants that were dwarf in stature compared with other plants were selected from forage-type breeding populations of annual ryegrass at Overton, TX. These populations had parents such as 'Gulf', 'TAM 90' (Nelson et al., 1992), and 'Marshall', as well as experimental breeding lines. These populations were winter-hardy and, with the exception of Marshall, resistant to crown rust caused by *Puccinia coronate* Corda. These 18 dwarf plants produced a high number of tillers and had narrow leaves.

The plants were transplanted to an isolation block and allowed to cross-pollinate and produce seed. Seed from individual plants was harvested and kept separate. Seed was determined to be free of endophyte caused by *Neotyphodium occutans* C.D. Moon, B. Scott, & M.J. Christensen, sp. Nov. (Moon et al., 2000) and was subsequently bulked. During the 1992–1993 growing season, seed from this bulk was screened for Al tolerance utilizing the hematoxylin staining procedure (Polle et al., 1978). Approximately 450 Al-tolerant seedlings were transplanted to the field at Overton. These plants were evaluated as spaced-plants, and all plants exhibiting high forage growth and normal leaf width were eliminated from the population. Two hundred dwarf plants remained at the end of the growing season and were allowed to cross-pollinate and produce seed. Plants were also selected for dark green color of leaves and freedom from frost injury (leaf tip burn) after periods of freezing weather. All plants exhibiting crown rust or barley yellow dwarf virus symptoms were eliminated from the population. Seed from this population was harvested and bulked in 1992. In 1997, approximately 0.33 ha of spaced plants was grown near Lebanon, OR. Non-dwarf plants accounted for approximately 5% of the population and were eliminated. In 1998–1999, a seed increase of 3 ha was grown near Albany, OR. This population was rogued twice at heading time to eliminate robust or tall plants prior to pollination. Approximately 2500 kg of Breeder seed was produced in 1999.

Crown rust data recorded at Beaumont, TX in 1997 indicate that Axcella is moderately resistant to crown rust. Axcella is less tolerant to crown rust than TAM 90 (resistant cultivar), but more resistant than Marshall (susceptible). Mean heading date at Overton in 1998 was 5 d later that TAM 90 and 12 d later than Gulf annual ryegrass. Axcella exhibited 99% fluorescent root-tips, indicating that it should be classified as an annual. Axcella had a smaller crown width of 71 cm, compared with 98 and 102 cm for the forage type Gulf and TAM 90, respectively. Leaf width on 10 Feb. and flag leaf width on 11 May for Axcella were much narrower than Gulf or TAM 90. Tiller number per plant on 10 Feb. for Axcella, Gulf, and TAM 90 was 92, 71, and 62, respectively. Spike number per plant on 11 May was 31, 33, and 36, respectively, for Axcella, Gulf, and TAM 90. Plant height of seed heads at maturity was 84, 105, and 108 cm for Axcella, Gulf, and TAM 90, respectively.

When planted in a bermudagrass (*Cynodon dactylon* L.) sod in east Texas, Axcella ryegrass will transition out (die) by mid-May compared with mid-June for turf-type perennial ryegrass (*Lolium perenne* L.). Axcella is much less competitive with the bermudagrass compared with perennial ryegrass and allows a smooth transition to the warm season turf. Color of Axcella is slightly darker than Gulf, but less dark compared with 'Gettysburg' perennial ryegrass.

Breeder seed of Axcella is maintained by the Texas Agricultural Experiment Station in cooperation with CEBECO International Seeds, Halsey, OR. CEBECO International Seeds will be responsible for producing Foundation, Registered, and Certified classes of seed. Seed is available for research and testing purposes from L.R. Nelson. U.S. Plant Variety Protection has been applied for.

L.R. Nelson,* J. Crowder, M.C. Engelke, R. White, and V.G. Lehman

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Registration of 'AC Black Diamond' Black Dry Bean

'AC Black Diamond' (Reg. no. CV-191, PI 615158) is a large-seeded (25 to 40 g 100^{-1} seeds) shiny black dry bean (*Phaseolus vulgaris* L.) developed at the Agriculture and Agri-

Food Canada Research Centre, Lethbridge, AB, in cooperation with the Agriculture and Agri-Food Canada Research Station, Morden, MB, and released in 2000. It is a high yielding cultivar particularly well-suited to western Canada. Registration number 5210 was issued for AC Black Diamond on 10 Nov. 2000 by the Variety Section, Plant Products Division, Canadian Food Inspection Agency.

AC Black Diamond, tested as L96F101, was derived from a double cross made in 1993, 94CT382 = LE93-7/XAN 51// LE93-8/DOR 391. This cross was carried out under contract with AAFC at the Centro Internacional de Agricultura Tropical (CIAT), Cali, Colombia, resulting from crossing the upright Lethbridge line, LE93-7, with XAN 51 from CIAT; LE93-8, with the CIAT line DOR 391, and crossing the two resulting single-cross F_1 to obtain a double-cross. LE93-7 and LE93-8 are two elite great northern sister lines from the Lethbridge program that are upright and early maturing, with red kidney, small red, navy, and great northern bean parents. XAN 51 was derived from population SEL 10/BAT 946 (Rodriguez et al., 1995). It is a small (23 g 100^{-1} seed) white-seeded line with indeterminate Type III growth habit (Singh, 1982). It has *I* gene resistance to bean common mosaic virus (BCMV) and is tolerant to common bacterial blight (caused by *Xanthomonas axonopodis* pv. *phaseoli* Starr & Garces 1950 emend) (Vauterin et al., 1995); syn. *X. campestris* pv. *phaseoli* (Smith) Dye. DOR 391 was derived from population DOR 376//DOR 364/LM 30649 (Rodriguez et al., 1995). It is a small red line with upright indeterminate Type II growth habit. It has *I* gene resistance to BCMV and is tolerant to bean golden mosaic virus.

The double-cross F_1 was space-planted at CIAT-Palmira, Colombia (soil was a fine silty, mixed isohypothermic, Aquic Hapludoll, with a pH of 7.5; 24°C mean growing temperature). The F_1- derived F_2, F_3, and F_4 families were advanced and the F_5 seed multiplied at CIAT-Palmira. The nursery was periodically sprayed with pesticides against diseases and insect pests. The single-pod bulk method was used to advance generations from F_2 to F_4; however, some selection was practiced for plant type, maturity, and seed characteristics. The harvested F_5 bulk was sent to Canada for multi-location yield testing as line L96F101. A series of yield tests followed from 1996 to 1997. These included: narrow-row (23 cm) tests at Lethbridge and Vauxhall, AB, in 1996; narrow-row and wide-row (60 cm) tests, at Lethbridge and Vauxhall, and a wide-row test at Morden, MB, in 1997. Line L96F101 was entered into official registration trials in 1998. In 1998 and 1999, it was tested in the Wide-Row Cooperative Registration trials and in 1999 also was tested in the Narrow-Row Cooperative Registration trials. Twenty-one progeny-rows were increased in Chile in 1998–1999, grown in Idaho in 1999 and again increased at Yuma, AZ in 2000. After roguing in the field, 19 of these progeny rows formed the first Breeder seed which was grown in bulk at Quincy, WA in 2000 and harvested in October.

AC Black Diamond proved particularly promising in narrow-row tests, and yields were significantly increased over those of the checks, 'UI 906' and 'CDC Nighthawk'. When averaged over six narrow-row trials, AC Black Diamond matured in 109 d and had yields of 2290 kg ha^{-1} compared with a corresponding 108 d and 1880 kg ha^{-1} for UI 906 and 108 d and 1690 kg ha^{-1} for CDC Nighthawk. Coefficients of variation for yield in those trials were below 20%. When averaged over nine wide-row trials, AC Black Diamond matured in 109 d and had yields that averaged 2510 kg ha^{-1} compared with 108 d and 2360 kg ha^{-1}, respectively for UI 906.

AC Black Diamond has Type IIa indeterminate growth habit (Singh, 1982), with erect stems and with few vines, and was similar to the two check cultivars, UI 906 and CDC Nighthawk. Pods and leaves of AC Black Diamond are dark green compared to light green for UI 906 and medium green for CDC Nighthawk. Dry seeds of AC Black Diamond and the two checks are black with the seed coat luster of AC Black Diamond being shiny, contrasted to the opaque (dull) luster of UI 906 and CDC Nighthawk. The seed mass of AC Black Diamond (at 140 g kg^{-1} moisture) averaged 24.9 g 100^{-1} seeds over 13 sites which is considerably greater in mass than that of UI 906 which averaged 15.1 g 100^{-1} seeds and that of CDC Nighthawk which averaged 16.8 g 100^{-1} seeds. The seed shape of the median longitudinal section is elliptic for AC Black Diamond in contrast to ovate for UI 906. Flower color of AC Black Diamond and the two checks is violet. The pod length of AC Black Diamond is longer than that of both UI 906 and CDC Nighthawk. Plant height of AC Black Diamond averaged over five narrow-row trials was 42 cm compared with 45 cm for UI 906 and 41 cm for CDC Nighthawk. Over nine wide-row trials, plant height was 35 cm for AC Black Diamond compared with 39 cm for UI 906. Lodging at maturity averaged over nine wide-row and irrigated trials was 1.5 and 1.4 for AC Black Diamond and UI 906, respectively (with 1 = upright and 5 = prostrate).

On the basis of greenhouse inoculation tests at Harrow, ON, AC Black Diamond is resistant to strains 1 and 15 of BCMV, while both checks, UI 906 and CDC Nighthawk, are susceptible. Similar to the two checks, AC Black Diamond is moderately susceptible to white mold [caused by *Sclerotinia sclerotiorum* (Lib.) de Bary], on the basis of tests in a disease nursery at Lethbridge for both disease incidence and severity in 1998 and 1999. On the basis of greenhouse inoculation tests at Harrow, ON, AC Black Diamond, UI 906, and CDC Nighthawk are all susceptible to common blight.

AC Black Diamond has been released on an exclusive basis, through a licensing arrangement with the Agricore–Bean Business Unit (2802 - 5th Avenue North, Lethbridge, Alberta, Canada T1H 0P1), where pedigreed seed may be purchased. Small samples of seed of AC Black Diamond may be obtained from the corresponding author for at least five years.

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Acknowledgments

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Registration of 'AC Argonaut' Navy Dry Bean

'AC Argonaut' (Reg. no. CV-192, PI 615157) is a high-yielding navy dry bean (*Phaseolus vulgaris* L.) developed at the Agriculture and Agri-Food Canada Research Centre, Lethbridge, AB, Canada, in cooperation with and final selection and testing carried out at the Agriculture and Agri-Food Canada Research Station, Morden, MB, and released in 2000. It is a high-yielding cultivar suited for production in western Canada. Registration number 5211 was issued for AC Argonaut on 10 Nov. 2000 by the Variety Section, Plant Products Division, Canadian Food Inspection Agency, Nepean, ON, Canada.

AC Argonaut was derived from a complex cross, 90071A, made in 1990 with the following parentage: 'Redkloud'/'Kentwood'/3/Redkloud/Kentwood//'Swan Valley'/4/'Beryl'. Redkloud is an old (>25 yr) light red kidney bean selected from California Light Red Kidney in New York (Bravo and Wallace, 1974). Kentwood was released as an early-maturing, high-yielding navy bean cultivar from Agriculture Canada in Harrow, ON (Anonymous, 1973). Swan Valley is a navy bean registered in 1986, selected for its taller, more erect plant type with a narrower profile and fewer basal branches than standard cultivars and exhibiting good field tolerance to root rot [caused by *Fusarium solani* (Mart.) Appel and Wr.f. sp. *phaseoli* (Burk.) Snyd. and Hans.] (Adams et al., 1986). Beryl is a later maturing great northern cultivar released by Rogers Brothers Seed Company, Twin Falls, ID, in 1986. The cross 90071A became line L95A035, which was advanced using single seed descent to F_5 in the field near Lethbridge. Plant 3 was selected from the F_5, on the basis of seed characteristics, and seed of an $F_{5:6}$ plant was increased indoors. The progeny was bulked and again increased in 1994–1995 for multi-location yield trials that commenced in 1995. A series of eight yield tests were conducted from 1995 to 1997. These included: two wide-row (60 cm) and six narrow-row (23–30 cm) tests in Alberta and Manitoba. Line L95A035 proved particularly promising in Manitoba and was entered in the Manitoba Dry Bean Cooperative Registration trials in 1998 and 1999. Twenty-two single plant selections made from a population grown in a greenhouse at Morden were increased at Kimberly, ID, as progeny rows in 1999. These were again increased in row-plots at Yuma, AZ, in 2000. After roguing off-types, rows were bulked to produce the first Breeder seed at Quincy, WA, in 2000.

AC Argonaut proved promising in Manitoba tests due to increased yields over the official check, 'Envoy'. In seven irrigated trials of the cooperative registration trials, grown in1998 and 1999, with coefficients of variation for yield below 20%, AC Argonaut averaged 3000 kg ha^{-1} compared with 2200 kg ha^{-1} for Envoy.

AC Argonaut has the type IIa, semi-determinate growth habit, with semi-erect stem and branches and with some long vines (Schwartz et al., 1996), in contrast to the erect type I determinate growth habit of Envoy. AC Argonaut has darker green leaf color than that of Envoy. Pod distribution is high on the plant and not scattered as it is for Envoy. Days to flower for AC Argonaut, at 51 d over 7 sites, were 2 d later than Envoy. The flower color of AC Argonaut and Envoy is white. On the basis of seven yield trials, AC Argonaut matured in 101 d, which was 2 d earlier than Envoy. Days to maturity ranged from 93 d to 106 d for AC Argonaut and from 94 d to 111 d for Envoy. The seed of AC Argonaut (at 14% moisture), averaged 22.0 g 100^{-1} seeds over 7 sites and was greater than that of Envoy (16.4 g 100^{-1} seeds).

On the basis of greenhouse inoculation tests at the AAFC-Greenhouse and Processing Crops Research Centre in Harrow, AC Argonaut was resistant to strains 1 and 15 of bean common mosaic virus (BCMV). AC Argonaut was susceptible to white mold [caused by *Sclerotinia sclerotiorum* (Lib.) de Bary], in contrast to the moderately susceptible check, Envoy, based on tests in a disease nursery at Lethbridge. On the basis of greenhouse inoculation tests at Harrow, AC Argonaut and the Envoy check were susceptible to bean common bacterial blight, [caused by *Xanthomonas axonopodis* pv. *phaseoli* Starr & Garces 1950 emend.; syn. *X. campestris* pv. *phaseoli* (Smith) Dye.] (Vauterin et al., 1995). AC Argonaut was susceptible to the alpha and delta races of anthracnose [caused by *Colletotrichum lindemuthianum* (Sacc. & Magnus) Lams.-Scrib.], while Envoy was moderately resistant. On the basis of greenhouse inoculation tests at Fort Collins, CO, AC Argonaut was resistant to prevalent races of rust, collected from the field, caused by [*Uromyces appendiculatus* (Pers.: Pers.) Unger, former syn. *U. phaseoli* (Pers.) G. Wint.] (Hall, 1994) as is Envoy (which had a hypersensitive response); and both lines were susceptible to fusarium root rot [caused by *Fusarium solani* f. sp. *Phaseoli* (Burk.) Snyd. & Hans.].

AC Argonaut has been released on an exclusive basis, through a licensing arrangement with the Agricore-Bean Business Unit 2802 - 5th Avenue North, Lethbridge, AB, Canada, T1H 0P1, where pedigreed seed may be purchased. Small samples of AC Argonaut may be obtained from the corresponding author for at least five years.

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Acknowledgments

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Registration of 'AC Oxley II' Cicer Milkvetch

'AC Oxley II' cicer milkvetch (Reg. no. CV-193, PI 615074) (*Astragalus cicer* L.) was developed by the Agriculture and Agri-Food Canada Research Centre, Lethbridge, AB.

AC Oxley II, tested as LRC95-93-1, is a synthetic cicer milkvetch cultivar developed for improved seedling vigor and forage yield. About 5000 scarified seeds of Oxley cicer milkvetch cultivar were seeded in deep flats in the greenhouse in winter 1989. About 200 seedlings that emerged from a depth of 10 cm of a soil-free Cornell mix were transplanted to a poly-cross field nursery in summer 1990. In 1991, individual plants were scored for spring growth, ability to maintain growth during summer, and ability to produce seed. Plants showing poor growth were eliminated from the nursery before flowering. Fifty-four plants with improved agronomic performance were selected and the remaining plants were eliminated from the nursery. In the following winter (1991–1992), harvested seeds of these 54 selected plants (progeny rows) were scarified and tested for seedling vigor in deep flats. Seed was again harvested (1992) from the same 54 plants and were then tested for seedling vigor during the winter (1992–1993). The 38 most vigorous emerging plants from the 10 best progeny rows were transplanted to a poly-cross field nursery in summer 1993. Each plant was then vegetatively cloned into three and planted at random in the same nursery. Seed of each plant was collected separately in 1994 and 1995. Equal amounts of seed from each of the plants were bulked and the resulting population was designated as LRC95-93-1. Breeder seed plots for this synthetic were seeded in 1996 and 1999.

AC Oxley II is a perennial, rhizomatous, shallow rooted legume with indeterminate and prostrate growth habit. It has soft, hollow stems and pinnately-compound leaves with 19–25 leaflets. Seedling growth and regrowth after cutting of AC Oxley II is faster than those of Oxley. As is observed for other cicer milkvetch cultivars, AC Oxley II has better winterhardiness than any forage legume cultivar grown in western Canada. Forage stands show no susceptibility to diseases, while seed stands may show susceptibility to sclerotinia white mold [caused by *Sclerotinia sclerotiorum* (Lib.) de Bary]. Its white to pale yellow flowers are borne on racemes. Flowering occurs over a long period of time; some plants bloom from June to the first frost. At maturity, the black round leathery seed pods contain 3 to 11 bright yellow shiny seeds. AC Oxley II has larger seeds, 4.34 g 1000^{-1} seeds compared with 3.83 g for Oxley. Seeds do not shatter from the pods even after complete maturity.

AC Oxley II cicer milkvetch is intended for use as a pasture and silage legume in pure and mixed stands. It can produce a good hay crop in mixed stand with grasses. It produces more biomass than Oxley in dark brown (136% of Oxley), gray luvisol (120% of Oxley) and black soil (132% of Oxley) zones of western Canada. In brown soil zone AC Oxley II produced as much biomass as Oxley. This cultivar yielded 123 and 111% of Oxley check under dryland and irrigated conditions in western Canada, respectively. The mean total annual dry matter yield of this cultivar under irrigated conditions over 8 location-years was 8.74 t ha^{-1}, whereas under dryland conditions over (26 location-years) it produced 5.4 t ha^{-1}. Due to its winterhardiness and wide adaptation, the productive stand life of this cultivar is expected to be long (over 10 years).

AC Oxley II, like other cicer milkvetch cultivars, produces seed through cross pollination. Three species of indigenous bumble bees (*Bombus huntii* Green or *B. nevadensis* Cresson or to a lesser degree *B. rufocinctus* Cresson) are the main pollinators for this crop, although honey bees (*Apis mellifera* L.) and leaf cutter bees (*Megachile rotundata* Fibricius) have been found to improve seed set. The seed crop has to be either desiccated or swathed and allowed to thoroughly dry before seed combining. A high cylinder speed is required during threshing. AC Oxley II is a good seed producer and has produced, on average, about 500 kg ha^{-1} at Lethbridge under irrigation. This is about 10% better than Oxley seed yield. AC Oxley II has a high percentage of hard seeds and so needs to be scarified before planting. Both forage and seed stands of this cultivar should be planted with inoculated seeds using a special *Astragalus* bacterial inoculant. This cultivar establishes well when seeds are drilled 1.5 to 2 cm deep into a weed-free firm seed bed.

Breeder seed of AC Oxley II cicer milkvetch will be maintained by Agriculture and Agri-Food Canada Research Centre, Lethbridge, AB. Seed distribution rights have been granted to Prairie Seeds Inc., 1805 - 8th Street, Nisku, AB, Canada T9E 7S8 and Newfield Seeds Company Ltd., 701 Railway, Nipawin, SK, Canada S0E 1E0. Seed of AC Oxley II cicer milkvetch will be available for commercial production in 2002.

S.N. Acharya

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Registration of 'Georgia Valencia' Peanut

'Georgia Valencia' (Reg. no. CV-69, PI 617040) is a new large-podded valencia market type peanut (*Arachis hypogaea* L. subsp. *fastigiata* var. *fastigiata*) cultivar that was released by the Georgia Agricultural Experiment Stations in 2000. It was developed at the University of Georgia, Coastal Plain Experiment Station for the fresh market boiling trade in the southeastern USA.

Georgia Valencia was derived from a cross made in 1990 between Georgia Red (Branch and Hammons, 1987) and UF85I79. Pedigree selection method was practiced within the F_2, F_3, and F_4 segregating populations. Performance testing was begun in the $F_{4:6}$ generation with the advanced pure-line selection, GA 952514.

For four consecutive years (1996–1999), Georgia Valencia has produced a significantly higher yield and dollar value return per acre (approximately 30–40%) than Georgia Red, and Georgia Red has produced significantly higher yield (between 35–45%) and dollar value (between 50–70%) compared

with 'New Mexico Valencia A'(Hsi and Finkner, 1972), 'New Mexico Valencia C'(Hsi, 1980), and 'Valencia McRan'. Georgia Valencia also has a significantly larger pod size with >25% more fancy pods than Georgia Red, N.M. Valencia A, N.M. Valencia C, and Valencia McRan.

Georgia Valencia is comparable to Georgia Red in disease tolerance, and both are significantly better with 20–40% less total disease incidence than N.M. Valencia A, N.M. Valencia C, and Valencia McRan. Georgia Valencia also is similar to Georgia Red in having a compact bunch growth habit, maturity of between 110–125 d after planting in south Georgia, number seed per pod (averaged 20–25% 4 seed pod^{-1}, 60–65% 3 seed pod^{-1}, and 10–15% 2 seed pod^{-1}), red testa color, protein and oil content, O/L ratio, and roasted and boiled flavor.

U.S. Plant Variety Protection is pending for Georgia Valencia. Breeder seed of Georgia Valencia will be maintained by University of Georgia Coastal Plain Experiment Station at Tifton. Foundation seed stock will be available from the Georgia Seed Development Commission, 2420 S. Milledge Avenue, Athens, GA 30605.

W.D. Branch*

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Registration of 'Earl' Rice

'Earl' rice (*Oryza sativa* L.) (Reg. no. CV-112, PI 614900) is an early maturing, high yielding, medium-grain cultivar developed at the Rice Research Station at Crowley, LA, by the Louisiana State University Agricultural Center in cooperation with the USDA-ARS, the Arkansas Agricultural Experiment Station, the Mississippi Agricultural and Forestry Experiment Station, and the Texas Agricultural Experiment Station. Earl was officially released 1 Mar. 2000.

Earl originated from the cross 'Mercury'/'Rico 1'//'Bengal' made at the Rice Research Station in 1991. Mercury is a high yielding, early maturing, semidwarf medium-grain cultivar released by the Rice Research Station in 1987 (McKenzie et al., 1988). Rico 1 is high yielding, midseason, conventional height medium grain released by the USDA-ARS and the Texas Agricultural Experiment Station in 1987 (Bollich et al., 1990). Bengal is an early maturing, semidwarf medium grain developed and released by the Rice Research Station in 1992 (Linscombe et al., 1993). The selection number of Earl was 9431618. It was entered into the preliminary yield nursery (experimental designation 9502172) as an F_4 bulk in 1995. Earl was entered into the Louisiana Commercial-Advanced Yield tests and the Uniform Regional Rice Nurseries (URRN) in 1996 with the designation RU9602074.

Earl has conventional plant height and is susceptible to lodging. In the URRN grown in Louisiana, Arkansas, Mississippi, and Texas from 1997–1999, the average height of Earl was 107 cm and that of Bengal was 99 cm. The average number of days from emergence to 50% heading (URRN 1997–1999) was 84 and 83 for Earl and Bengal, respectively. The flag leaf of Earl averages 32 cm in length and is normally dark green in color and glabrous. Slight pubescence may be found on the lemma keel. Kernels have straw-colored hulls and apiculi. The average grain yield of Earl in the URRN in the four major rice producing states in the southern USA from 1997 to 1999 was 8457 kg ha^{-1} compared with 8639 kg ha^{-1} for Bengal. In the Louisiana Commercial-Advanced Yield tests conducted in 19 environments between 1997 and 1999, Earl produced an average yield of 9368 kg ha^{-1} compared with 8684 kg ha^{-1} for Bengal. Milling yield averages (mg g^{-1} whole kernel: mg g^{-1} total milled rice) at 120 mg g^{-1} moisture from the URRN (1997–1999) were 556:703 (56:71%) for Earl and 603:713 (60:71%) for Bengal. Milling yield averages in the Louisiana Commercial-Advanced Yield tests (14 environments) from 1997–1999 were 603:714 (60:71%) for Earl and 629:719 (63:72%) for Bengal. Individual kernel dimensions for Earl and Bengal are shown in Table 1.

Table 1. Paddy, brown, and milled grain dimensions and weight for Earl and Bengal rice grown at Crowley, LA, in 1999.

Cultivar	Length (L)	Width (W)	Thickness	L/W Ratio	Weight
	mm				mg
			Paddy Rice		
Earl	8.15	3.13	2.07	2.60	26.7
Bengal	8.30	3.16	2.14	2.63	27.4
			Brown Rice		
Earl	6.36	2.73	1.99	2.33	22.6
Bengal	6.47	2.81	2.06	2.30	23.7
			Milled Rice		
Earl	6.01	2.59	1.92	2.32	20.7
Bengal	6.06	2.65	1.94	2.29	21.8

Rice quality evaluations from the USDA-ARS laboratory at Beaumont indicate that Earl has typical U.S. medium-grain cooking quality characteristics as described by Webb et al. (1985). Earl has an average apparent starch amylose content of 12.5 g kg^{-1} and a low gelatinization temperature (65–68°C) as indicated by an average alkali spreading reaction of 6 in 17 g L^{-1} KOH. The endosperm of Earl is non-glutinous, non-aromatic, and has a light brown pericarp.

Earl is moderately susceptible to the blast fungus [caused by *Pyricularia grisea* (Cooke) Sacc.] races IB-1 and IB-49 and moderately resistant to races IB-45, IB-54, IC-17, IE-1, IG-1, and IH-1. Earl is moderately resistant to sheath blight (caused by *Rhizoctonia solani* Kuhn), resistant to narrow brown leaf spot (*Cercospora oryzae* Miyake), moderately resistant to leaf smut (caused by *Entyloma oryzae* Syd. & P. Syd.), and moderately susceptible to the physiological disorder straighthead.

Variants observed and removed from increase fields of Earl included any combination of the following: taller, shorter, pubescent, awned, long grain, short grain, earlier, later, and gold hull. The total number of variants was fewer than 1 per 5,000 plants.

U.S. Plant Variety Protection of Earl has been applied for. Breeder and Foundation seed of Earl will be maintained by the Louisiana State University Agricultural Center, Louisiana Agricultural Experiment Station, Rice Research Station, P.O. Box 1429, Crowley, LA 70527-1429. Limited quantities of seed are available upon request to the corresponding author.

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Registration of 'L-205' Rice

'L-205' rice (*Oryza sativa* L.) (Reg. no. CV-113, PI 608664) is a long-grain cultivar developed by California Cooperative Rice Research Foundation, Inc. (CCRRF) at the Rice Experiment Station, Biggs, CA. It was designated experimentally 94-Y-40 and released jointly by CCRRF, California Agricultural Experiment Station, and USDA-ARS on 1 Mar. 1999.

L-205 is a pure line selection from the cross 'M7'/R660// M7/R1588/3/82-Y-52/4/'Rexmont'/83-Y-45 (R15679) that was made in 1989. M7 (Carnahan et al., 1978) is a semidwarf medium-grain cultivar and R660 is a sister line of 'L-201' (Tseng et al., 1979) developed by CCRRF. R1588 is a semidwarf long-grain selection from a cross of experimental selection 72-3761/72-32228 where 72-3761 is a selection from PI 321161, a tall, long-grain introduction from the International Rice Research Institute that was moderately resistant to cool temperature induced sterility. 72-32228 is a semidwarf long-grain selection of unknown pedigree. 82-Y-52 is a sister line of 'L-202' (Tseng et al., 1984), and Rexmont (Bollich et al., 1990) is a semidwarf long-grain cultivar developed by the USDA-ARS at Texas A&M University Research and Extension Center, Beaumont, TX. 83-Y-45, a parental line of 'L-203' (Tseng et al., 1992), is a semidwarf long-grain line having high yield potential.

L-205 is a photoperiod insensitive, early maturing, semidwarf long-grain cultivar. It has glabrous leaves and spikelets, but a few hairs occur on the lemma and palea keels. The spikelet is awnless and straw-colored with a red apiculus. The stigma is light purple. Tillers are upright with intermediate flag leaf angle and leaves are less dark green than 'L-204'.

L-205 was compared with the commercial long-grain cultivars L-203 and L-204 in multi-location yield tests conducted in cooperation with University of California Cooperative Extension during 1994 to 1998. L-205 reaches 50 percent heading in about 88 d, which is 2 d later than L-204, and very similar to L-203. L-205 averages 91 cm in height and is about 5 and 4 cm taller than L-203 and L-204, respectively. L-205 is resistant to lodging like L-204. Visual scores for seedling vigor of L-205, L-203, and L-204 were 3.9, 4.0, and 4.2, respectively, using a scale of 1 = poor and 5 = excellent. L-205 is tolerant during the seedling stage to thiobencarb and molinate herbicides like current California rice cultivars. L-205 showed no significant difference in reaction to stem rot (caused by *Sclerotium oryzae* Catt.) or aggregate sheath spot [caused by *Rhizoctonia oryzae-sativae* (Sawada) Mordue] diseases compared with L-203 and L-204. Using a scale of 0–10 (Oster, 1990), stem rot disease ratings were 5.8, 5.3, 5.7 and aggregate sheath spot ratings (number of dead leaves on the uppermost 4 nodes) were 2.2, 2.3, and 2.2 for L-205, L-203, and L-204, respectively. L-205 is susceptible to the *IG-1* race of the rice blast fungus [*Pyricularia grisea* (Cooke) Sacc.] that is present in California. Reaction to other blast races and rice diseases not present in California is not known.

L-205 has shown yield potential similar to L-203 and L-204. Average yield at 120g kg^{-1} (12%) grain moisture in the 28 tests conducted during 1994 to 1998 was 9422 kg ha^{-1} for L-205 compared with 9444 kg ha^{-1} for L-203. In 24 tests conducted during 1995 to 1998, L-205 averaged 9276 kg ha^{-1} compared with 9367 kg ha^{-1} for L-204. Whole grain milling yield from samples harvested sequentially at grain moisture contents ranging from about 220 to 150 g kg^{-1} (22 to 15%) over 3 years (1996 to 1998) were 584 and 570 g kg^{-1} (58.4 and 57.0%) for L-205 and L-204, respectively. L-205 has a smaller kernel than L-203 and L-204. In 1998, brown rice kernels of L-205 averaged 7.55 mm in length, 2.18 mm in width, and 21.7 mg in weight compared with 8.01 mm, 2.19 mm, and 24.3 mg for L-203 and 8.13 mm, 2.28 mm, and 25.9 mg for L-204, respectively. The L-205 kernel has a light brown pericarp and a colorless, non-glutinous, non-aromatic endosperm. L-205 has an apparent amylose content of 246 g kg^{-1} (24.6%) and an intermediate alkali spreading value of 3 to 5 in 17 g L^{-1} KOH solution. The apparent amylose content is about 2% higher than L-204 (22.3%) and is about the same as L-203 (25.3%). Apparent amylose content and alkali spreading values were determined by the USDA-ARS Rice Quality Laboratory, Beaumont, TX. L-205 rice cooks dry and fluffy like southern U.S. long grains. The amylographic profile of L-205 is distinctly different from L-203 and L-204, having a high set back and low breakdown which is indicative of cultivars that are well suited for parboiling, soup canning, and noodle manufacturing.

L-205 was approved for certification by the California Crop Improvement Association in 1999. The initial Foundation seed field contained glabrous medium-grain rice that appeared to be M-202 and a slightly taller bold grain type that appeared to be out-crosses with medium and short-grain rices. The off-type plants (<0.00001%) were rogued from the seed fields. Classes of seed will be Breeder, Foundation, Registered, and Certified. Application is being made for L-205 protection under the U.S. Plant Variety Protection Act, Title V Option. Breeder and Foundation seed classes of L-205 will be maintained by California Cooperative Rice Research Foundation, Inc., Rice Experiment Station, 955 Butte City Highway, P.O. Box 306, Biggs, CA 95917-0306.

S.T. Tseng, C.W. Johnson, K.S. Mckenzie,* J.J. Oster, J.E. Hill, and D.M. Brandon

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Registration of 'Calmati-201' Rice

'Calmati-201' is a basmati-type long-grain rice cultivar (*Oryza sativa* L.) (Reg. no. CV-114, PI 608665) developed by California Cooperative Rice Research Foundation, Inc. (CCRRF) at the Rice Experiment Station, Biggs, CA. It was experimentally designated 96-Y-90 and released jointly by CCRRF, the California Agricultural Experiment Station, and USDA-ARS on 1 Mar. 1999. Calmati-201 originated from cross R17918 made in 1992. The pedigree is 82-Y-51/83-Y-45// 'L-202'/PI 373938/3/83-Y-45/PI 457918. 82-Y-51 is a semidwarf sister line of L-202 (Tseng et al., 1984). The L-202 parent is an early maturing, semidwarf long-grain cultivar developed by CCRRF. PI 373938, 'Dehraduni', is a tall basmati rice introduction. 83-Y-45, a parent of 'L-203', is a high yielding semidwarf long-grain selection developed by CCRRF. PI 475918, an introduction from Pakistan, is a semidwarf mutant of 'Basmati 370'.

Calmati-201 is a photoperiod insensitive, early maturing, semidwarf cultivar that was evaluated with commercial cultivars 'A-201' (Tseng et al., 1997a) and 'L-204' (Tseng et al., 1997b) in multi-location tests conducted in cooperation with University of California Cooperative Extension. It reaches 50% heading in about 91 d, which is similar to A-201 and 5 d later than L-204. Average heights of Calmati-201, A-201, and L-204 were 100, 100, 91 cm, respectively. Calmati-201 plants have pubescent hulls and leaves and occasional short awns on the lemma. The apiculus color at maturity ranges from colorless to purple. Tillers are upright with erect flag leaves. Leaves are green with purple lines on the leaf sheath base.

Calmati-201 kernels are smaller than A-201 and L-204. Brown rice kernels of Calmati-201 averaged 7.54 mm in length, 2.11 mm in width, and 21.0 mg in weight compared with 8.28 mm, 2.11 mm, and 23.6 mg for A-201 and 8.13 mm, 2.28 mm, and 25.9 mg for L-204. The Calmati-201 kernels have a light brown pericarp and a colorless, non-glutinous aromatic endosperm with apparent amylose content of 227 g kg^{-1} (22.7%) compared with 240 g kg^{-1} (24.0%) and 226 g kg^{-1} (22.6%) for A-201 and L-204, respectively. Calmati-201 has an intermediate gelatinization temperature indicated by alkali spreading value of 3 to 5 in 17 g L^{-1} KOH solution. The concentration of 2-acetyl-l-pyrroline, the principle aroma compound in aromatic rices (Buttery et al., 1982) was 660 ppb in 1998 and falls within the range for U.S. aromatic cultivars. Amylose content, alkali spreading value, and 2-acetyl-1-pyrroline were determined by the USDA-ARS Rice Quality Laboratory, at Beaumont, TX. Calmati-201 produces elongated slender kernels when cooked, similar to basmati rice from India and Pakistan. Kernel elongation ratios following cooking of Calmati-201, A-201, and L-204 were 2.06, 1.67, and 1.56, respectively. Calmati-201 rice kernels need to be soaked thoroughly (30 min or more) before cooking to achieve an extended kernel elongation.

Head rice milling yield from 1997 and 1998 samples harvested sequentially at grain moisture contents ranging from 230 to 150 g kg^{-1} (23 to 15%) averaged 536, 482, and 589 g kg^{-1} (53.6, 48.2, 58.9%) for Calmati-201, A-201, and L-204, respectively.

Calmati-201 is tolerant during the seedling stage to thiobencarb and molinate herbicides, like current California rice cultivars. Calmati-201 has demonstrated weaker seedling vigor than A-201 and L-204. Seedling vigor visual scores for Calmati-201, A-201, and L-204 averaged 3.9, 4.5, and 4.4, respectively, using a scale of 1 = poor and 5 = excellent. Calmati-201 is moderately susceptible to cool temperature induced sterility and should be grown only in the warmer rice production regions of California. Mean grain yields of Calmati-201 at 120 g kg^{-1} (12%) grain moisture were 7604 kg ha^{-1} compared with 8529 kg ha^{-1} for A-201 from tests conducted in 1997 and 1998. Average yield of Calmati-201 was 7790 kg ha^{-1} compared with 9235 kg ha^{-1} for L-204 in yield tests conducted from 1996 to 1998. Calmati-201 is considered moderately susceptible to stem rot (caused by *Sclerotium oryzae* Catt.) disease like A-201 and L-204 (Oster, 1990). Calmati-201 is susceptible to the *IG-1* race of the rice blast fungus [*Pyricularia grisea* (Cooke) Sacc.] that is present in California. Reaction to other blast races and rice diseases not present in California is not known.

Calmati-201 was approved for certification by the California Crop Improvement Association in 1999. The Foundation seed field was rogued for off-type plants which occurred at a frequency of less than 1 in 50,000 plants. Included in the off-type plants were early as well as taller late plants that appeared to be from outcrosses. Classes of seed will be Breeder, Foundation, Registered, and Certified. Application is being made for Calmati-201 protection under the U.S. Plant Variety Protection Act, Title V Option. Breeder and Foundation seed classes will be maintained by California Cooperative Rice Research Foundation, Inc., Rice Experiment Station, P.O. Box 306, Biggs, CA 95917-0306.

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Registration of 'Barnes' Soybean

'Barnes' soybean [*Glycine max* (L.) Merr.] (Reg. no. CV-433, PI 614831) was developed by the North Dakota Agricultural Experiment Station, North Dakota State University (NDSU), Fargo, ND. It was released 18 Jan. 2000. Barnes has high seed yield compared with other cultivars of similar maturity, especially in North Dakota and Minnesota environments.

Barnes is an F_3-derived line, originally designated ND95-931, and has the pedigree ND88-800/'Pioneer 9061'; ND88-800 has the pedigree 'Maple Amber'/'Evans' and Pioneer 9061 has the pedigree 'Wells'/'Rampage'//'Corsoy'(Bernard et al., 1995; Lambert and Kennedy, 1975; Wilcox et al., 1973; Weber and Fehr, 1970a, 1970b).

The cross was made in the summer of 1993 at Fargo, and the F_1 plants were grown during the winter of 1993–1994 at Los Andes, Chile, in a winter nursery. The F_2 population was grown at Fargo in the summer of 1994 and advanced to the

F_3 generation by the single-pod bulk method. The single-pod bulk method consists of picking one three-seeded pod from each plant in a segregating population. The seed from all pods which were picked is threshed as a bulk and put into one envelope. A random sample of one-third of the seed in the envelop is planted to form the segregating population of the next generation. The F_3 population was grown in the 1994–1995 winter nursery located at Los Andes and F_3 plants from the segregating population were individually threshed. $F_{3:4}$ plant rows were selected in 1995. ND95-931 was first tested in replicated yield trials in 1996.

Barnes was evaluated in the Uniform Regional Test 0, Northern States, in 1998 and 1999 (Wilcox, 1999). In the 2 yr of testing in the Uniform Soybean Test 0, Barnes averaged 9% higher in seed yield than 'Traill' and 5% less than 'Lambert' (Helms and Nelson, 1998; Orf and Kennedy, 1994). Traill is a 0.0 Maturity Group cultivar and Lambert is a 0.8 Maturity Group cultivar. Barnes matures 3 d later than Traill and 5 d earlier than Lambert and is a 0.3 Maturity Group cultivar. Lodging and seed quality scores of Barnes are similar to Traill. Plant height of Barnes is 15 cm taller than Traill and the same as Lambert. Seeds of Barnes are 19 mg seed^{-1} larger than Traill and 10 mg seed^{-1} larger than Lambert. Protein content of Barnes was 407 g kg^{-1} and oil content was 215 g kg^{-1}, compared with 409 g kg^{-1} protein content and 211 g kg^{-1} oil content for Traill.

Barnes has purple flowers, grey pubescence, brown pod color, dull yellow seed coat, and buff hila. Barnes has indeterminate growth habit and is adapted as a full-season cultivar from 45 to 47°N lat. Barnes was evaluated in the Red River Valley of the North from 1996 to 1999 by the North Dakota State University and University of Minnesota soybean breeding projects for a total of 21 location-years. In these Red River Valley tests, Barnes averaged 9% higher seed yield than Traill and matured 5 d later. Barnes yielded the same as Lambert and matured 5 d earlier. Barnes was resistant to races 3, 4, and 25, but susceptible to races 7 and 17 of phytophthora root rot (caused by *Phytophthora sojae* M.J. Kaufmann & J.W. Gerdemann).

Breeder seed of Barnes will be maintained by NDSU. A small sample of seed for research purposes can be obtained from the corresponding author for at least 5 yr. U.S. Plant Variety Protection for Barnes has been applied for.

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Registration of 'Bruehl' Wheat

'Bruehl' (Reg. no. CV-912, PI 606764) is a club soft white winter (SWW) wheat (*Triticum aestivum* L.) developed by the Agricultural Research Center of Washington State University (WSU) in cooperation with the Agricultural Experiment Station of the University of Idaho and the United States Department of Agriculture-Agricultural Research Service (USDA-ARS). Bruehl was named in honor of George (Bill) W. Bruehl, retired plant pathologist from WSU, Pullman, WA, and released for areas of the Pacific Northwest (PNW) that have severe speckled snow mold (caused by *Typhula idahoensis* Rems and *T. ishikariensis* Imai) disease problems.

Bruehl (WA007833, VO95435) was derived from the 1988 cross UNA(NS1971)/5/'Oasis'/4/'Luke'//'Itana'/CItr1343(WA 6362)/3/Luke Mutant 14(WA6242)/6/'Tres'/'Eltan'. Luke (Peterson et al., 1974) and Eltan (Peterson et al., 1991) are SWW common, Itana (Hehn and Klages, 1966) is a hard red winter, Oasis (Patterson et al., 1975) is a soft red winter and Tres (Allan et al., 1986) is a SWW club. The F_1 through F_5 generations were grown in Pullman and advanced by a modified pedigree-bulk breeding method, in which initial selections were based on general adaptive characteristics. It was selected as an F_6 head row from a snow mold observation nursery at Waterville, WA.

Bruehl is a semidwarf that matures 2 to 3 d earlier than Eltan, but under snow mold pressure will mature up to 7 d earlier. Spikes of Bruehl are awned, elliptical, middense and erect. Glumes are glabrous, white, midlong, midwide; shoulders oblique to rounded; and beaks midwide, acuminate, 0.5 to 1.5 mm in length. Kernels of Bruehl have club characteristics: white, soft, midlong, ovate; germ small; crease midwide, middeep; cheeks rounded; and brush midsized and midlong.

Based on natural field infections from 1995 to 1999 of races that are common (CDL-17, CDL-20, CDL-37, CDL-43, CDL-44, and CDL-45) to Washingston, Bruehl expresses adult plant resistance to stripe rust (caused by *Puccinia striiformis* Westend.). It is moderately susceptible to leaf rust (race MBCL: virulent on *Lr1*, *Lr3*, *Lr108*, and *Lr26*) (caused by *Puccinia triticina* Eriks; syn *Puccinia recondita* Roberge ex Desmaz. f. sp. *tritici* Eriks. and E. Henn.) and moderately susceptible to natural field infections of stem rust (caused by *P. graminis* Pers.:Pers.). It is moderately susceptible to eyespot (caused by *Pseudocercosporella herpotrichoides* (Fron.) Deighton) and Cephalosporium stripe (caused by *Cephalosporium gramineum* Nis.& Ika.). Bruehl has a high level of resistance to speckled snow mold. Its average snow mold rating (scale ranges from 0-8, with 0 equaling no recovery and 8 equaling complete recovery) from 1995 to 1997 (years with severe natural field infection of snow mold at Waterville, WA) was 5.2. 'Sprague' (Bruehl et al., 1978) (highly resistant) had an average snow mold rating of 5.8 and Eltan (moderately resistant) was 3.6 (Murray et al., 1999). Bruehl also exhibited resistance to dwarf bunt (caused by *Tilletia controversa* Kühn) in inoculated field tests.

In 58 replicated field trials over 4 years in Washington State, Bruehl produced on average 3.1 and 4.3% more grain per hectare than Eltan (5200 kg ha^{-1}) and 'Hiller' (Peterson et al., 1999) (5140 kg ha^{-1}), respectively. Grain volume weight was similar to Eltan (745 g L^{-1}) and 2.1% greater than Hiller (729 g L^{-1}). The average plant height of Bruehl is similar to

Eltan and Hiller (89 cm), but the straw strength (moderately stiff) is superior to Eltan (moderately weak). It is comparable to Eltan for emergence, but inferior to the tall club wheat cultivar 'Edwin' (Jones et al., 2000). Bruehl is similar to Hiller for cold hardiness and shattering.

On the basis of tests ($n = 26$) conducted by the USDA-ARS Western Wheat Quality Laboratory using grain produced in Washington from 1996 to 1998, Bruehl has excellent overall club SWW quality traits. Bruehl is similar to Hiller ($n = 5$ comparisons) for grain protein (9.6%), flour protein (8.2%), cookie diameter (9.6 cm), break flour yield (53.8%), sponge cake score (73), sponge cake volume (1280 cm^3), mixograph water absorption (52.8%), and top grain score (7.2).

U.S. plant variety protection for Bruehl will be applied for. Seed of Bruehl will be maintained by the Washington State Crop Improvement Association under supervision of the Department of Crop and Soil Sciences and the Washington State Agricultural Research Center, and may be obtained by contacting the corresponding author or through the National Plant Germplasm System (http://www.ars-grin.gov/npgs/[homepage]).

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Registration of 'Lebsock' Durum Wheat

'Lebsock' (Reg. no. CV-911, PI 613620), spring durum wheat (*Triticum turgidum* L. var. *durum* Desf.), was developed by the North Dakota Agricultural Experiment Station in cooperation with USDA-ARS and officially released on 1 July 1999. Lebsock was named in honor of Dr. Kenneth L. Lebsock, a USDA-ARS durum wheat breeder stationed at Fargo, ND, where he worked in close collaboration with researchers at North Dakota Agricultural Experiment Station developing durum wheat cultivars. Lebsock was released because of its high yield and test weight and good quality.

Lebsock was tested as D901442 and was selected from the cross 'Munich'/D8469 made in 1986 by R.G. Cantrell. The parent D8469 was derived from the cross D79220/D79122. The pedigree of D79122 is 'Edmore'/'Wakooma'. D79220 was derived from the cross 'Vic'/D7025. D7025 was derived from the cross D6468//D61130/'Leeds'. Lebsock was developed using the pedigree method and was bulked in the F_5 generation as an F_4-derived line in 1990. Lebsock was tested for agronomic and quality traits at 51 location-years from 1994 to 1998.

Lebsock is a daylength-sensitive durum wheat that is similar in heading date to 'Ben' (Elias and Miller, 1998) (58 d) and 1.3 d earlier than 'Mountrail' (Elias and Miller, 2000b). Lebsock's plant height averages 85 cm and is 4 cm shorter than Ben and 14 cm taller than the semidwarf cultivar 'Lloyd' (Cantrell et al., 1984). The culms are white and the peduncle is slightly recurved. Lebsock's spikes are midlong, awned, oblong, middense, and erect. The awns are white and 12 to 13 cm in length. The glumes are glabrous, white, long, and wide. The kernels are amber, hard, long, and elliptical; the germ is midsized; the crease is midwide and shallow; and the brush is absent.

Mean grain yield of Lebsock (3696 kg ha^{-1}) was 4.0 and 4.6% higher than Ben and 'Renville' (Cantrell et al., 1989), respectively, on the basis of 51 location-years of testing in the Uniform Regional Durum Nursery from 1994 to 1998. Lebsock (3286 kg ha^{-1}) had a 8.2 and 7.7% higher mean yield than both Ben and Renville, respectively on the basis of 23 location-years in the North Dakota Research Extension Centers' varietal trials from 1994 to 1998. Lebsock had 781.8 kg m^{-3} grain volume weight and 37.7 mg kernel weight when tested at 51 location-years in the Uniform Regional Durum Nursery. Lebsock has 10.3 kg m^{-3} higher grain volume weight and 2.0 mg lower kernel weight than Ben.

On the basis of 30 location-years in North Dakota field plots (1994 to 1998), the semolina extraction rate of Lebsock (61.2%) on the Buhler-Miag laboratory mill at the Department of Cereal Science, North Dakota State University, is higher than Ben (60.8%). Other milling characteristics and spaghetti color were favorable. Lebsock has strong gluten mixing characteristics (classification: 6.0) as estimated by mixograph, weaker than 'Maier' (Elias and Miller, 2000a) and similar to Ben (classification: 7.0 and 6.0, respectively). Semolina protein of Lebsock was 136 g kg^{-1}, which is similar to Ben and Renville but lower than Maier (144 g kg^{-1}).

Lebsock was evaluated at the USDA-ARS, Northern Crop Science Laboratory, Fargo, ND for wheat stem rust (caused by *Puccinia graminis* Pers.:Pers. f. sp. *tritici* Eriks. & E. Henn) and was found to be highly resistant to pathotypes Pgt-QCCJ, -QTHJ, -RTQQ, -TMLK, -TPMK, and -HPHJ. Lebsock's adult plant resistance in the field to leaf rust (caused by *P. triticina* Eriks.) is high (5R) and is similar to Ben and Renville. Lebsock has a moderate level of resistance to tan spot [caused by *Pyrenophora tritici-repentis* (Died.) Drechs]. Lebsock is moderately susceptible to Fusarium head blight [caused by *Fusarium graminearum* Schwabe; teleomorph *Gibberella zeae* (Schweinitz) Petch].

Breeder seed will be maintained by the Seedstocks Project, Agricultural Experiment Station, North Dakota State Univ., Fargo, ND 58105-5051. Protection for Lebsock will be applied for under the U.S. Plant Variety Protection Act for Foundation, Registered, and Certified seed.

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Acknowledgments

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Registration of 'Plaza' Durum Wheat

'Plaza' (Reg. no. CV-910, PI 613619), spring durum wheat (*Triticum turgidum* L. var. *durum* Desf.), was developed by the North Dakota Agricultural Experiment Station in cooperation with USDA-ARS and officially released on 1 July 1999. Plaza was named after a community in Mountrail County, ND. Plaza was released because it is a semidwarf high yielding cultivar with good quality.

Plaza was tested as D91080 and was selected from the cross 'Plenty'/D8291 made in 1987 by R.G. Cantrell. The parent D8291 was derived from the cross 'Cando'//'Edmore'/'Coulter'. Plaza was developed using the pedigree method and was bulked in the F_5 generation as an F_4-derived line in 1991. Plaza was tested for agronomic and quality traits at 40 location-years from 1995 to 1998.

Plaza is a daylength-sensitive durum wheat (59 d) that is 0.5 and 0.9 d later in heading date than 'Lloyd' (Cantrell et al., 1984) and 'Ben' (Elias and Miller, 1998), respectively. Plaza's plant height averages 74 cm and is 3 cm taller than Lloyd and 15 cm shorter than the medium height cultivar Ben. The culms are white and the peduncle is slightly recurved. Plaza's spikes are midlong, awned, oblong, middense, and erect. The awns are white and 10 to 11 cm in length. The glumes are glabrous, white, long, and wide. The kernels are amber, hard, long, and elliptical; the germ is midsized; the crease is midwide and shallow; and the brush is absent.

Grain yield of Plaza (3790 kg ha^{-1}) was 4.6 and 5.8% higher than Ben and 'Renville' (Cantrell et al., 1989), respectively, on the basis of 40 location-years of testing in the Uniform Regional Durum Nursery from 1995 to 1998. Plaza (3333 kg ha^{-1}) had a 8.8 and 6.4% higher mean yield than Ben and Renville, respectively, on the basis of 17 location-years in the North Dakota Research Extension Centers' varietal trials from 1996 to 1998. Plaza had 750.1 kg m^{-3} grain volume weight and 34.8 mg kernel weight when tested at 40 location-years in the Uniform Regional Durum Nursery. Plaza has 32.2 kg m^{-3} higher grain volume weight and 0.6 mg lower kernel weight than Lloyd.

On the basis of 23 location-years in North Dakota field plots (1995 to 1998), the semolina extraction rate of Plaza (60.7%) on the Buhler-Miag laboratory mill at the Department of Cereal Science, North Dakota State University, is higher than Lloyd (59.8%) and similar to Ben. Other milling characteristics and spaghetti color were favorable. Plaza has strong gluten mixing characteristics (classification: 5.0) as estimated by a mixograph, weaker than Lloyd and 'Maier' (Elias and Miller, 2000) (classification: 6.0 and 7.0, respectively). Semolina protein of Plaza was 131 g kg^{-1}, which is similar to Lloyd but lower than Maier (145 g kg^{-1}) and Ben (139 g kg^{-1}).

Plaza was evaluated at the USDA-ARS, Northern Crop Science Laboratory, Fargo, ND for wheat stem rust (caused by *Puccinia graminis* Pers.:Pers. f. sp. *tritici* Eriks. & E. Henn) and was found to be highly resistant to pathotypes Pgt-QCCJ, -QTHJ, -RTQQ, -TMLK, -TPMK, and -HPHJ. Plaza's adult plant resistance in the field to leaf rust (caused by *P. triticina* Eriks.) is high (10R) and is similar to Ben and Renville. Plaza has a moderate level of resistance to tan spot [caused by *Pyrenophora tritici-repentis* (Died.) Drechs]. Plaza is moderately susceptible to Fusarium head blight [caused by *Fusarium graminearum* Schwabe; teleomorph *Gibberella zeae* (Schweinitz) Petch].

Breeder seed will be maintained by the Seedstocks Project, Agricultural Experiment Station, North Dakota State Univ., Fargo, ND 58105-5051. Protection for Plaza will be applied for under the U.S. Plant Variety Protection Act for Foundation, Registered, and Certified seed.

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REGISTRATIONS OF GERMPLASMS

Registration of Arkot A306 and Arkot A314 Germplasm Lines of Cotton

Two germplasm lines of cotton (*Gossypium hirsutum* L.), designated Arkot A306 (Reg. no. GP-732, PI 617030) and Arkot A314 (Reg. no. GP-733, PI 617031), were developed by the Arkansas Agricultural Experiment Station and released in 2000. The lines possess agronomic, fiber strength, and host-plant resistance traits that make them valuable as breeding lines.

Arkot A306 (tested as A306-16) and Arkot A314 (tested as A314-07-20) were derived from crosses made in 1983 with

one common parent, 752120, which was a selection from a cross of 'Rex 713'/'Delcot 277J' (Sappenfield, 1979). The other parents of Arkot A306 and Arkot A314 were 'DES 422' (Bridge, 1982) and DES 210-23 (an advanced strain from the cross 'Stoneville 7A' by PD 2164 (Culp and Harrell, 1974) made in 1966), respectively.

Individual plant selections were made in 1985 from their respective F_2 populations with subsequent individual plant selections from $F_{2:3}$ progeny rows in 1986. These selections included A306-16 and A314-07 which were evaluated as $F_{3:4}$ progeny rows in 1988. Plants were bulked within $F_{3:4}$ progeny rows and evaluated as pure lines in replicated tests from 1989 through 1995. Individual plant selections were made from A306-16 and A314-07 in 1995. These were evaluated as progeny rows in 1996, with superior ones selected and evaluated as strains in 1997 and 1999 in Arkansas. One selection, A314-07-20, was considered to be superior to A314-07. None of the 1996 selections from A306-16 were retained separately.

Agronomic traits of Arkot A306 were compared to 'DES 119' in 23 tests from 1989 through 1995 at four Arkansas Agricultural Research Station sites in the Mississippi River Delta. Across all tests, Arkot A306 yielded 94% as much as DES 119, was earlier maturing (4% higher open boll percentage) and had higher fiber strength (12 kN m kg^{-1} stronger). However, the line had lower lint percentage (1.5% less), shorter fiber length (1.3 mm less), and a lower fiber elongation (0.3% less) than DES 119.

In six Arkansas tests in 1997 and 1999, Arkot A314 was equal in yield and fiber length, was earlier maturing (4% higher open boll percentage at time of defoliation), and had higher HVI fiber bundle strength (4 kN m kg^{-1} stronger) than 'SureGrow 125'. Negatively, Arkot A314 had lower lint percentage (1.6% less), lower fiber elongation (0.9% less) and higher micronaire reading (0.15 units) than SureGrow 125.

In field tests conducted in 1994 and 1995, A314-07 was equal to DES 119 in resistance to tarnished plant bug, *Lygus lineolaris* (Palisot de Beauvois). Arkot A306 was more susceptible than DES 119, but more resistant than the frego-bract susceptible check. In the Regional Cotton Fusarium Wilt Test at Tallassee, AL, resistance of the two lines to fusarium wilt [caused by *Fusarium oxysporum* Schlect. f. sp. *vasinfectum* (Atk.) Snyd. & Hans.] was equal to the resistant check, 'Auburn 56' in 1991 (Johnson, 1992) and M-315 in 1995 (Glass and Gazaway, 1995). Arkot A314, a selection from A314-07, has not been evaluated for tarnished plant bug nor fusarium wilt resistance.

The relatively high strength, early maturity, and wide area of adaptation of Arkot A306 and Arkot A314 should make them valuable as breeding lines.

Small quantities of Arkot A306 and Arkot A314 seed may be obtained for breeding purposes from the corresponding author.

F.M. Bourland* and C.W. Smith

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Registration of EPM6 and SIM6 Maize Germplasm, High Silk-Maysin Sources of Resistance to Corn Earworm

Germplasm sources EPM6 and SIM6 (Reg. no. GP-364, PI 614735, and Reg. no. GP-365, PI 614736, respectively) are dent maize (*Zea mays* L.) populations developed cooperatively by the USDA-ARS Insect Biology and Population Management Research Laboratory, Tifton, GA and Richard Russell Research Center, Athens, GA. The populations were released in August 1999 as sources of resistance to the corn earworm, *Helicoverpa zea* Boddie, because of the high concentration of a C-glycosyl flavone, maysin, in their silks that gives them antibiosis resistance to the corn earworm (Snook et al., 1997).

The EPM breeding population was derived by bulking equal numbers of seed from four crosses among a maysin producing inbred, GT114, (Widstrom et al., 1988) and three exotic collections; a flavonoid (maysin = 0.171%) with the intensifier gene (*in*), a selection of Zapalote Chico (maysin = 0.350%) containing mostly purple plants, and a popcorn plant introduction PI340856 (maysin = 0.823%), (obtained from sources, Dr. Ed Coe, USDA, Columbia, MO, CIMMYT, Mexico D.F. and USDA Plant Introduction Station, Ames, IA, respectively). The SIM breeding population was derived by bulking equal numbers of seed from seven crosses (Akd24 × Ab618, Akd-24 × GT114, Akd24 × H30, GT112 × GT114, GT114 × H30, Tx-501 × Ab618, and Tx501 × Akd24) among six inbred lines with silks having higher than average concentrations of maysin in their silks (Ab618 = 0.204%, Akd24 = 0.305%, GT112 = 0.097%, GT114 = 0.259%, H30 = 0.059%, and Tx501 = 0.215%). The average concentrations of the original composited breeding populations, EPM and SIM were 0.54% and 0.36% on a fresh weight basis.

Each population was independently subjected to six cycles of recurrent selection for high concentration of silk-maysin evaluated by reversed-phase HPLC (Snook et al., 1989). At least one hundred plants were evaluated and selfed in each population for silk maysin concentration within each cycle of selection. Progress was evaluated after completion of six cycles of selection in replicated, randomized complete block experiments in 1997 and 1998. Approximately 10% of the plants with highest silk maysin concentration in each population (10 to 12) were selected for recombination in each cycle. Sixth cycle plants of EPM6 contain 1.6–1.9% silk maysin on a fresh weight basis while those of SIM contain 1.5%–1.9% (Widstrom et al., 1999). Consistent advances of approximately 0.2% maysin per cycle occurred for both populations, resulting in levels that are seven to eight times the concentration necessary to produce a significant impact on first instar larvae of corn earworm (Snook et al., 1989). Trait responses are highly heritable (h^2 = 0.65 to 0.68) and will allow plant breeders to introgress resistance to the corn earworm into elite material (Byrne et al., 1998). Both classical and quantitative inheritance procedures may be effectively used to increase or transfer silk maysin concentrations (Widstrom and Snook, 1998).

The sixth cycle populations are designated EPM6 and SIM6, respectively. Plants in the EPM6 population reach pollen shed and silking 52–55 d after planting, while those of SIM6 reach this stage later at 59–62 d. EPM6 has red cobs and purple kernels of flinty or popcorn type, while SIM6 has yellow dent kernels with red cobs. Both have good seed quality. Seed of EPM6 and SIM6 have been deposited in the National Seed

Storage Laboratory at Fort Collins, CO, and in the Maize Active Collection at the Plant Introduction Research Unit at Ames, IA. Seed of these populations will also be maintained and distributed by USDA-ARS at Tifton, GA, and can be obtained in 100 g lots by request from USDA, Agricultural Research Service, Crop Genetics and Breeding Research, P.O. Box 748, Tifton, GA 31793-0748. It is requested that appropriate recognition be given if this germplasm contributed to the development of a new breeding line or hybrid.

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Registration of High Digestibility Maize Germplasm GT-HID9

GT-HID9, a maize (*Zea mays* L.) germplasm population (Reg. no. GP-366, PI 614805) was released by the USDA-ARS and the University of Georgia Coastal Plain Experiment Station in March 2000. It was released as a source of high in vitro dry matter digestibility (IVDMD) in southern-adapted germplasm.

GT-HID9 was developed using restricted recurrent phenotypic selection (RRPS) (Burton, 1974, 1982) within a population derived by random mating of the hybrid Coker 77B. GT-HID9 is a result of nine cycles of RRPS for IVDMD and forage yield with equivalent selection pressure for both traits using rank sums as the criterion for 20% selection of 80 recombined ear-rows grown for evaluation each cycle. Entries for evaluation of the random mated Coker 77B population (C0) consisted of 80 selfed ears from that population plus a check, and entries in subsequent cycles were ear-rows obtained by pollinating five ears within each of the 16 selected ear-rows with bulked pollen from those 16 ear-rows. The 80 entries and C0 were evaluated each cycle in a 9×9 balanced lattice square with five replications (Burton and Fortson, 1965).

GT-HID9 has white cobs and yellow kernels with good grain quality. The plants of GT-HID9 vary in maturity from AES1100 to AES1200 with no change from the original Coker 77B derived population in average maturity. Plants average about 2 m in height, and ear height averages about 1 m. Dry matter yields of GT-HID9 exceed the C0 by more than 2 Mg ha^{-1} after nine cycles of RRPS. IVDMD exceeds the original random mated population by 1.1% after nine cycles of selection and exceeds the source hybrid Coker 77B by 1.2%.

Seed of GT-HID9 has been deposited in the National Seed Storage Laboratory at Fort Collins, CO, and in the Maize Active Collection at the Plant Introduction Research Unit at Ames, IA. Seed of GT-HID9 will also be distributed in 100 g lots upon written request to the Crop Genetics and Breeding Research Unit, USDA-ARS, P.O. Box 748, Tifton, GA 31793-0748. It is requested that appropriate recognition be given if this germplasm contributes to the development of a new breeding line or hybrid.

N.W. Widstrom,* G.W. Burton, and R.N. Gates

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Registration of P8901-AP1A2B1B and P8901-AQ1A2B1B Hard Red Spring Wheat Germplasm Lines with *Lr21* and *Lr34* Leaf Rust Resistance

P8901-AP1A2B1B (Reg. no. GP-723, PI 613175) and P8901-AQ1A2B1B (Reg. no. GP-724, PI 613176) hard red spring wheat lines (*Triticum aestivum* L.), were released in 2000 by Agriculture and Agri-Food Canada (AAFC), Semiarid Prairie Agricultural Research Centre in Swift Current, Saskatchewan. P8901-AP1A2B1B and P8901-AQ1A2B1B derive from the cross 'Laura'/RL5801//5*Laura. RL5801 [provided by Dr. E. Kerber, Cereal Research Centre (CRC), AAFC] is a hard red spring wheat which carries the gene *Lr21* for seedling resistance to the prevalent races of leaf rust (caused by *Puccinia triticina* Eriks.) found in the Northern Great Plains (Kolmer and Liu, 1997). Laura (DePauw et al., 1988) hard red spring wheat possesses the *Lr34* adult plant leaf rust resistance gene (Kolmer, 1994).

Seed of the segregating BC_5F_1, the BC_5F_2, and BC_5F_3 generations, plus Laura and RL5801, were grown in 288 small cavity flats (approximately 2 mL per cavity) watered on demand with 200 μg/mL NPK 20-20-20 nutrient solution and were inoculated at the one and a half leaf stage with race LR145 (provided by Dr. J. Kolmer CRC, AAFC, currently USDA, ARS, St. Paul, MN), which is avirulent on *Lr21*. Rust inoculation was performed by previously described methods (Stubbs et al., 1986). Plants with resistant reactions (necrosis associated with the pustules and comparable or superior to the resistant parent possessing *Lr21*) were selected and crossed.

Homozygous resistant BC_5F_4 lines were selected and increased in a winter nursery near Brawley, CA. In 1991, BC_5F_5 and in 1992 BC_5F_6 selected lines were grown near Swift Current, Saskatchewan in four-row plot trials and near Winnipeg, Manitoba in a rust nursery inoculated with leaf rust races (BBB, CBG, FLM, KBB, KBG, KCG, KDB, KFB, MBB, MBG, MDB, MDG, MFB, NBB, TBB, TBD, TBG, TBJ, TDB, TDG, and TFB) found in the Northern Great Plains.

P8901-AP1A2B1B and P8901-AQ1A2B1B were selected from among other rust resistant lines on the basis of their overall agronomic performance relative to adapted Canada Western Red Spring wheat cultivars in breeding trials. P8901-AQ1A2B1B has dark chaff and P8901-AP1A2B1B has white chaff. Chaff color is linked to the *Lr21* gene (Jones et al., 1990). P8901-AP1A2B1B represents a chaff color *Lr21* recombinant.

P8901-AP1A2B1B and P8901-AQ1A2B1B were among 22 lines tested as seedlings to leaf rust race TDT in 1994 and tested in the field in 1995 in a rust nursery near Winnipeg (using races CCD, KBG, MBL, MBQ, MBR, MCR, MDB, MDG, MDL, MDM, MDQ, MDR, MFM, PBM, TBB, TBG, TDB, TDG, TFB, TFG, TFL, TFM, and TFQ). Seedling reactions using races MBR and MFM indicated that *Lr21* was present (results provided by J. Kolmer). Seedling and field reactions to leaf rust showed near-complete resistance (mostly necrotic flecks with a few very small sporulating pustules) which was superior to the resistance shown by RL5801 which has the gene *Lr21* and to the mesothetic reaction of *Lr34* present in the recurrent parent Laura. The superior resistance is consistent with the synergistic effect reported when *Lr34* is present with other leaf rust resistance genes (Kolmer, 1997).

P8901-AP1A2B1B and P8901-AQ1A2B1B are similar in height to Laura, which ranges from 73 cm in dry environments to 92 cm in moist environments (DePauw et al., 1988). Unlike Laura both germplasm lines are awnless. Grain yield was measured at Indian Head and Swift Current in 1991 and at Swift Current in 1997. Average yield of P8901-AP1A2B1B was 3673 Kg ha^{-1} which was 3.6% lower yielding than Laura (3812 Kg ha^{-1}) and 23.8% higher yielding than RL5801 (2967 Kg ha^{-1}). Yield of P8901-AQ1A2B1B averaged 3910 Kg ha^{-1} which was 2.6% higher yielding than Laura and 31.8% higher yielding than RL5801. Maturity of both lines were similar to Laura which ranges from 98 d in dry environments to 109 d in moist environments (DePauw et al., 1988). On a one to nine scale where one shows no lodging and nine is completely lodged, P8901-AP1A2B1B and P8901-AQ1A2B1B were similar to Laura which ranges from 1.2 in dry environments to 4.0 in moist environments (DePauw et al., 1988). Like Laura, P8901-AQ1A2B1B was susceptible to loose smut [caused by *Ustilago tritici* (Pers.) Rostr.] and common bunt [caused by *Tilletia caries* (DC.) Tul. & C. Tul., *T. laevis* Kühn in Rabenh.] (results were not obtained for P8901-AP1A2B1B). Small quantities of seed of P8901-AP1A2B1B and P8901-AQ1A2B1B are available from the authors.

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REGISTRATIONS OF GENETIC STOCK

Registration of Five Genetic Marker Stocks of Foxtail Millet

Five foxtail millet [*Setaria italica* (L.) Beauv.] lines, N-Si-1 (Reg. no. GS-2, PI 614814), N-Si-2 (Reg. no. GS-3, PI 614815), N-Si-3 (Reg. no. GS-4, PI 614816), N-Si-4 (Reg. no. GS-5, PI 614817), and N-Si-5 (Reg. no. GS-6, PI 614818) developed by the University of Nebraska Agricultural Experiment Station and released in June 1999. These lines were identified as sources of three pigment (plant color, anther color, and seed coat color) and three morphological (bristle development, earhead density, and seed shape) genetic markers in half diallel crosses among seven parental lines at the University of Nebraska-Lincoln in 1994–1995 (Baltensperger, 1996). These materials were selections from PI 458628, PI 531445, PI 473598, NESE2, and PI 464233, respectively, that matured in western Nebraska, showed potential for resistance to wheat streak mosaic virus, and had above average yield potential in nurseries grown in the Nebraska Panhandle 1991–1994.

Plant pigmentation starts at the seedling stage, 3 to 5 d after emergence, on the first leaf sheaths and progresses upward on the nodes, midribs, leaf blades, internodes, peduncle, and bristles. The pigmentation is either purple or green and is conditioned by a single factor, with purple (P) dominant over green (p) (Table 1). N-Si-2 and N-Si-4 develop purple pigment similar to 'Red Siberian' and 'Golden German' (Baltensperger, 1996). N-Si-1, N-Si-3, and N-Si-5 are green throughout the plant, and when crossed to N-Si-2 and N-Si-4 produce purple F_1 plants and F_2 progenies that segregate in a 3 purple to 1 green ratio.

Emerging anthers are orange with varying degrees of brown (blackish-brown when dry) or white. Orange anther color is dominant over white and is conditioned by three factors (A, B, and C) with complementary effects (Baltensperger, 1996) (Table 1). N-Si-4 (aabbcc) has white anthers, while N-Si-1, N-Si-2, N-Si-3, and N-Si-5 have orange anthers, similar to Red Siberian and Golden German. N-Si-1, N-Si-2, and N-Si-3, proposed to have the same genotype (AABBCC), crossed to N-Si-4 produce F_1 progeny with orange anthers and F_2 progenies that segregate in a 45 orange to 19 white ratio. N-Si-5 (AABBcc) crossed to N-Si-4 produces orange anthers in the F_1, but the F_2 progenies segregate in a 9 orange to 7 white ratio.

Table 1. Proposed genotypes for plant/bristle, anther, seedcoat color, bristle length, earhead density, and seed shape for five genetic stocks and two cultivars of foxtail millet.

Parental line	Plant color	Anther color	Seed coat color	Bristle length	Earhead density	Seed shape
N-Si-1	pp	AABBCC	LLrrII	L_2L_2	DDee	$A_rA_rB_rB_r$
N-Si-2	pp	AABBCC	llRRII	L_1L_1	DDEE	$A_eA_eB_eB_e$
N-Si-3	pp	AABBCC	LLrrII	L_1L_1	DDee	$A_eA_eB_eB_e$
N-Si-4	PP	aabbcc	LLrrii	L_2L_2	ddee	$A_rA_rB_rB_r$
N-Si-5	pp	AABBcc	LLrrii	L_1L_1	ddEE	$A_eA_eB_eB_e$
Red Siberian	PP	AABBCC	llRRii	L_1L_1	DDEE	$A_eA_eB_eB_e$
Golden German	PP	AABBCC	LLRRII	L_1L_1	ddEE	$A_eA_eB_rB_r$

Seed coat color varies from light buff to brick red (dark-brown red) and is proposed to be under the control of three factors, L, R, and I (Baltensperger, 1996) (Table 1). N-Si-4 and N-Si-5 develop light-buff seeds, N-Si-1 and N-Si-3 have cinnamon-buff seed coat, and N-Si-2 produces brick-red seeds, much darker than those of Red Siberian. N-Si-4 and N-Si-5 (LLrrii) mated with N-Si-1 and N-Si-3 produce light-buff F_1 seed and 1 cinnamon buff to 3 light-buff ratio in the F_2 generation. N-Si-1 and N-Si-3, N-Si-4, and N-Si-5 crossed to N-Si-2, Red Siberian, or Golden German produce golden-buff seeds, similar to those of Golden German. In the F_2 generation, the segregation of these crosses is quite complex (Siles, 1997).

Bristle development can be classified into long, medium, and short types and is controlled by a single factor (L) with additive effects (Baltensperger, 1996) (Table 1). N-Si-1 and N-Si-4 develop short bristles (<2.5 mm in length) and N-Si-2, N-Si-3, and N-Si-5 develop long bristles (≥5 mm) similar to those of Red Siberian and Golden German. N-Si-1 and N-Si-4 (L_2L_2) mated to N-Si-2, N-Si-3, N-Si-5, Red Siberian, or Golden German (L_1L_1) produce F_1 progeny with medium bristles and F_2 progenies segregating in a 1 long to 2 medium to 1 short ratio.

Earhead type (dense and lax) is proposed to be conditioned by two factors (A and B) with duplicate effects (Table 1). The presence of at least one dominant allele of either gene is essential for the expression of dense earhead type. N-Si-1, N-Si-2, N-Si-3, and N-Si-5, develop dense earheads similar to Red Siberian and Golden German; however, the spikes of N-Si-1 and N-Si-2 are relatively more compact than those of N-Si-3 and N-Si-5. The spike of N-Si-4 is lax. When N-Si-4 is crossed to N-Si-1 or N-Si-5 and Golden German, F_1 progeny have dense head type, and the F_2 progenies segregate in a 3 dense to 1 lax ratio. N-Si-2, N-Si-3, and Red Siberian mated to N-Si-4 produce dense F_1 progenies and segregate in a 15 dense to 1 lax ratio in the F_2 generation.

Seed shape can be explained on the basis of two factors (A and B) with additive effects (Baltensperger, 1996) (Table 1). N-Si-1 and N-Si-4 produce round seeds, while N-Si-2, N-Si-3, and N-Si-5 develop elliptical seeds, similar to Red Siberian. N-Si-1 and N-Si-4 crossed to N-Si-2, N-Si-3, and N-Si-5 or Red Siberian produce F_1 progenies with medium seed shape, similar to Golden German. The segregation patterns in the F_2 generation of these crosses fit of 5 elliptical to 6 medium to 5 round ratio. N-Si-1 and N-Si-4 in crosses with Golden German produce round F_1 seeds, resembling the parental round seeds. In the F_2 generation, these crosses segregate in a 1 medium to 3 round ratio. In crosses between Golden German and N-Si-2, N-Si-3, N-Si-5, or Red Siberian, the F_1 progenies develop elliptical seeds and the F_2 progenies segregate in a 3 elliptical to 1 medium ratio (Siles, 1997).

Requests for seed should be made to the Panhandle Research and Extension Center, 4502 Ave. I, Scottsbluff, NE 69361. Seed of each line will be made available in 100 seed packets.

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M.M. Siles and A. Marcon, former students, Dep. of Agronomy, L.A. Nelson, Dep. of Agronomy, University of Nebraska-Lincoln, Lincoln, NE 68583-0915, D.D. Baltensperger and G.E. Frickel, Panhandle Research and Extension Center, University of Nebraska, Scottsbluff, NE 69361-4939. This manuscript has been assigned Journal Series No. 13109, Agricultural Research Division, University of Nebraska. Registration by CSSA. Accepted 30 Apr. 2001. *Corresponding author (dbaltensperger1@unl.edu).

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REGISTRATIONS OF PARENTAL LINES

Registration of B115 Inbred Line of Maize

Inbred B115 (Reg. no. PL-304, PI 615190) is a yellow dent maize (*Zea mays* L.) line developed cooperatively by the Iowa Agriculture and Home Economics Experiment Station and USDA-ARS. The line was released in April 2000 because of its potential value as a source of germplasm in pedigree-selection breeding programs.

B115 was derived from BS11(FR)C9, a strain of BS11 that had undergone nine cycles of reciprocal full-sib selection with BS10 the tester for BS11 (Eyherabide and Hallauer, 1991). BS11 is a selected strain of Pioneer Two-ear Composite (Hallauer, 1967). B115 was developed from one of the lines [BS11(FR)C9-3227-9] that was included in the intermatings that formed BS11(FR)C10. The line was evaluated in testcross with B73 at the S_2 generation. On the basis of testcross performance, the line was advanced ear-to-row by seven generations of self-pollination in a breeding nursery and included in a crossing nursery to produce single-cross seed with B73, B104, B105, B109, and H123. Single crosses that included B115 as one parent were evaluated in two-replication trials in 1996 (3 locations), 1997 (4 locations), 1998 (9 locations), and 1999 (12 locations) with commercial check hybrids (2 to 4) included in each trial. Average data across years and locations showed that single crosses that included B115 (89.1 q ha^{-1}) had yields similar to the check hybrids (87.4 q ha^{-1}), similar root (8.1 vs. 5.3%) and stalk (8.2 vs. 5.1%) lodging, and similar ear droppage (0.0 vs. 0.3%), but B115 single crosses had significantly greater grain moisture (24.2 vs. 19.8%) at harvest.

B115 is a vigorous line that has above average resistance to first- and second-generation European corn borer (*Ostrinia nubilalis* Hübner) and early infection by common corn rust (caused by *Puccinia sorghi* Schw.), gray leaf spot (caused by *Cercospora Zeae-maydis* Tehon and Daniels), and northern corn leaf blight (caused by *Exserohilum turcicum* Pass.). B115 has a light, green plant color and tends to produce more than one ear per plant. Plant and ear heights of B115 are similar to B73 and Mo17, but hybrids with B115 have greater grain moisture at harvest; i.e., a slower rate of grain drying. B115 has light, yellow, semi-dent kernels. Seed yield of B115 is similar to Mo17, but seed size is similar to B73. Ears of B115 have 16 kernel rows, have ear lengths intermediate to B73 and Mo17, and have ear diameters similar to Mo17. B115 performs better in crosses with lines derived from Iowa Stiff Stalk Synthetic. Maturity classification is AES 700-800.

Seed of B115 is maintained by the Iowa Agriculture and

Home Economics Experiment Station and is distributed upon request (100 seeds per request) by the Committee for Agriculture Development, 133 Curtiss Hall, Iowa State University, Ames, IA 50011-1050.

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