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Content will focus on resilience to climate change in agricultural systems, exploring the latest research investigating strategies to adapt to and mitigate climate change. Innovation and imagination backed by good science, as well as diverse voices and perspectives are encouraged. Where are we now and how can we address those challenges? Abstracts must reflect original research, reviews and analyses, datasets, or issues and perspectives related to objectives in the topics below. Authors are expected to review papers in their subject area that are submitted to this virtual issue.

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Published May, 2001

REGISTRATIONS OF CULTIVARS

Registration of 'COAN' Peanut

'COAN' (Reg. no. CV-68, PI 610452) is a runner market-type peanut (*Arachis hypogaea* L. subsp. *hypogaea* var. *hypogaea*) ($2n = 4x = 40$) cultivar with a high level of resistance to root-knot nematodes [*Meloidogyne arenaria* (Neal) Chitwood and *M. javanica* (Treub) Chitwood]. The new cultivar was tested as TP262-3-5 and was released by the Texas Agricultural Experiment Station on 25 March 1999. COAN is the first peanut cultivar to have root-knot nematode resistance and is the first to have an identifiable gene transferred from a wild species of *Arachis*.

COAN was derived from a backcross introgression pathway (Simpson, 1991) involving a complex interspecific amphiploid hybrid ($2n = 4x = 40$), utilizing Florunner (*A. hypogaea* subsp. *hypogaea* var. *hypogaea*) as the recurrent parent. The amphiploid was formed by first crossing *A. cardenasii* Krapov. and W.C. Gregory/*A. diogoi* Hoehne, and then crossing the 50% pollen fertile F_1 hybrid with *A. batizocoi* Krapov. and W.C. Gregory. The resulting tri-species hybrid ($2n = 20$) was <1% pollen stained and produced no fruit. The chromosome number was doubled with colchicine to form TxAG-6 (Simpson et al., 1993). TxAG-6 is about 89% pollen stained and is highly fertile, both selfed or when crossed with *A. hypogaea*. The fertile amphiploid was crossed with Florunner, and five backcrosses produced the designated breeding line, TP262-3-5. In each backcross cycle, selection was made for agronomic characters similar to Florunner and resistance to root-knot nematodes (Nelson et al., 1990; Starr et al., 1990).

COAN has a smaller vine size than Florunner (17% by measurement of main stem and cotyledonary laterals). The smaller canopy has a rounded appearance in mature plants, and the main stem is not apparent in most locations and seeding rates. The lateral branching is profuse, like Florunner, with an alternate pattern, but not uniformly 2 × 2. Leaf color is light green like Florunner. Pods of COAN are similar in size and shape to Florunner, mostly two-seeded (≈one in 400, three-seeded). The constriction between the kernels is slightly greater than Florunner (4%). Seed size and color is almost identical to Florunner.

COAN averaged numerically less in yield than Florunner and Tamrun 96 in 19 tests from 1996 to 1998 in Texas but was not statistically different ($P = 0.10$) than the two check cultivars. In six tests with damaging levels of root-knot nematode present, COAN was 225% higher in pod yield hectare^{-1} than Florunner with no nematicide application.

Resistance of COAN to root-knot nematodes is expressed as a reduction in nematode reproduction. COAN typically has <10% of the final nematode population density at crop maturity in relation to nematode development on susceptible Florunner (Starr et al., 1995). Nematodes invade the roots of COAN but either fail to develop or develop at a much reduced rate. Resistance to the nematode species was confirmed in the third and fourth self-pollinated generations of TP262-3-5 (Starr et al., 1995).

In shelling tests, COAN was not different ($P = 0.10$) from Florunner in percentage of jumbo, medium, or No. 1 seed size distribution. Splits, other kernels, damaged kernels, and oilstock were equal to Florunner, and 100 seed weight was equal to Florunner at 57 g 100^{-1}.

Quality analyses varied some by location but indicated no significant difference between COAN and Florunner. Oleic to linoleic fatty acid (O/L) ratio was 1.2:1.4. Oil content was 46:47%, and protein 24%. Flavor and blanchability were both equal to Florunner.

From the $BC_5F_{2:3}$, 137 of 300 individual plants were selected for uniform phenotype. Ten seeds per selection were screened for nematode resistance and 127 progeny rows which had no susceptible plants (among the 10 seeds tested) were grown in Puerto Rico for winter increase in 1997–1998. The increase resulted in 468 kg of Breeder seed, which were planted near Dilley, TX, for Foundation seed increase in the summer of 1998.

Foundation seed of COAN will be maintained by Foundation Seed Services, Texas Agric. Exp. Station, Texas A&M Univ., Agric. Res. & Ext. Ctr., Vernon, TX. Application (PVP no. 9900338) has been made for U.S. Plant Variety Protection. The cultivar must be sold as a class of Certified seed by variety name only. Small samples of seed for research purposes may be obtained from the corresponding author for a period of five years.

C.E. Simpson* and J.L. Starr

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C.E. Simpson, Texas Agric. Exp. Stn., Texas A&M Univ. Stephenville, TX 76401 and J.L. Starr, Dep. Plant Path. and Micro., Texas A&M Univ. College Sta., TX 77834. Appreciation is expressed to the Texas Peanut Producers Board for their generous support of this research from 1988 to the present time. Registration by CSSA. Accepted 31 Oct. 2000. *Corresponding author (c-simpson@tamu.edu).

Published in Crop Sci. 41:918 (2001).

Registration of 'Plantation' Tall Fescue

'Plantation' tall fescue (*Festuca arundinacea* Schreb.) (Reg. no. CV-85, PI 608578) was developed jointly by the New Jersey Agricultural Experiment Station of Rutgers University, Advanta Seeds Pacific, Inc., Albany, OR, and Pennington Seed, Inc. of Madison, GA. It was released in September 1999 by Pennington Seeds, a division of Central Garden and Pet Supply, Lafayette, CA. 'Pennington 1901' was the experimental designation of Plantation. The first Certified seed was produced in 1999.

Plantation tall fescue is a turf-type cultivar selected from the maternal progenies of 59 clones. Thirty one closely related clones served as extra pollen sources. Its parental germplasm traces to plants related to 'Rebel' (Funk et al., 1981) and to plants collected from old turfs in the USA from 1962 to 1984. The most promising plants were found in New Jersey, Pennsylvania, North Carolina, Georgia, Alabama, Mississippi, Tennessee, Texas, Ohio, Kansas, and Idaho.

Plants selected from old turfs differed from commercial cultivars in use at the time of collection. Selected plants had persisted for many years to form large patches of attractive

turf in stressful environments. A few hundred attractive, turf-type plants were collected and placed in spaced-plant nurseries and/or frequently mowed clonal evaluation tests. A few dozen plants were selected on the basis of low-growing turf with finer leaves, greater density, darker color, and greater tolerance of frequent close mowing than any commercial seed source or plant introduction tested at Rutgers. They most probably originated from early introductions from Europe (Buckner et al., 1979). However, some might have been extremely rare segregates from 'Kentucky 31' or 'Alta'. After evaluation in spaced-plant nurseries and/or frequently mowed clonal trials, the most promising plants were subsequently allowed to interpollinate in isolation or were top-crossed with plants related to Rebel. Single-plant progenies were evaluated in closely mowed turf trials. Tillers selected from the best of these plots were used to initiate additional cycles of phenotypic and genotypic recurrent selection. Each cycle of selection was effective in developing populations with a darker green color and the ability to produce turf with greater density, finer leaves, a lower growth profile, and better turf performance ratings. Many separate breeding populations were maintained to help retain genetic diversity and reduce inbreeding under high selection pressure. Following varying numbers of selection cycles, single plant progenies of the most promising clones were established in turf trials at Adelphia and North Brunswick, NJ, in September 1991 and September 1992. These turf trials were maintained at a 3.6-cm mowing height and evaluated frequently for turf performance. The highest turf quality ratings were given to plots with an attractive appearance reflecting (i) relative freedom from disease, insect injury, and other stresses, (ii) a rich, medium-dark green color, (iii) medium-high density, (iv) medium-fine leaf texture, (v) a compact growth profile with a reduced rate of vertical growth, (vi) clean mowing with less shredding of leaf tips, and (vii) uniformity. Observations and ratings were also made on early spring greenup, reaction to specific diseases, appearance during summer stress, and rate of recovery from heat, drought, and other stresses.

Following periods of summer stress in 1993 and 1994, a total of 9800 plants were selected from the best performing turf plots and transferred to spaced-plant nurseries at the Rutgers Plant Science Research and Extension Farm at Adelphia, NJ. The ninety parental clones of Plantation were selected from these nurseries and moved to an isolated, replicated crossing block in 1995. Breeder seed was harvested from the 59 maternal clones showing the best floret fertility in 1996. A few clones were removed from this breeder block prior to anthesis.

Plantation is an attractive, medium-dark-green, persistent, medium-low-growing, turf-type tall fescue with medium-fine leaf blades. It has an excellent record of performance in the NTEP turf trials established in 1996 and evaluated at 28 locations throughout the USA (Morris and Shearman, 1998, 1999). Plantation ranked first in 1997 and second in 1998 in mean turfgrass quality of the 129 tall fescue cultivars evaluated in the 27 tests growing in full sun. It also performed well in a shade trial at Mississippi State, MS, and under traffic stress at Mead, NE. Plantation did well at varying nitrogen fertility regimes, different mowing heights, and various irrigation levels tested. It showed good performance in the cool-humid, cool-arid, and transition zones of the USA. Plantation did not differ significantly from the top entry in the NTEP tests for early spring greenup, turf density during spring, summer, and fall, % living ground cover in spring, summer, and fall, and color retention during summer.

Plantation is recommended for turf use on lawns, industrial grounds, parks, play fields, roadsides, and conservation areas. It should perform well when grown alone or in mixtures with Kentucky bluegrass (*Poa pratensis* L.) cultivars able to perform well at the low maintenance and severe environmental stress conditions normally used for tall fescue. Seed lots of Plantation containing viable *Neotyphodium* endophytes should produce turf with enhanced resistance to many harmful insect pests (Funk et al., 1985; Funk and White, 1997). However, endophyte containing grasses should not be used for animal consumption (Bacon et al., 1977).

Certified seed production of Plantation is limited to three generations of increase from Breeder seed: one each of Foundation, Registered, or Certified. Advanta Seeds Pacific maintains breeder seed. U.S. Plant Variety Protection (no. 9900142) has been applied for.

W.A. Meyer,* R. Stapp, K. Hignight, D.A. Smith, R.F. Bara, and C.R. Funk

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W.A. Meyer, D.A. Smith, R.F. Bara, and C.R. Funk, Plant Science Dep., New Jersey Agric. Exp. Stn. (NJAES), Cook College, Rutgers Univ., New Brunswick, NJ 08901-8525; R. Stapp, Pennington Seed, Inc., P.O. Box 290, Madison, GA 30650; and K. Hignight, Advanta Seeds Pacific, Inc., 33725 Columbus Street S.E., Albany, OR 97321. Publication no. D-12155-1-00, NJAES. Some of this work was conducted as part of NJAES Project no. 12155, supported by NJAES funds, other grants, and gifts. Additional support was obtained from the Rutgers Center for Turfgrass Science, the U.S. Golf Association–Golf Course Superintendents Association of America Research Fund, and theNew Jersey Turfgrass Association. Registration by CSSA. Accepted 31 Oct. 2000. Appreciation is expressed to Kevin N. Morris, Robert Shearman and all other participants in the National Turfgrass Evaluation Program for their assistance in the evaluation of Plantation. The contributions of Barbara Smith, Jennifer M. Johnson-Cicalese, Karen Plumley, Melissa Mohr, George Ziemienski, and Michael Reynolds are acknowledged. *Corresponding author (wmeyer@aesop.rutgers.edu).

Published in Crop Sci. 41:918–919 (2001).

Registration of 'Anand' Soybean

'Anand' soybean [*Glycine max* (L.) Merr.] (Reg. no. CV-428, PI 614732) was developed by the Missouri Agricultural Experiment Station and released simultaneously by Missouri, Arkansas, Kansas, Kentucky, North Carolina, and Tennessee Agricultural Experiment Stations in January 1999. Anand is a midmaturity Group V variety with resistance to soybean cyst nematode (SCN, *Heterodera glycines* Ichinohe).

Anand was developed at the Delta Center of the University of Missouri, Portageville, MO. It was selected from the cross 'Holladay' × 'Hartwig' (Anand, 1992; Burton et al., 1996). The F_1 was grown in Puerto Rico and the F_2 generation was planted in a cyst nematode nursery at the Rhodes Farm of the University of Missouri near Clarkton, MO. Two pods were picked from each of the selected F_2 plants and bulked. The F_3 generation was advanced in Puerto Rico and the F_4 was planted in the cyst nematode nursery at the Rhodes Farm. Individual plants were harvested and 10 seeds from each plant were screened in the greenhouse for reaction to various races of SCN. Resistant F_5 progenies were evaluated for various agronomic characters and uniform progenies were composited for yield testing and seed increase. Anand was tested under the designation S94-1956 in the station tests from 1995 through 1997, and in Regional Preliminary and Uniform Tests V in 1996 and 1997, respectively (Tyler, 1996, 1997). Based on 44 trials, conducted over a 3 yr period, Anand yielded 3501 Kg ha^{-1} compared with 3299 Kg ha^{-1} of Hutcheson. In the SCN infested field at the Rhodes Farm, Anand yielded 74% greater than Hutcheson.

Anand is a determinate soybean variety in midmaturity group V. It has purple flowers and tawny pubescence. Seeds are yellow with black hila. Anand is resistant to SCN Races 2, 3, 5, and 14. It is susceptible to southern root-knot nematode [*Meloidogyne incognita* (Kofoid & White) Chitwood] and peanut root-knot nematode [*M. arenaria* (Neal) Chitwood]. Anand is moderately resistant to stem canker [caused by *Diaporthe phaseolorum* (Cooke & Ellis) Sacc. var. *Caulivora* K.L. Athow & R.M. Caldwell]

Anand has been named after Dr. S.C. Anand, Professor of Agronomy, for his contributions as the Soybean Breeder at the Delta Center of the University of Missouri from 1979 through 1998. Anand will be marketed by the Missouri Seed Improvement Association; 3211 Lemone Industrial Blvd., Columbia, MO 65201-8245. Application for Plant Variety Protection (PVP) is being submitted. Seed of Anand will be maintained by the Missouri Agricultural Experiment Station, Columbia, MO. A sample of 200 seeds may be requested for research purposes from Teresa Newman, University of Missouri, Delta Research Center, P.O. Box 160, Portageville, MO 63873.

S.C. Anand,* T. Newman, and J. Fisher

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S.C. Anand, Dep. of Agronomy, Univ. of Missouri, 210 Waters Hall, Columbia, MO 65211. Teresa Newman and Jake Fisher, Univ. of Missouri, Delta Research Center, P.O. Box 160, Portageville, MO 63873. Contribution from the Missouri Agric. Exp. Stn. Journal Series no. 13,054. Registration by CSSA. Accepted 31 Oct. 2000. *Corresponding author (anands@missouri.edu).

Published in Crop Sci. 41:919–920 (2001).

Registration of 'Prichard' Soybean

'Prichard' soybean [*Glycine max* (L.) Merr.] (Reg. no. CV-429, PI 612157) was developed by the Georgia Agricultural Experiment Stations, and released in May of 1998 because of its disease and nematode resistance and high productivity. Prichard was derived from an F_5 plant from the cross Co82-622 × 'Howard' (USDA-ARS, 2000). Co82-622, a breeding line developed by the former Coker's Pedigreed Seed Company of Hartsville SC, was evaluated in Uniform Test VIII from 1985 to 1988 (Hartwig and Edwards, 1989). It was derived from the cross of 'Braxton' × 'Coker 368' (Novartis Seeds; USDA-ARS, 2000).

The population was inbred by the single pod-bulk method to the F_5 generation in Georgia and Puerto Rico. The F_5-derived line, designated G90-1551, was tested in Georgia for disease resistance, agronomic performance, and seed yield from 1991 to 1998. It was evaluated in the Uniform Soybean Tests, Southern Region (Uniform Group VIII) in 1994, 1995, 1997, and 1998. It is adapted to the southeastern USA where Maturity Group VIII soybean cultivars are commonly grown.

Prichard has a determinate growth habit, white flowers, gray pubescence, and tan pod walls. Seeds are yellow with shiny seed coats and buff hila. Prichard is classified as Maturity Group VIII (relative maturity 8.5), and matures 3 d later than 'Maxcy' and 7 d later than 'Cook' (Boerma et al., 1992; Shipe et al., 1995). Agronomic performance of Prichard was compared with Cook and Maxcy over 4 yr in 43 southern U.S. environments (Day et al., 1999; Tyler and Bell, 1999). Both Prichard and Maxcy averaged 90 cm in plant height compared with 93 cm for Cook. The plant lodging score (score of 2.0; where, 1 = all plants upright to 5 = all plants prostrate), and seed quality score (score of 2.0; where, 1 = excellent to 5 = poor), was similar for Prichard, Maxcy, and Cook. Prichard averaged a seed weight of 137 mg $seed^{-1}$, compared with 141 and 146 mg $seed^{-1}$ for Maxcy and Cook, respectively. Seed of Prichard averaged 17 g kg^{-1} more protein and 5 g kg^{-1} less oil than Maxcy. In these 43 environments, Prichard averaged 6% higher in seed yield than Cook and Maxcy.

Prichard is resistant to southern stem canker [caused by *Diaporthe phaseolorum* (Cooke & Ellis) Sacc. var. *meridionalis* F. A. Fern] and bacterial pustule [caused by *Xanthomonas campestris* pv. *glycines* (Nakano) Dye]. It has resistance to the southern [*Meloidogyne incognita* (Kofoid & White) Chitwood] root-knot nematode (Raymer et al., 1996, 1997). It is susceptible to the peanut [*M. arenaria* (Neal) Chitwood] and javanese [*M. javanica* (Treub) Chitwood] root-knot nematodes, and the reniform nematode (*Rotylenchulus reniformis* Linford & Oliveira). Prichard is resistant to races 3, 9, and 14 of the soybean cyst nematode (*Heterodera glycines* Ichinohe) and to the G1 strain of soybean mosaic virus (Raymer et al., 1996, 1997; Tyler and Bell, 1999). Prichard has produced good yields in fields infested with Columbia lance nematode (*Hoplolaimus columbus* Sher), and has performed well in late-June plantings (Day et al., 1999).

Breeder seed of Prichard was provided to the Georgia Seed Development Commission in 1997. The Georgia Agricultural Experiment Stations will be responsible for the maintenance of Breeder seed. Application has been made for U.S. Plant Variety Protection (PVP no. 9900378). The University of Georgia Research Foundation, Inc. has licensed the marketing rights of Prichard to Southern Elite Genetics Association, Inc. Small quantities of seed for research purposes can be obtained from the corresponding author.

H.R. Boerma,* R.S. Hussey, D.V. Phillips, E.D. Wood, G.B. Rowan, S.L. Finnerty, and J.T. Griner

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Published in Crop Sci. 41:920–921 (2001).

Registration of 'Strong' Soybean

'Strong' soybean [*Glycine max* (L.) Merr.]) (Reg. no. CV-432, PI 614808) was developed jointly by the USDA Agricultural Research Service and the Ohio Agricultural Research and Development Center. It was released September 30, 1999 as a high yielding, lodging resistant, determinate semidwarf cultivar with specific adaptation to highly productive environments, where lodging frequently is a barrier to higher soybean yields with taller indeterminate cultivars (Cooper, 1981, 1985).

Strong is a F_4-derived line, originally designated as HC94-422, from the cross, 'Sprite 87' × HC85-6577 (Cooper et al., 1991). HC85-6577 is a determinate semidwarf line from the cross, HC78-350 × HC78-676. HC78-350 is a semidwarf line from the cross, L72U-2567 × 'Essex' (12). L72U-2567 is an F_2-derived semidwarf line from the cross, 'Williams' × 'Ransom' (Bernard and Lindahl, 1972; Brim and Elledge, 1973). HC78-676 is a semidwarf line from the cross, L70T-543G × L74D-619. L70T-543G is an indeterminate line from the cross, L15 × 'Amsoy 71' (Probst et al., 1972). L15 is a BC_5-derived near-isogenic line of 'Wayne' (Bernard, 1966) containing the *Rps1-a* allele from 'Clark 63' (Bernard, 1964). L74D-619 is a semidwarf line from the cross, Williams × Ransom. The cross of Sprite 87 × HC85-6577 was made in 1990, at the Ohio Agricultural Research and Development Center, Wooster, OH. Strong was developed by early generation testing and was derived from an F_4 plant from the F_2-derived line, HC92-2048 that was yield tested in Ohio in 1992 and 1993. Strong was tested at multiple locations in Ohio from 1994 to 1998 and evaluated in the Uniform Soybean Tests, Northern States, Preliminary Test IVB in 1997 and the Uniform Test IV in 1998 (Wilcox, 1999) under the designation HC94-422. The original release notice from The Ohio State University for HC94-422 named the cultivar Sturdie. However, due to possible confusion with the soybean cultivar Sturdy (Orf et al., 1991), the official name for HC94-422 was changed to Strong.

Strong has white flowers, tawny pubescence, tan pods, and dull yellow seed with black hilum. It is an early Maturity Group IV, determinate semidwarf (dt1e1) cultivar with specific adaptation to high yield environments (>3300 kg ha^{-1}) where lodging can limit the yield of taller indeterminate varieties. Because of its small plant size, Strong should be solid-seeded in 17- to 20-cm row spacing at a seeding rate of 750 000 seed ha^{-1} of 90+% germination (675 000 viable seed ha^{-1}) for maximum yield. In high yield environments at Wooster, Ohio, 1995 to 1998, Strong averaged 10% higher in yield than the mid-Maturity Group III semidwarf variety, 'Charleston' (Cooper et al., 1995). In the Uniform Regional Trials, Sturdie averaged 10% higher yield than 'Ripley' (Cooper et al., 1990), is 2 d earlier in maturity, similar in lodging resistance, and 5 cm shorter in plant height. Compared with Ripley, Strong has larger seed (19.1 vs. 14.8 g 100 $seed^{-1}$) and is higher in both oil (201 vs. 194 g kg^{-1}) and protein (418 vs. 404 g kg^{-1}). Strong carries the *Rps1-a* gene for resistance to Phytophthora root rot [caused by *Phytophthora sojae* (M.J. Kaufmann and J.W. Gerdemann)].

Breeder seed of Strong was distributed to the Ohio Foundation Seeds, Inc. for production of Foundation seed in 1999. Breeder seed of Strong will be maintained by OARDC/OSU with the cooperation of Ohio Foundation Seeds, Inc. A small sample of seed for research purposes can be obtained from the corresponding author. U.S. Plant Variety Protection will not be applied for.

R.L. Cooper,* T. Mendiola, S.K. St. Martin, R.J. Fioritto, A.F. Schmitthenner, and A.E. Dorrance

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Published in Crop Sci. 41:921–922 (2001).

Registration of 'Stout' Soybean

'Stout' soybean [*Glycine max* (L.) Merr.]) (Reg. no. CV-431, PI 614807) was developed jointly by the USDA Agricultural Research Service and the Ohio Agricultural Research and Development Center. It was released 30 Sept. 1999 as a high yielding, lodging resistant, determinate semidwarf cultivar with specific adaptation to highly productive environments, where lodging frequently is a barrier to higher soybean yields with taller indeterminate cultivars (Cooper, 1981, 1985).

Stout is a F_4-derived line, originally designated as HC94-421, from the cross, 'Sprite 87' × HC85-6577 (Cooper et al., 1991). HC85-6577 is a determinate semidwarf line from the cross, HC78-350 × HC78-676. HC78-350 is a semidwarf line from the cross, L72U-2567 × 'Essex' (Smith et al., 1973). L72U-2567 is an F_2-derived semidwarf line from the cross, 'Williams' × 'Ransom' (Bernard and Lindahl, 1972; Brim and Elledge, 1973). HC78-676 is a semidwarf line from the cross, L70T-543G × L74D-619. L70T-543G is an indeterminate line from the cross, L15 × 'Amsoy 71' (Probst et al., 1972). L15 is a BC5-derived near-isogenic line of 'Wayne' (Bernard, 1966) containing the *Rps1-a* allele from 'Clark 63' (Bernard, 1964). L74D-619 is a semidwarf line from the cross, Williams × Ransom. The cross of Sprite 87 × HC85-6577 was made in 1990, at the Ohio Agricultural Research and Development Center, Wooster, OH. Stout was developed by early generation testing and was derived from an F_4 plant from the F_2-derived line, HC92-2048 which was yield tested in Ohio in 1992 and 1993. Stout was tested at multiple locations in Ohio from 1994 to 1998 and evaluated in the Uniform Soybean Tests, Northern States, Preliminary Test IIIB in 1997, and the Uniform Test III in 1998 (Wilcox, 1999) under the designation, HC94-421.

Stout has white flowers, tawny pubescence, tan pods, and dull yellow seed with black hila. It is a maturity group III (relative maturity 3.3), determinate semidwarf (dt1e1) cultivar with specific adaptation to high yield environments (>3300 kg ha^{-1}) where lodging can limit the yield of taller indeterminate varieties. Because of its small plant size, Stout should be solid-seeded in 17 to 20 cm row spacing at a seeding rate of 750 000 seed ha^{-1} of 90+% germination (675 000 viable seeds ha^{-1}) for maximum yield. In high yield environments at Wooster, OH, 1995 to 1998, Stout averaged 8% higher in yield than semidwarf variety, 'Charleston' (Cooper et al., 1995). In the Uniform Regional Trials, Stout was similar in yield to Charleston in 1997 but lower in yield in 1998 because of poor seed quality that resulted in poor stands at several locations. Stout is 1 d earlier in maturity than Charleston, similar in lodging resistance and plant height, with larger seed (15.9 vs. 14.2 g 100 $seeds^{-1}$) that are higher in oil (212 vs. 201 g kg^{-1}) and lower in protein content (406 vs. 419 g kg^{-1}). Stout carries the *Rps1-a* gene for resistance to Phytophthora root rot (caused by *Phytophthora sojae* M.J. Kaufmann. & J.W. Gerdemann).

Breeder seed of Stout was distributed to the Ohio Foundation Seeds, Inc. for production of Foundation seed in 1999. Breeder seed of Stout will be maintained by OARDC/OSU with the cooperation of Ohio Foundation Seeds, Inc. A small sample of seed for research purposes can be obtained from the corresponding author. U.S. Plant Variety Protection will not be applied for.

R.L. Cooper,* T. Mendiola, S.K. St. Martin, R.J. Fioritto, A.F. Schmitthenner, and A.E. Dorrance

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Published in Crop Sci. 41:922 (2001).

Registration of 'Troll' Soybean

'Troll' soybean [*Glycine max* (L.) Merr.] (Reg. no. CV-430, PI 614806) was developed jointly by the USDA Agricultural Research Service and the Ohio Agricultural Research and Development Center. It was released 30 Sept. 1998 as a high yielding, lodging resistant, determinate semidwarf cultivar with specific adaptation to highly productive environments, where lodging frequently is a barrier to higher soybean yields with taller indeterminate cultivars (Cooper, 1981a, 1985).

Troll is a F_4-derived line, originally designated as HC90-196, from the cross, 'Sprite 87' × HC80-1756 (Cooper et al., 1991). HC80-1756 is a determinate semidwarf line from the cross, L73U-623 × 'Elf' (Cooper, 1981b). L73U-623 is a determinate semidwarf line from the cross, 'Miller 67' × 'Williams' (Bernard and Lindahl; 1972). Miller 67 is a determinate Maturity Group III cultivar introduced from Korea in 1967 by a farmer, Richard Miller from Arcanum, OH. The cross of Sprite 87 × HC80-1756 was made in 1986, at the Ohio Agricultural Research and Development center, Wooster, OH. Troll was developed by early generation testing and was derived from an F_4 plant from the F_2-derived line HC88-1872, which was yield tested in Ohio in 1988 and 1989. Troll was tested in multiple locations in Ohio 1990 to 1997, and evaluated in the Uniform Tests Northern States, Uniform Test IV, 1995 to 1997 (Wilcox, 1998) under the designation HC90-196.

Troll has white flowers, tawny pubescence, brown pods,

and dull yellow seed with black hila. It is a Maturity Group IV (relative maturity 4.3), determinate semidwarf (dt1e1) cultivar with specific adaptation to high yield environments (>3300 kg ha^{-1}) where lodging can limit the yield of taller indeterminate cultivars. Because of its small plant size, Troll should be solid-seeded in 17 to 20 cm row spacing at a seeding rate of 750 000 seeds ha^{-1} of 90+% germination (675 000 viable seeds ha^{-1}) for maximum yield. In a high yield environment at South Charleston, OH, 1995 to 1997, Troll averaged 15% higher yield than the semidwarf cultivar, 'Ripley' (Cooper et al., 1990). In the Uniform Regional Trials, Troll averaged 10% higher in yield than Ripley, was 1 d earlier in maturity, similar in lodging resistance, and 6 cm taller in plant height. Compared with Ripley, Troll has larger seed (16.5 g 100 $seed^{-1}$ vs. 14.1 g 100 $seed^{-1}$), and is higher in oil (216 vs. 198 g kg^{-1}) and lower in protein (392 vs. 408 g kg^{-1}). Troll carries the *Rps1-k* gene for resistance to Phytophthora root rot (caused by *Phytophthora sojae* M.J. Kaufmann. & J.W. Gerdemann).

Breeder seed of Troll was distributed to the Ohio Foundation Seeds, Inc. for production of Foundation seed in 1998. Breeder seed of Troll will be maintained by OARDC/OSU with the cooperation of Ohio Foundation Seeds, Inc. A small sample of seed for research purposes can be obtained from the corresponding author. U.S. Plant Variety Protection will not be applied for.

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Published in Crop Sci. 41:922–923 (2001).

Registration of 'AC Polaris' Great Northern Dry Bean

'AC Polaris' (Reg. no. CV-183, PI 613178) is a great northern dry bean (*Phaseolus vulgaris* L.) developed at the Agriculture and Agri-Food Canada Research Centre, Lethbridge, AL, in cooperation with the Agriculture and Agri-Food Canada Research Centre, Morden, MB, and released in 2000. It is a high yielding cultivar particularly well-suited to the narrow-row (drilling) production system used in parts of western Canada. Registration number 5086 was issued for AC Polaris on March 24, 2000 by the Variety Section, Plant Products Division, Canadian Food Inspection Agency.

AC Polaris, tested as L95E101, was derived from a simple cross made in 1990, with the following parentage: E8805-S1/'Beryl'. E8805-S1 is an elite great northern line from the Lethbridge bean breeding program with the following pedigree: 83B352/5/'GN Star' *2 /3/- 'Redkloud'/'Kentwood'//'Swan Valley'/4/GN Star*2 /3/ Redkloud/Kentwood//Swan Valley. GN Star is a great northern cultivar from Nebraska with common blight and bacterial blight tolerance (USDA-ARS, 2000) and 83B352 is a great northern bean breeding line from the University of Idaho introduced to Alberta in the early 1980s. Redkloud is an old (>25 yr) light red kidney bean cultivar selected from California 'Light Red Kidney', from 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 that was selected for its taller and more erect ideotype with a narrower profile and fewer basal branches than standard cultivars, and good field tolerance to root rot caused by *Fusarium solani* (Mart.) Sacc. f. sp. *phaseoli* (Burkholder) W.C. Snyder & H.N. Hans. (Adams et al., 1986). Beryl is a great northern cultivar released by Rogers Brothers in 1986, maturing 4 d later than 'US 1140'. Cross 90032E was advanced in the field near Lethbridge by single seed descent to F_4. Plant 21 was selected from the F_4, on the basis of seed characteristics and early maturity, and seed of Plant 1 of the F_5 was increased indoors. The progeny of Plant 1 of the F_6 was bulked and again increased indoors in 1994–1995 to multiply seed for multi-location yield trials which commenced in 1995. A series of nine yield tests followed from 1995 to 1997. These included six narrow-row (23 cm) tests and three wide-row (60 cm) tests at Lethbridge and Vauxhall, AB, Outlook and Saskatoon, SK, and Morden, MB. Line L95E101 proved particularly promising under narrow rows and thus was entered into the Narrow-Row Cooperative Registration trials in 1998 and 1999. Fifty single plant selections from greenhouse-grown plants at Lethbridge were grown at Kimberly, ID, as progeny rows in 1999. After roguing in the field, 48 of these progeny rows formed the first Breeder seed which was increased at Yuma, AZ, in 2000.

AC Polaris proved particularly promising in narrow-row tests because of increased yields over that of the check cultivars, US 1140 and 'CDC Nordic'. In seven irrigated trials, with coefficients of variation for yield below 20%, AC Polaris matured in 110 d with yields of 2703 kg ha^{-1}, compared with a corresponding 109 d and 2004 kg ha^{-1} for US 1140, and 108 d and 1764 kg ha^{-1} for CDC Nordic. In seven dryland trials, AC Polaris matured in 102 d with yields in eight trials of 2537 kg ha^{-1}, compared with a corresponding 103 d and 1838 kg ha^{-1} for US 1140, and 101 d and 1639 kg ha^{-1} for CDC Nordic.

AC Polaris has Type IIb (Schwartz et al., 1996) indeterminate growth habit, with very short vines, in contrast to the Type IIIb of US1140, with weak to prostrate stems, and to the Type I determinate growth habit of CDC Nordic. Pods are higher on plants of AC Polaris and more widely distributed than on the standard US 1140, and pod length for AC Polaris is longer than that of US 1140 and CDC Nordic. The seed mass of AC Polaris (at 140 g kg^{-1} moisture) averaged 30.9 g 100^{-1} over 12 sites, and is slightly lower in mass than that of US 1140, at 31.5 g 100^{-1} and lower than that of CDC Nordic, at 32.8 g 100^{-1}. The seed shape of the median longitudinal section is elliptic for AC Polaris, in contrast to ovate for US 1140 and CDC Nordic. Flower color and dry seed color of AC Polaris and the two checks used is white. AC Polaris has lighter green leaf color than US 1140. Plant height of AC

Polaris averaged over eight trials was 44 cm, compared with 46 cm for US 1140 and 37 cm for CDC Nordic. Lodging at maturity averaged over two trials was 3.2, 3.4, and 2.8, respectively, for AC Polaris, US 1140, and CDC Nordic (with 1 = upright and 5 = prostrate on the ground).

On the basis of greenhouse inoculation tests at Harrow, ON, AC Polaris is resistant to Strains 1 and 15 of Bean Common Mosaic Virus (BCMV), while both checks, US1140 and CDC Nordic, are susceptible. In contrast to the susceptible check, US1140, and similar to the moderately susceptible check, CDC Nordic, AC Polaris is moderately susceptible to white mold, caused by *Sclerotinia sclerotiorum* (Lib.) de Bary, determined on the basis of tests in a disease nursery at Lethbridge, AB, for both disease incidence and severity in 1998 and 1999. On the basis of greenhouse inoculation tests at Harrow, ON, AC Polaris, US 1140, and CDC Nordic are susceptible to common blight, caused by *Xanthomonas axonopodis* pv. *phaseoli* Starr & Garces 1950 emend (Vauterin et al., 1995) [= *X. campestris* pv. *phaseoli* (Smith) Dye].

AC Polaris 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 seed of AC Polaris may be obtained from the corresponding author for at least 5 yr. It is not expected that U.S. Plant Variety Protection status will be applied for.

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Published in Crop Sci. 41:923–924 (2001).

Registration of 'AC Ultima' Spring Triticale

'AC Ultima' spring triticale (× *Triticosecale* Wittmack) (Reg. no. CV-24, PI 613354) was developed jointly by the International Maize and Wheat Improvement Centre (CIMMYT), México DF, México, and the Semiarid Prairie Agricultural Research Centre (SPARC), Research Branch, Agriculture and Agri-Food Canada, Swift Current, SK, as part of the Canadian Rye Breeding Program. Canadian Reg. no. 4988 was issued for AC Ultima by the Variety Registration Office, Canadian Food Inspection Agency, Agriculture and Agri-Food Canada in September 1999. AC Ultima is widely adapted to the Canadian Prairies and represents a significant improvement in Hagberg Falling Number, which is usually associated with improved harvest-time sprouting resistance. AC Ultima expressed high grain yield, earlier maturity, heavier kernels, and excellent lodging resistance compared with the check cultivars. AC Ultima meets the criteria of the Canada Triticale grain class.

AC Ultima is a complete hexaploid triticale, which was derived from the progeny of the cross 'Drago'/'Ibex'// 'Civet'#2, made by CIMMYT at Ciudad Obregon, Sonora, México in 1987. It was developed by a modified pedigree selection method known as the shuttle breeding method (Borlaug, 1968; Rajaram, 1995), that has been employed in CIMMYT cereal breeding programs (Rajaram, 1995). Shuttling germplasm between Obregon (40 m altitude and latitude 27.5°N) and Toluca (2640 m altitude and latitude 18°N) enables cereal breeders to select cultivars which are adapted to a wide range of biotic and abiotic stress.

The F_1, F_3, F_5, F_7, and F_9 generations of AC Ultima were grown in Obregon, with F_5 being grown from reserve seed. The F_2, F_4, F_6, and F_{10} generations were grown in El Batan, México State, respectively, with the F_6 and F_{10} being harvested in bulk. The F_8 generation was grown at Papalotla, México State, and harvested in bulk.

In Ciudad Obregon, an arid region, selection was done in three mega-environments (ME): ME1, a high input environment with full irrigation; ME4, arid conditions with one irrigation before planting; and ME5, with heat stress. Early generation selection in Obregon and Papalotla was based primarily on agronomic type, resistance to leaf rust (caused by *Puccinia recondita* Rob. ex Desm. f. sp. *tritici*) and resistance to stem rust (caused by *P. graminis* Pers.:Pers f. sp. *tritici* Eriks. & E. Henn.). Grain yield and test weight were added as selection traits in advanced generations. At El Batan, a high rainfall site with acid soils (ME3), selection criteria were: improved resistance to yellow rust (caused by *P. striiformis* West.), to scab or head blight (caused by *Fusarium* spp.), and to septoria leaf spot (caused by *Septoria* spp.); tolerance to low pH soils; harvest time sprouting; and agronomic traits.

AC Ultima was introduced into the triticale program at SPARC in 1993 as entry no. 62 of the 25th ITSN and designated 9330A-062. It was evaluated for agronomic kernel and quality characteristics in the 25th ITSN in 1993, and entered into the Triticale 'A' Test in 1994, and advanced to the Triticale 'B' Test in 1995. It was evaluated in the Western Spring Triticale Cooperative Test from 1996 to 1998, inclusive under the experimental designation T150. AC Ultima was grown in special nurseries established for the evaluation of reaction to common root rot [caused by *Bipolaris sorokiniana* (Sacc.) Shoemaker], common bunt [caused by *Tilletia laevis* Kuhn in Rabenh. and *T. caries* (DC) Tul. & C. Tul.], and leaf and stem rust at Agriculture and Agri-Food Canada Research Centres, located at Swift Current, SK, Lethbridge, AB, and Winnipeg, MB.

In 29 performance trials in the Canadian Prairies, the grain yield of AC Ultima (5.36 Mg ha^{-1}) was significantly greater ($P < 0.05$) than that of 'AC Copia' (4.97 Mg ha^{-1}) and 'AC Certa' (5.09 Mg ha^{-1}) and equal to that of the best check cultivar, 'Pronghorn' (5.19 Mg ha^{-1}). On the Brown and Dark Brown soils of Saskatchewan and Alberta, and on the irrigated Brown soil of the Alberta sites, there were no significant differences in grain yield between AC Ultima and the three check cultivars. During 1996 and 1997, AC Ultima yielded significantly more grain (18%) than that of 'AC Taber', a

Canada Prairie Spring wheat. Maturation of AC Ultima (105 d) was significantly earlier than AC Copia (107 d) and equal to AC Certa and Pronghorn (106 d), the earliest check cultivars. AC Ultima (101 cm) was significantly shorter than all of the check cultivars. Lodging resistance of AC Ultima was greater than that of AC Copia, and equal to that of AC Certa and Pronghorn. The test weight of AC Ultima (705 kg m^{-3}) was significantly less than that of AC Copia (721 kg m^{-3}) and AC Certa (741 kg m^{-3}), and significantly greater than that of Pronghorn (690 kg m^{-3}). The kernel weight of AC Ultima (45.4 mg) was significantly greater than that of all of the check cultivars.

AC Ultima was very resistant to the prevalent races of stem rust, leaf rust, and common bunt, and moderately resistant to common root rot.

The Hagberg Falling Number of AC Ultima (155 s) was significantly greater than those of all of the triticale check cultivars. Falling Numbers for AC Ultima were ≥200 s for 11 of the 29 site years sampled over 3 yr, compared with AC Copia, which was ≥200 s for 0 of the 29, and Pronghorn and AC Certa, which were ≥200 s for one of the 29 site years. AC Ultima is suitable for food, feed, and industrial uses. AC Ultima is eligible for the grades of Canada Triticale.

The spikes are long, tapered, and nodding at maturity. They are mid-dense and glaucous. The chaff is white; the awns are long, white, and spreading at maturity.

The kernels are larger in size than the check cultivars, have a red NaOH reaction, and are soft. Kernels are elliptical in shape, with rounded cheeks, a medium depth, and a narrow crease. The brush hairs are of medium length. The germ is large and oval. The phenol reaction of the kernel is black.

AC Ultima has been released exclusively to Quality Assured Seeds Ltd., 422 McDonald St., Regina, SK, S4N 6E1, Canada, for multiplication, distribution, and marketing. No plant variety protection will be sought on AC Ultima. Breeder seed will be maintained by the Seed Increase Unit of the Experimental Farm, Research Branch, Agriculture and Agri-Food Canada, Indian Head, SK, S0G 2K0.

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Published in Crop Sci. 41:924–925 (2001).

Registration of 'Hayden' Wheat

'Hayden' (Reg. no. CV-893, PI 608040) hard red winter wheat (*Triticum aestivum* L.) was developed cooperatively by the Idaho Agricultural Experiment Station and the USDA-ARS, and released to seed producers in September 1999. Hayden was released because of its higher grain yield compared to all other cultivars when grown under dryland management in northwestern Colorado. Hayden was selected in 1987 as the F_4 line ID77349 from the cross A7480W-9-2/A75284W-1 made at the University of Idaho, Aberdeen Research and Extension Center, in 1983. The parentage of A7480W-9-2 is 'Atlas 50'/4/'Rex'/'Rio'//2*'Cheyenne'/3/'Turkey'/5/Snow Mold 6/4/'Itana'*2/Utah175a-53//Beadle's Burt/3/CI13438/6/'Bezostaja 2'//'Norin 10'/'Brevor'/3/'Kiowa'/Utah 233-3-10//'Burt'. The parentage of A75284W-1 was Atlas 50/4/Rex/Rio//2*Cheyenne/3/Turkey/5/ Snow Mold 6/4/Itana*2/Utah175a-53//Beadle's Burt/3/CI13438/6/Itana*2/Utah 175a-53//Beadle's Burt/3/CI13438/5/NP824/4/Itana*2/Utah 175a-53/3/Beadle's Burt/3/CI13438. Hayden was tested in the Western Regional Winter Wheat Nursery in 1994 and 1995, and in western Colorado during 1995, 1996, 1997, and 1999.

Hayden is an awned, medium height, brown-glumed cultivar which has been most similar to 'Manning' in appearance. The spikes are erect to inclined, and it has averaged 4 to 7 d later in heading than Manning and equal to 'Jeff'. Hayden (75 cm) has averaged 5 cm taller than Manning and is similar in straw strength. When compared to the current highest performing hard red winter wheat (Manning), Hayden (3487 kg ha^{-1}) had an 11% higher grain yield when grown under dryland management in northwestern Colorado. Test weight has been about 1.3 kg hL^{-1} lower than Manning in 2 yr of tests near Hayden, CO.

In 2 yr of Western Regional testing, Hayden had an average yield of 4165 kg ha^{-1} compared with the tall check cultivar Wanser's yield of 4031 kg ha^{-1} and the semidwarf cultivars Utah 100 and Boundary that yielded 5510 kg ha^{-1} and 5241 kg ha^{-1}, respectively. Two years of dwarf bunt (caused by *Tilletia controversa* Kühn in Rabenh.) evaluations at the USDA-ARS Green Canyon, UT, site confirmed Hayden as resistant to dwarf bunt, comparable to the best check cultivars Bonneville, Manning, and Utah 100. On the basis of Hayden's pedigree and common bunt reactions [caused by *T. tritici* (Bjerk.) G. Wint. in Rabenh., Races L8, L16, T19, T25, R36, R43, & R48] at Aberdeen, ID, it likely carries novel sources of dwarf bunt resistance complimentary to the resistance derived from PI 178383, the source of resistance for most intermountain hard red winter wheat cultivars. In Western Regional evaluations, Hayden was found to be moderately susceptible to stripe rust (caused by *Puccinia striiformis* Westend.). Seedling reactions to stripe rust inoculation confirmed that Hayden is resistant to races CDL-17, CDL-37, and CDL-45, but is susceptible to race CDL-43.

Hayden has excellent bread-making quality for domestic and export use. It has more tolerance to dough mixing than Manning (mixograph scores of 6.6 vs. 6.3) and a slightly longer mixing requirement in trials at Aberdeen in 1994 and 1995. Flour extraction is satisfactory and comparable to Utah 100 and Boundary (71.6 vs. 71.5 and 71.0%, respectively). Interior and exterior loaf characteristics are equal or superior to Manning. Protein concentrations of Hayden and Manning were 12.8 and 11.2%, respectively.

The foliage of Hayden is green at booting stage with a waxy bloom and yellow anthers at anthesis. The glume is midlong and midwide with an oblique shoulder and an acuminate beak. The coleoptile color is white and juvenile growth habit is semierect. The kernel is short, red, hard textured, and ovate. The kernel has rounded cheeks, midsize germ, short brush, and a wide, shallow crease, but lacks a collar.

Breeder and foundation seed of Hayden will be maintained by Colorado State University, Soil and Crop Sciences Dep., Fort Collins, CO. Application will not be made for U.S. Plant Variety Protection. Seed may be requested by writing to the Foundation Seed Project, Western Colorado Research Center, Colorado State University, Fruita, CO 81521.

J.S. Quick,* E. Souza, and C.H. Pearson

Quick, J.S., and C.H. Pearson, Dep. of Soil and Crop Sciences, Colorado State University, Fort Collins, CO 80523.; E. Souza, Dep. of Plant, Soil and Entomological Sciences, University of Idaho, Moscow, ID 83843. Hayden was developed with partial financial support from the Colorado Wheat Administrative Committee. Registration by CSSA. Accepted 31 Oct. 2000. *Corresponding author (jquick@agsci.colostate.edu).

Published in Crop Sci. 41:925–926 (2001).

Registration of 'LA422' Wheat

'LA422' (Reg. no. CV-898, PI 614733) is a soft red winter wheat (*Triticum aestivum* L.) cultivar developed by the Louisiana Agricultural Experiment Station, in cooperation with the Florida (FAES) and Georgia (GAES) Agricultural Experiment Stations. It was tested as LA85422-C13-1-4-2 and released in 1998 because of its grain yield, disease resistance, and adaptation to the Gulf Coast region.

LA422 was derived from the cross 'Florida 302'/IN76529A5-4. The original cross, designated FL85322, was made in 1985 at the University of Florida. Florida 302 (PVP no. 8500054, PI 601163) was widely grown across the southeastern USA during the mid 1980s. IN76529A5-4, a Hessian fly [*Mayetiola destructor*, (Say)] resistant breeding line from the Purdue University program carries genes *H9* and *H10* from 'Elva' and *H6* from PI94587. The pedigree of IN76529A5-4 is: 'Arthur'/3/P5517B8-5-3-3//'Monon'/Elva. The pedigree of P5517 is Redcoat'/8/'Norin33'/5/'Fairfield'/4/PI94587//'Fultz'/'Hungarian'/3/Fultz/Hungarian/6/'Trumbull'*3//'Hope'/'Hussar'/4/Trumbull/3/W38-6//Fultz/Hungarian/7/'Knox'.

LA422 was bulk harvested in the F_1 generation as part of the FAES wheat breeding program. Seed from selected F_2 plants were planted by the GAES at Tifton, GA, and individual F_3 heads were selected to become $F_{3:4}$ headrows at Tifton, GA, in 1989. A selected headrow, designated 85322C13-1, was harvested and grown as an observation plot at Tifton, GA, in 1990, and in preliminary yield trials in 1991. Heads were reselected and $F_{6:7}$ headrows were grown at Attapulgus, GA, in 1992. A single $F_{6:7}$ headrow, designated 85322C13-1-4-2, was harvested and evaluated by the LAES wheat breeding program as LA85422-C13-1-4-2 at Baton Rouge, LA, in 1993. The change in line designation was to avoid confusion with a preexisting cross designated LA85322.

LA422 is a facultative wheat with a semierect juvenile growth habit. Heads are awned, middense, and tapering. Kernels are ovate, with rounded cheek, and have a dark brown phenol reaction. The brush is medium and noncollared. Kernel color is RHS161B, as determined by the Royal Horticultural Society Colour chart.

LA422 was evaluated in LAES statewide performance trials beginning in 1995 (harvest year). LA422 had the second-highest mean grain yield (4441 kg ha^{-1}) across 16 location-years in Louisiana from 1995 to 1997, compared with 4448 kg ha^{-1} for 'Mason' and 4327 kg ha^{-1} for '2684'. LA422 was evaluated in the USDA-ARS Uniform Southern Soft Red Winter Wheat Nursery (USSRWWN) in 1996 and 1997 (harvest years). LA422 had a yield of 3796 kg ha^{-1} across 24 locations in the 1996 USSRWWN, compared with a mean of 4280 kg ha^{-1} for 'Coker 9835' and 3837 kg ha^{-1} for Florida 302. LA422 had a mean yield of 4340 kg ha^{-1} in the 1997 USSRWWN across 25 locations, compared with 4609 kg ha^{-1} for Coker 9835 and 3810 kg ha^{-1} for Florida 302. The test weight of LA422 (728 kg m^{-3}) was higher than that of Florida 302 (698 kg m^{-3}) and Coker 9835 (720 kg m^{-3}) across 49 year-locations of the uniform nursery. LA422 had a heading date (117 d) equal to Coker 9835, and was 2 d earlier than Florida 302. LA422 was 86 cm tall, 5 cm taller than Coker 9835.

In evaluations by USDA-ARS Cereal Disease Lab, as part of the uniform nurseries, LA422 was determined to carry unidentified genes for resistance to leaf rust (caused by *Puccinia triticina* Eriks.). LA422 was resistant to races PLMQ, MCJL, TCDL, LBBQ, TCBQ, TLGG, and PNML in 1997, and susceptible to MBRL. LA422 appears to segregate for resistance to stem rust (caused by *Puccinia graminis* Pers.:Pers. f. sp. *tritici* Eriks. & E. Henn.) and was postulated to segregate for *SR10* and to possibly contain other genes for resistance. LA422 is moderately resistant to powdery mildew {caused by *Erysiphe graminis* DC. f. sp. *tritici* Em. Marchal [= *Blumeria graminis* (DC.) E.O. Speer]}, and susceptible to Hessian Fly biotype L. Tests conducted by the USDA-ARS Hessian Fly Laboratory, West Lafayette, IN, indicate that LA422 probably has resistance to biotype E, although results over three tests varied.

LA422 has good soft wheat milling and baking quality as determined by the USDA-ARS Soft Wheat Quality Laboratory in Wooster, OH. Data from the 1997 USSRWWN showed LA422 to have a flour yield of 691 g kg^{-1}, compared with 702 g kg^{-1} for Florida 302; LA422 had an average flour protein of 83.6 g kg^{-1}, compared with 84.2 g kg^{-1} for Florida 302. Alkaline water retention capacity and cookie diameter were 55.4% and 17.8 cm for LA422, and 54.4% and 17.2 cm for Florida 302. LA422 has been licensed to Terral Seed Co., Inc. of Lake Providence, LA, and protection has been applied for under the U.S. Plant Variety Protection Act (PVP no. 200000321). Breeder seed will be maintained by the Agronomy Department, Louisiana Agricultural Experiment Station, Baton Rouge, LA 70803-2110. Small quantities of seed for research are available upon request from the corresponding author. Recipients of seed are asked to make appropriate recognition of the source of LA422 when it is used in the development of a new cultivar, germplasm, parental line, or genetic stock.

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Published in Crop Sci. 41:926 (2001).

Registration of 'McVey' Wheat

'McVey' is a hard red spring wheat (*Triticum aestivum* L.) (Reg. no. CV-894, PI 612966) cooperatively developed and released by the Minnesota Agricultural Experiment Station and USDA-ARS in February 1999. It was named McVey after Donald V. McVey, USDA-ARS plant pathologist and long time collaborator. McVey was released for its high grain yield and *Fusarium* head blight resistance (primarily caused by *Fusarium graminearum* Schwabe). It was derived from the cross

Ning 8331/MN87029//MN89068. Ning 8331 (PI 531191) is an elite line from China that is resistant to spread of Fusarium head blight (FHB) in the wheat spike. 'Sumai 3' is a parent of Ning 8331 and is the likely source of FHB resistance. MN87029 (MN81136/'Vance') has 'Era', 'Fletcher', 'Kitt', 'Chris', and 'Polk' in its pedigree as well as several lines from the International Maize and Wheat Improvement Center (CIMMYT) program. MN89068 (MN80406/MN7663) has Era and Chris mutant (Heiner and Elsayed, 1974) in both of its parents, and Fletcher, 'Lovrin 11', Kitt, Polk, CI*tr*13990, and several lines from CIMMYT in its background.

McVey originated as a head selection from an F_4 line in 1992. Seed of an F_5 head was increased in the 1992–1993 winter nursery in Arizona, and the F_6 line was evaluated in a preliminary yield trial in 1993 as MN93413. In 1993, under severe FHB disease pressure, MN93413 and its sibs had double the yield of other test lines. Only seeds of MN93413 were classified as hard textured. About 500 $F_{9:10}$ head rows of McVey were grown for purification at St. Paul, MN, in 1997, and 472 selected rows were bulked. About 6 kg of this bulked seed was planted on about 0.75 ha in California during the 1997–1998 winter, increased during the 1998 summer in Minnesota on about 50 ha, and increased further during the winter on 20 ha in California in 1998–1999.

McVey was tested as MN93413 in Minnesota statewide yield trials from 1997 through 1999. McVey is relatively late maturing and appears to be best adapted to northern Minnesota. In eight northern Minnesota location–years, McVey yielded 3453 kg ha^{-1} compared with 3266 kg ha^{-1} for both Pioneer brand '2375' and 'Oxen'. In nine southern Minnesota tests, McVey yielded 2966 kg ha^{-1} compared with 2940 and 3440 kg ha^{-1} for 2375 and Oxen, respectively. Under severe natural FHB environments in Minnesota in 1994 and 1995, McVey yielded 2944 kg ha^{-1} compared with 2768 and 2886 kg ha^{-1} for 'Grandin' and 2375, respectively. In 31 environments from 1996 through 1997 in the Uniform Regional Hard Red Spring Wheat Nursery, McVey yielded 3737 kg ha^{-1} compared with an average of 3110 kg ha^{-1} produced by the highest yielding check cultivars, Stoa and Era. Over all elite yield trials in Minnesota from 1997 through 1999, McVey's grain volume weight (70 kg hL^{-1}) was lower than both 2375 (74 kg hL^{-1}) and Oxen (73 kg hL^{-1}). McVey is 2–4 d later to head than 2375 and Oxen, respectively. High temperatures often prematurely terminated McVey's grain filling in the southern part of the state, causing lower grain volume weight, compared with the earlier maturing 2375 and Oxen. McVey was ≈2 cm taller than 2375 (79 cm) and ≈5 cm taller than Oxen. It is moderately susceptible to lodging (4.8), more susceptible than Oxen (2.8), and similar to 2375 (4.7), when scored on a scale of 1 (erect) to 9 (flat).

McVey has long, wide, white glumes with an apiculate shoulder and an acuminate beak. The spike is awned, middense, and tapering. The kernel is red in color and ovate in shape with angular cheeks and a narrow, middeep crease. The brush on the kernel is long and has no collar. Spikes of McVey have a light green color, similar to the Ning 8331 parent.

McVey expresses a resistant reaction to FHB spread in the spike (Type II resistance) when a central spikelet is inoculated in the greenhouse, but is somewhat less resistant than 'Sumai 3' and more similar to the reaction of Ning 8331. It was the highest yielding entry with relatively low DON (deoxynivalenol) in an inoculated and misted nursery at Crookston, MN, in both 1997 and 1998 (J. Wiersma, unpublished data). McVey is resistant to currently prevalent races of stem rust (caused by *Puccinia graminis* Pers.: Pers.) as a seedling (Cereal Disease Laboratory isolate no. HJCS, QFBS, QSHS, RKQS, RTQQ, RTQS) and to field isolates. It is moderately resistant to moderately susceptible to leaf rust (caused by *Puccinia triticina* Eriks.) depending upon the races present. McVey is moderately resistant to tan spot [caused by *Pyrenophora tritici-repentis* (Died.) Drechs.] and Septoria tritici blotch (caused by *Septoria tritici* Roberge in Desmaz.) on the basis of field observations.

The USDA Spring Wheat Quality Laboratory, Fargo, ND, evaluated bread-making properties of McVey grown in yield trial plots from 1996 through 1998. Compared with 2375, McVey is about 14 g kg^{-1} lower in protein, 36 g kg^{-1} higher in flour extraction, stronger mixing with longer mixing time, and has slightly less loaf volume. Compared with Oxen, McVey is about 13 g kg^{-1} lower in protein, 20 g kg^{-1} lower in flour extraction, weaker mixing, but has similar mixing time and lower loaf volume. The industry evaluations by the Wheat Quality Council in 1997 and 1998 indicated that McVey was somewhat lower in quality than the high quality check, Grandin. Compared with Grandin, McVey was lower in protein (139 vs. 155 g kg^{-1}), similar in flour yield, mixogram water absorption, mixing time, and mixing tolerance, but slightly lower in loaf volume (1516 vs. 1548 cc). Overall quality (1–5 scale:1-lowest to 5-best) was rated 3.6 for McVey compared with 4.0 for Grandin over environments.

The Minnesota Agricultural Experiment Station, St. Paul, MN 55108, will maintain Breeder seed of McVey. Foundation seed will be produced and maintained by the Minnesota Crop Improvement Association, 1900 Hendon Ave., St. Paul, MN 55108. Application has been made for Plant Variety Protection with seed certification option (PVP no. 200000159). Small quantities of seed for research purposes may be obtained from J.A. Anderson.

R.H. Busch,* D.V. Mcvey, G.L. Linkert, J.A. Anderson, J.V. Wiersma, R. Dill-macky, and G.A. Hareland

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Published in Crop Sci. 41:926–927 (2001).

Registration of 'MTHW9420' Wheat

'MTHW9420' (Reg. no. CV-892, PI 612605) is a hard white spring wheat (*Triticum aestivum* L.) developed by the Montana Agricultural Experiment Station. It was developed to complement hard red spring varieties that are traditionally grown in Montana. MTHW9420 was an F_4 plant selection from the cross MT8182/MT8289. MT8182 was a selection from 'Yding', which has the pedigree 'CIANO F67'/'Penjamo T62'// 'Gallo'. MT 8289 was a selection from the cross 'Tanager'/ 'Pichihuila'. Populations from which MT8182 and MT8289 were selected were from the International Maize and Wheat Improvement Center, and both had hard white kernels.

MTHW9420 was tested at five locations in Montana yearly since 1994, along with hard red spring wheat cultivar Hi-Line (Lanning et al., 1992), and hard white spring wheat cultivar

Klasic (PI 486139). A head row–line row purification system was employed in 1997 to increase the variety. In 1999, exclusive license to market the variety was granted to Heartland Seed in Moccasin, MT.

MTHW9420 has white straw and chaff, white glumes, and a lax, awned head. The flag leaf is erect. The kernels are ovate with a medium length and have a brush of medium length. Kernels have a medium V-shaped crease with angular cheeks.

MTHW9420 is susceptible to the wheat stem sawfly (*Cephis cinctus* Nort.) and to the Russian wheat aphid (*Diuraphis noxia* Mordvilko). It is resistant to stem rust (caused by *Puccinia graminus* Pers:Pers) based on screening in Bozeman with races previously collected in Eastern Montana during natural infections from 1980 to 1990. It is moderately susceptible to leaf rust (caused by *Puccinia triticina* Eriks.) based on natural infection in Bozeman in 1997.

MTHW9420 has mid-early maturity with an average heading date of 28 June based on 16 location–years in Montana, similar to Hi-Line, and 3 d later than Klasic. MTHW9420 is a semi-dwarf, with an average height of 73 cm, similar to Hi-Line, and 17 cm taller than Klasic. Yield of MTHW9420 has averaged 4549 kg ha^{-1}. This is ≈200 kg ha^{-1} and 355 kg ha^{-1} more than Hi-Line and Klasic, respectively. Grain volume weight of MTHW9420 averaged 771 kg m^{-3}, vs. 777 and 779 kg m^{-3} for Hi-Line and Klasic, respectively. Grain protein percentage of MTHW9420 has been 133 g kg^{-1}, which is 6 g kg^{-1} lower than Hi-Line, and 4 g kg^{-1} lower than Klasic.

Milling and baking quality of MTHW9420 is acceptable, based on tests by the Montana State University Cereal Quality Lab using grain collected from nine trials conducted from 1994 through 1998. Flour yield of MTHW9420 averaged 685 g kg^{-1}, vs. 663 g kg^{-1} and 688 g kg^{-1} for Hi-Line and Klasic, respectively. MTHW9420 had an average bake water absorption of 720 g kg^{-1}, as opposed to 730 g kg^{-1} and 710 g kg^{-1} for Hi-Line and Klasic, respectively. Loaf volume of MTHW9420 was 1013 cc, while that of Hi-Line and Klasic was 1098 and 1060 cc, respectively. MTHW9420 has partial waxy starch characteristics due to a null *wx* 4A allele.

Breeder seed of MTHW9420 will be maintained by the Montana Foundation Seed Stocks Program, Plant Sciences Department, Montana Agricultural Experiment Station, Montana State University, Bozeman, MT 59717. U.S. Plant Variety Protection has been applied for (PVP Certificate no. 200000138).

S.P. Lanning, D. Habernicht, W.E. Grey, G.R. Carlson, M.E. Giroux, J.L. Eckhoff, G.D. Kushnak, R.N. Stougaard, D.M. Wichman, K. Kephart, and L.E. Talbert*

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S.P. Lanning, D. Habernicht, W.E. Grey, M.E. Giroux, and L.E. Talbert, Plant Sciences Dept., Montana State University, Bozeman, MT 59717; G.R. Carlson, Northern Agr. Res. Center, Star Rt. 36, Havre, MT 59501; J.L. Eckhoff, Eastern Agr. Res. Center, 1501 N. Central Ave., Sidney, MT 59270; G.D. Kushnak, Western Triangle Agr. Res. Center, P.O. Box 1474, Conrad, MT 59425; R.N. Stougaard, Northwestern Agr. Res. Center, 4570 Montana 35, Kalispell, MT 59901; D.M. Wichman, Central Agr. Res. Center, HC-90-Box 20, Moccasin, MT 59462. K. Kephart, Southern Agr. Res. Center, 748 Railroad Highway, Huntley, MT 59037. Research was supported in part by the Montana Wheat and Barley Committee. This is Journal Series no. 2000-35 of the Montana Agricultural Experiment Station. Registration by CSSA. Accepted 31 Oct. 2000. *Corresponding author (usslt@montana.edu).

Published in Crop Sci. 41:927–928 (2001).

Registration of 'Prowers' Wheat

'Prowers' (Reg. no. CV-895, PI 605389) hard red winter wheat (*Triticum aestivum* L.) was developed by the Colorado Agricultural Experiment Station and released to seed producers in September 1997. Prowers was released because of its moderate resistance to the Russian wheat aphid (RWA) [*Diuraphis noxia* (Mordvilko)], superior baking quality, and higher grain yield in Colorado tests. The resistance gene *Dn4* is expressed to a lesser degree in Prowers than it is in 'Halt', 'Yumar' and 'Prairie Red'. In addition, 45 and 53% of Prowers seedlings were scored as symptomatic 14 and 21 d, respectively, after artificial infestation in greenhouse tests (Nkongolo et al., 1991).

Prowers was derived from the crosses and backcrosses CO850060/PI 372129//5*'Lamar' made between 1989 and 1993. PI 372129 is a RWA-resistant landrace selection from Turkmenistan (Quick et al., 1991). CO850060 is a breeding line from the Colorado State University (CSU) breeding program with the pedigree NS14/NS25//2*'Vona', and Lamar (PI 559719) is a cultivar released by CSU in 1988 with the pedigree 74 F878 (Mexican dwarf)/'Wings'//Vona. Backcross progeny were screened for RWA resistance each generation, and resistant plants were used for the next backcross. BC_5F_1 plants were screened for RWA resistance, and selfed during July through October, 1993. BC_5F_2 plants were screened for RWA resistance in January 1994. BC_5F_3 seed was harvested in April 1994, and the BC_5F_3 seedlings were screened for homozygosity for RWA resistance. BC_5F_3 plants were grown for seed increase in the 1995 greenhouse, and BC_5F_4 was planted in the field in the spring at Fort Collins where the line Lamar-R32 was selected to produce seed for the Colorado Variety Trials in 1996, 1997, and 1998. Lamar-R32 was later designated CO940750.

In 3 yr of dryland testing during 1996 to 1998 in the Colorado Variety Trial (10 location–years), Prowers was about equal in grain yield to Lamar (3454 vs. 3440 kg ha^{-1}), a conventional height wheat and the recurrent parent in the crossing program. Prowers is recommended for all production areas in Colorado where RWA is a significant threat and where taller wheats have a yield advantage over semidwarfs.

Prowers is an awned, white-chaffed, medium tall, medium late hard red winter wheat, similar to and indistinguishable from Lamar in all respects except that it is resistant to RWA, and Lamar is susceptible. Prowers is moderately susceptible to the prevalent unknown races of leaf rust (incited by *Puccinia triticina* Eriks.) and resistant to prevalent unknown races of stem rust (incited by *P. graminis* Pers.:Pers.). On the basis of field observations for incidence of wheat streak mosaic virus, Prowers is susceptible and similar to Lamar.

On the basis of composite samples from several Colorado locations in 1999, the flour protein concentration of Prowers (12.6 g kg^{-1}) has been similar to Lamar (12.1 g kg^{-1}). It has strong mixing characteristics as determined by the mixograph (4.0 min to peak). In Colorado milling and baking tests, Prowers has been similar in overall quality to Lamar, a high quality standard.

The foliage of Prowers is green at booting stage with a waxy bloom and yellow anthers at anthesis. The glume is midlong and midwide, with an oblique shoulder and an acuminate beak. The coleoptile color is white, and juvenile growth habit is semi-erect. The kernel is short, red, hard textured, and ovate. The kernel has rounded cheeks, midsize germ, short brush, and a wide, shallow crease, but lacks a collar.

Breeder seed of Prowers will be maintained by the Colorado Agricultural Experiment Station. Prowers has been granted U.S. Plant Variety Protection under P.L. 91-577 with the certi-

fication option (PVP no. 9800366). Small quantities of seed for research purposes may be obtained from the corresponding author and the Soil and Crop Sciences Department, Colorado State University, for at least 5 yr from the date of this publication.

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J.S. Quick, J.A. Stromberger, S. Clayshulte, B. Clifford, and J.J. Johnson, Dep. of Soil and Crop Sciences; F.B. Peairs and J.B. Rudolph, Dep. of Bioagsciences and Pest Management, and K.J. Lorenz, Dep. of Food Science and Human Nutrition, Colorado State University, Fort Collins, CO 80523. Prowers was developed with partial financial support from the Colorado Wheat Administrative Committee. Registration by CSSA. Accepted 30 Nov. 2000. *Corresponding author (jquick@agsci.colostate.edu).

Published in Crop Sci. 41:928–929 (2001).

Registration of 'Prowers 99' Wheat

'Prowers 99' (Reg. no. CV-896, PI 612420) hard red winter wheat (*Triticum aestivum* L.) was developed by the Colorado Agricultural Experiment Station, and released to seed producers in September 1999.

Prowers 99 was derived from a modified bulk procedure following single plant selection during 1997 and 1998 within the cultivar Prowers (1) for improved resistance to the Russian wheat aphid (RWA) (*Diuraphis noxia* Mordvilko). Prowers was derived from the crosses and backcrosses CO850060/PI 372129//5*'Lamar' made between 1989 and 1993. PI 372129 is a RWA-resistant landrace selection from Turkmenistan (Quick et al., 2001). CO850060 is a breeding line from the Colorado State University (CSU) breeding program with the pedigree NS14/NS25//2*'Vona', and Lamar (PI5597190) is a cultivar released by CSU in 1988 with the pedigree 74 F878 (Mexican dwarf)/'Wings'//Vona.

The resistance gene *Dn4* is expressed to a lesser degree in Prowers than it is in 'Halt', 'Yumar', and 'Prairie Red'. In addition, 45 and 53% of Prowers seedlings were scored as symptomatic 14 and 21 d, respectively, after artificial infestation in greenhouse tests (Nkongolo et al., 1991). Therefore, in summer 1997, 200 single head selections were made at random within the cultivar Prowers and planted as headrows in fall 1997 for production of Breeder seed in 1998. Seed subsamples from each of these selections were subjected to two cycles (during fall and winter 1997–1998) of standard RWA greenhouse screening procedures (Nkongolo et al., 1991). The first cycle identified 86 plant selections with resistance to RWA. Progeny testing of these plant selections confirmed RWA resistance in 67 plant selections. In summer 1998, seed of these 67 RWA-resistant plant selections was bulked to form Breeder seed of Prowers 99. Foundation seed was produced in 1998-99 and released to growers in September 1999. Under severe levels of artificial infestation in the greenhouse, Prowers 99 had 12.6% symptomatic plants compared with 53.3% in Prowers. At eight locations in 2000, Prowers and Prowers 99 had almost identical grain yields (2069 vs. 2076 kg ha^{-1}, respectively) and grain volume weights (74.0 vs. 73.7 kg hL^{-1}, respectively).

Prowers 99 is recommended for all production areas in Colorado where RWA is a significant threat and where taller wheats have a yield advantage over semidwarfs.

Prowers 99 is an awned, white-chaffed, medium tall, medium late hard red winter wheat similar to and indistinguishable from Prowers in all respects except that it is more resistant to RWA. Prowers 99 is moderately susceptible to the prevalent unknown races of leaf rust (incited by *Puccinia triticina* Eriks.) and resistant to prevalent unknown races of stem rust (incited by *P. graminis* Pers.:Pers.). On the basis of field observations for incidence of wheat streak mosaic virus, Prowers 99 is susceptible and similar to Prowers.

On the basis of composite samples from several Colorado locations in 1999, the flour protein concentration of Prowers 99 (12.6 g kg^{-1}) has been similar to Prowers (12.1 g kg^{-1}). They have strong mixing characteristics as determined by the mixograph (4.0 min to peak). In Colorado milling and baking tests, Prowers 99 has been similar in overall quality to Prowers, a high quality standard.

The foliage of Prowers 99 is green at booting stage with a waxy bloom and yellow anthers at anthesis. The glume is midlong and midwide with an oblique shoulder and an acuminate beak. The coleoptile color is white and juvenile growth habit is semi-erect. The kernel is short, red, hard textured, and ovate. The kernel has rounded cheeks, midsize germ, short brush, and a wide, shallow crease, but lacks a collar.

Breeder seed of Prowers 99 will be maintained by the Colorado Agricultural Experiment Station. The cultivar has been submitted for U.S. Plant Variety Protection under P.L. 91-577 with the certification option (PVP no. 200000315). Small quantities of seed for research purposes may be obtained from the corresponding author and the Soil and Crop Sciences Department, Colorado State University, for at least 5 yr from the date of this publication.

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Published in Crop Sci. 41:929 (2001).

Registration of 'Trego' Wheat

'Trego' (Reg. no. CV-897, PI 612576) hard white winter wheat (*Triticum aestivum* L.) developed cooperatively by the Kansas Agricultural Experiment Station and the USDA-ARS was released jointly in 1999 by the Kansas, Nebraska, Colorado, and Oklahoma Agricultural Experiment Stations. It is an increase of an F_5 plant selected from the cross KS87H325/

'Rio Blanco' made at Hays, KS, in 1988. KS87H325 was derived from the cross RL6005/RL6008// 'Larned'/3/'Cheney'/Larned/4/'Bennett' sib/5/'TAM 107'. RL6005 and RL6008 are Canadian lines where *Lr16* and *Lr17*, respectively, were backcrossed into a 'Thatcher' background.

Trego is white-chaffed and semidwarf, similar in height and straw strength to 'Jagger'. It heads 5 d later than Jagger, and on the basis of winter survival data collected from western Kansas dryland locations in 1996, Trego's winterhardiness is better than that of Jagger and equal to that of '2137'. Stems of Trego are white and hollow; the flag leaf is erect, not twisted, and has a waxy bloom. Spikes of Trego are tapering, middense, and inclined at maturity with midlong awns. Glumes are white, midlong, and midwide. Shoulders are midwide and elevated. Beaks are acuminate, narrow, and midlong. The kernel is white, hard, and ovate; the germ is small; the crease is narrow and shallow; the cheeks are angular; the brush is midsized and has no collar.

Trego was tested as KS95HW62-6 in Kansas performance tests starting in 1996. It was evaluated in the USDA Southern Regional Performance Nursery in 1998 and 1999. In western Kansas dryland tests from 1997 to 2000 (33 location years), the average grain yields of Trego, Vista, 2137, and Jagger were 4555, 4246, 4119, and 4103 kg ha^{-1}, respectively. Trego is recommended for dryland production throughout western Kansas.

On the basis of field evaluations in Kansas, breeding nurseries, and disease screening nurseries, Trego is resistant to stem rust (caused by *Puccinia graminis* Pers.:Pers. f. sp. *tritici* Eriks & E. Henn), leaf rust [caused by *Puccinia triticina* Eriks.; syn. *P. recondita* Roberge ex Desmaz. f. sp. *tritici* (Eriks. & E. Henn.) D. M. Henderson] and wheat soilborne mosaic virus (SBWMV). It is moderately resistant to wheat spindle streak mosaic virus (WSSMV) and wheat streak mosaic virus (WSMV). It is susceptible to powdery mildew (caused by *Erysiphe graminis* DC. f. sp. *Tritici* Em. Marchal) and wheat curl mite (*Aceria tosichella* Keifer). Trego does not carry the IAL.IRS translocation from 'TAM 107'. Seedling Hessian fly [*Mayetiola destructor* (Say)] tests using the Great Plains biotype indicate that Trego is heterogeneous for resistance.

Milling and bread baking properties of Trego were determined on yearly composite samples from western Kansas locations of the Kansas Intra-state Nursery from 1997 to 1999. In these tests, Jagger and 2137 were used as check cultivars. Trego had very good grain volume weight (80.3 kg hL^{-1}) compared with Jagger (76.8 kg hL^{-1}) and 2137 (77.9 kg hL^{-1}). Trego's 1000 kernel weight (31.5 g) was also higher than that of Jagger (30.3 g) and 2137 (30.6 g). The flour yield from Jagger was slightly higher (716 g kg^{-1}) on the Brabender Quadruamat Sr. Experimental mill than the yield of Trego and 2137 (703 g kg^{-1}). Flour ash and protein were lower for Trego (42 and 105 g kg^{-1}, respectively) than for Jagger (48 and 119 g kg^{-1}) or 2137 (44 and 112 g kg^{-1}). The mixing time of Trego, as measured with the mixograph, was 3.6 min compared with 3.3 min for 2137 and 4.4 min for Jagger. Trego's loaf volume (855 cm^{-3}) was similar to that of 2137 (858 cm^{-3}) and less than that of Jagger (912 cm^{-3}). Scores for internal crumb grain and texture were similar for all three cultivars.

Application has been made for cultivar protection under the U.S. Plant Variety Protection Act, Public Law 91-577. Breeder seed of Trego will be maintained by the Kansas Agricultural Experiment Station at the KSU Agric. Res. Center-Hays, Hays, KS 67601.

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Published in Crop Sci. 41:929–930 (2001).

Registration of 'Barimung-3' Mungbean

'Barimung-3' mungbean [*Vigna radiata* (L.) Wilczek] (Reg. no. CV-182 , PI 614897, formerly Grif 14471) was developed at the Pulses Research Center (PRC), Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur - 1701, Bangladesh, and registered by the National Seed Board (NSB) in 1996 as a high yielding cultivar for cultivation in mungbean growing areas of Bangladesh.

Barimung-3 is a selection from a cross between 'Sonamung' (Bangladeshi landrace) and 'Barimung-2' (released by PRC, BARI in 1987). Selection was made in the F_2 segregating population using the pedigree method. Barimung-3 originated as an F_3 plant selection from selfed progeny of an F_2 plant, bulked in the F_4, and designated as BMX-842243. It was tested in regional yield trials at several locations covering most of the pulse growing areas in Bangladesh over 5 yr (BARI, 1995).

Barimung-3 is a photoperiod-insensitive high-yielding cultivar with tolerance to mungbean yellow mosaic virus (MYMV) and cercospora leaf spot (CLS) [caused by *Pseudocercospora cruenta* (Sacc.) Deighton (= *Cerospora cruenta* Sacc.) or *Cercospora canescens* Ell. & Mart.] disease. It has an erect growth habit with trifoliate leaves that are moderately pubescent. Petiole length is intermediate and greenish–purple. Racemes are situated above the canopy. The corolla of the flower is yellow with a light-green calyx. Mature plants are 50 to 55 cm tall. Flowering occurs in 30 to 34 d after planting and physiological maturity is reached 60 to 65 d after emergence, which is 10 d earlier than the local cultivar (Sonamung). Barimung-3 has 9 to 11 pods per plant, which turn black at maturity. Seeds are drum shaped with greenish–brown seed coats. Seed weight is 29 g/1000 seeds. The average yield of this cultivar is 1.3 Mg/ha, which is 25% higher than the local check (Afzal et al., 1997).

Seed of Barimung-3 was distributed to the Bangladesh Agricultural Development Corporation (BADC) for producing Foundation and Certified seed. Breeder seed will be maintained by the Pulses Research Center, Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur - 1701, Bangladesh. U.S. Plant Variety Protection for Barimung-3 will not be applied for. Small quantities of seed for research purposes may be obtained from the corresponding author for at least 5 yr following the date of this publication.

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Published in Crop Sci. 41:930–931 (2001).

REGISTRATIONS OF GERMPLASM

Registration of High Fiber Strength Cotton Germplasm Line NM970513

NM970513 (Reg. no. GP-714, PI 613344) upland acala cotton (*Gossypium hirsutum* L.) germplasm line was developed by the New Mexico Agricultural Experiment Station and released in 2000. NM970513 will provide plant breeders a new source of genes for bundle fiber strength. NM970513 was selected from the cross 'Acala 1517-95'/NM24052 made in 1994 at the New Mexico Agricultural Experiment Station at Las Cruces, NM. Acala 1517-95 is a high quality acala cultivar with the pedigree Acala 3080/PD2165 (Cantrell and Escabedo, 1997). NM24052 is an experimental line derived from the cross St9/Del Cerro. Del Cerro is a complex population released in 1957 and contains introgression from *G. hirsutum* L., *G. hirsutum* var. *punctatum* (Schumach & Thonn.), *G. barbadense* L., *G. herbaceum* L., and *G. thurberi* Tod. (Smith et al., 1999; Staten, 1971). St9 is a stripper experimental line contributing earliness and compact growth habit to the cross.

In 1995, 122 F_2 plants from the cross Acala 1517-95/NM24052 were selfed in Las Cruces, NM, to produce $F_{2:3}$ progeny. These progeny were evaluated in replicated trials at Las Cruces and Artesia, NM, in 1996. Extensive transgressive segregation was observed in this population for fiber strength (Cantrell et al., 1995). All $F_{2:3}$ lines were grown also in 10-m rows in the genetics nursery at Las Cruces for selfing. Five random plants within each progeny row were selfed to generate $F_{3:4}$ progeny. Five $F_{3:4}$ lines that were selected on the basis of their 1996 fiber bundle strength in the replicated trials were grown in the 1997 Las Cruces genetics nursery. Fifty bolls were bulk harvested from each $F_{3:4}$ progeny row for fiber quality determination. The best 25% of the $F_{3:4}$ progeny rows were selected based on fiber strength and tolerance to Verticillium wilt (caused by *Verticillium dahliae* Kleb.). Five plants within each selected row were selfed to derive $F_{4:5}$ progeny. Open-pollinated seed ($F_{3:5}$) were also bulk harvested from each selected progeny row for 1998 replicated yield trials. NM970513 originated as a bulk of seed from a single $F_{4:5}$ progeny row grown in 1998. Bulked $F_{4:6}$ seeds were grown for multiplication and increase in 1999.

In six replicated tests from 1998 through 1999 in New Mexico, the fiber strength of NM970513 averaged 282.6 kN m kg^{-1} compared with 226.9 kN m kg^{-1} for Acala 1517-95. All fiber data originated from 50-boll hand-harvested samples from each plot. Fiber strength was measured on a plot-basis as the mean of two breaks on a 3.2-mm gauge stelometer (Uster Spinlab model 654) in the New Mexico State University fiber laboratory. Fiber length, short fiber index, and micronaire values of NM970513 and Acala 1517-95 were not different. Fiber elongation for NM970513 was lower than Acala 1517-95 (5.9 vs. 6.8). Samples from replicated tests in 1998 were sent to Starlab in Knoxville, TN, for micro-spinning evaluation. The yarn tenacity for 22-count yarn averaged 175.8 kN m kg^{-1} for NM970513 and 130.3 kN m kg^{-1} for Acala 1517-95. Similar fiber samples were submitted to the Texas Tech University International Textile Center for fineness and maturity testing on the Uster-Advanced Fiber Information System (AFIS). The maturity ratio is the ratio of fibers with a 0.50 (or greater) circularity ratio divided by the amount of fibers with a 0.25 (or less) circularity. The mean maturity ratio of NM970513 was 0.93 and 0.86 for Acala 1517-95. The immature fiber content of NM970513 was 8.5% compared with 11.1% for Acala 1517-95. The mean fiber fineness was 144 Mg M^{-1} (mTex) for both Acala 1517-95 and NM970513. This germplasm line has a very mature fiber, as defined by the AFIS instrumentation.

The lint yield of NM970513 averaged over six replicated trials in New Mexico was less ($P \leq 0.05$) than Acala 1517-95 (1224 vs. 1412 kg ha^{-1}). The handpicked lint percentage averaged 38.3 for NM970513 and 40.8 for Acala 1517-95. NM970513 has large seed with a seed index of 10.1 g. The bolls of NM970513 are ovate and are smaller ($P \leq 0.05$) than Acala 1517-95, 2.21 vs. 2.39 g of lint. The average plant height of NM970513 was 10 cm taller than Acala 1517-95, and the days to maturity of the two were not different. NM970513 has similar levels of tolerance to Verticillium wilt as Acala 1517-95.

Small amounts of seed of NM970513 will be provided upon written request to the corresponding author. Recipients are asked to make appropriate recognition of the source of the germplasm if used for research purposes, or for development of a parental line, cultivar, or hybrid.

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Published in Crop Sci. 41:931 (2001).

Registration of Six Lentil Germplasm Lines with Combined Resistance to Viruses

Six lentil (*Lens culinaris* Medik.) germplasm lines, ILL 74 (Reg. no. GP-208, PI 612870), ILL 75 (Reg. no. GP-209, PI