Registration of 'Vavilov' Siberian Crested Wheatgrass

'Vavilov' Siberian crested wheatgrass [*Agropyron fragile* (Roth) Candargy] (Reg. no. CV-23, PI 583980) was developed by the USDA-ARS Forage and Range Research Lab. at Utah State Univ. and released in cooperation with the Utah Agric. Exp. Stn. and the USDA-NRCS on 1 July 1994. The cultivar was named to recognize the contribution of the N.I. Vavilov Research Institute of Plant Industry, St. Petersburg, Russia (VIR), to the germplasm resources of the USDA-ARS range grass breeding program.

The parental germplasm for Vavilov was derived from accessions originally received from VIR, Stavropol Botanical Garden (Stavropol, Russia), and Eskisehir Plant Breeding Station (Eskisehir, Turkey) and from selections from the cultivar P-27. The C0 breeding population for Vavilov consisted of 10 plants selected from a genetically broad-based population on the basis of green-color retention and vegetative vigor during the late summer under extreme drought conditions on a range site in Box Elder County, Utah. This population was subjected to three cycles of selection for vegetative vigor, response to drought, resistance to diseases and insects, seedling vigor (emergence from deep seeding), seed yield, and plant type. Open-pollinated progenies from 14 selected clonal lines in the third breeding cycle were bulked to form breeder seed.

Seedling vigor of Vavilov, as indicated by establishment in field trials and seedling emergence from deep seedings, is comparable to 'Hycrest' and is consistently better than P-27. It produced significantly more forage dry matter than P-27 in most evaluation trials. Limited data indicate that Vavilov had slightly lower in vitro dry matter digestibility than P-27; however, levels of Mg, Ca, and K in the forage indicate that it was less likely to cause grass tetany in grazing animals than P-27. The cultivar produced 450 kg of seed ha^{-1} when grown in rows 1 m apart on a dryland site that received 350 mm of annual precipitation. Supplemental irrigation increased seed yields ≈50%. At 100% purity, there are ≈330 000 seeds kg^{-1}.

Vavilov is a tetraploid ($2n=4x=28$) and is fully interfertile with cultivars of standard crested wheatgrass [*Agropyron desertorum* (Fisch. ex Link) Schultes], as well as the cultivar Hycrest. Cytological studies show that Siberian crested wheatgrass shares the P genome with diploid ($2n=2x=14$), tetraploid, and hexaploid ($2n=6x=42$) forms of the crested wheatgrass complex. Siberian wheatgrass is a perennial bunchgrass characterized by long, narrow linear spikes. Genetic introgression occurs between Siberian and standard forms in nature, and a gradation between the long, narrow spike of Siberian and the shorter, wider spike of standard forms is evident in Vavilov.

In its native habitat, the Siberian form of crested wheatgrass is more drought-resistant than either standard or fairway crested wheatgrass [*Agropyron cristatum* (L.) Gaertner sensu lato] and is better adapted to sandy soils than other crested wheatgrass types. Vavilov is recommended for semiarid range sites receiving 200 to 450 mm of precipitation annually at altitudes up to 2100 m. Under dryland range conditions, seeding at 8 kg ha^{-1} is recommended.

Breeder, Foundation, and Certified seed classes will be recognized. Breeder seed will be maintained by the USDA-ARS Forage and Range Research Laboratory at Logan, UT. Foundation seed will be produced by the USDA-ARS at Logan and distributed to seed growers by the Utah Crop Improvement Association (Plants, Soils, and Biometeorology Department, Utah State University, Logan, UT 84322-4820). Protection has been applied for under the U.S. Plant Variety Protection Act of 1970 as amended in 1994. Conditions of this license specify that seed of Vavilov can be marketed only as a class of certified seed.

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References and Notes

1. K.H. Asay, D.A. Johnson, K.B. Jensen, N.J. Chatterton, W.T. Hansen, and W.H. Horton, USDA-ARS Forage and Range Res. Lab., Utah State Univ., Logan, UT 84322-6300; S.A. Young, Plants, Soils, and Biometeorology Dep., Utah State Univ., Logan, UT 84322-4820. Cooperative investigations of USDA-ARS and the Utah Agric. Exp. Stn., Logan, UT 84322-4820. Approved as Journal Paper no. 4671. Registration by CSSA. Accepted 28 Feb. 1995. *Corresponding author.

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Registration of 'Douglas' Crested Wheatgrass

'Douglas' is the first cultivar of hexaploid ($2n=6x=42$) crested wheatgrass [*Agropyron cristatum* (L.) Gaertner sensu lato] (Reg. no. CV-22, PI 583979) to be released in North America. It was developed by a research team at the USDA-ARS Forage and Range Research Lab., Utah State University, Logan, UT, and released 1 July 1994 in cooperation with the Utah Agric. Exp. Stn. and the USDA Natural Resources Conservation Service (formerly the SCS). Douglas was evaluated as 6X-BLR. It was named in honor of Douglas R. Dewey, who established the germplasm base for the USDA-ARS grass breeding program at Logan.

The breeding population for Douglas was derived from hybrids between an accession from the former Soviet Union (PI 406442) and four other hexaploid accessions, three from Iran (PI 401076, PI 401080, and PI 401085) and one from Turkey (PI 173622). Accession PI 406442 is characterized by exceptionally broad leaves; it was used as the female parent in all crosses to retain the cytoplasm of this accession in the breeding population.

Two cycles of selection for broad leaf type, vegetative vigor, seed yield potential, and response to pests and drought were carried out in spaced-plant nurseries. The C2 population was screened for seed size and emergence from a 7.6-cm seeding depth. Breeder seed was produced from a composite of 10 selected open-pollinated progenies.

Douglas has larger seed than diploid and tetraploid cultivars, and it exhibited excellent establishment vigor in field evaluation trials. Based on emergence from 7.6-cm planting depth, seedling vigor of Douglas was significantly greater than 'Nordan', 'Fairway', and 'Ephraim' and equivalent to 'Hycrest'. Although it produces less total forage yield, it is leafier and its leaves remain green for a longer period during the growing season than other crested wheatgrass cultivars. Grazing animals preferred Douglas over other crested wheatgrass cultivars under sward conditions. Results from a semiarid range site in western Utah indicate that the in vitro digestibility of Douglas forage was significantly higher than that of other crested wheatgrass cultivars, particularly late in the growing season.

Douglas is not as resistant to drought as Hycrest and Nordan, and it is recommended for range sites receiving at least 250 mm of annual precipitation at altitudes below 2100 m. Under dryland range conditions, a seeding rate of 8 kg ha^{-1} is recommended. Douglas produced ≈400 kg seed ha^{-1} in seed-increase blocks established on dryland sites receiving 350 mm of annual precipitation. With a single irrigation, seed yields of more than 750 kg ha^{-1} have been obtained. This hexaploid cultivar will hybridize with other diploid and tetraploid forms of crested wheatgrass, although the fertility of the hybrid progenies is substantially reduced. Accordingly, isolation from all other crested wheatgrass plants, regardless of ploidy level, is required in seed production fields.

Breeder, Foundation, and Certified seed classes will be recognized. Breeder seed will be maintained by the USDA-ARS Forage and Range Research Lab. at Logan, UT. Foundation seed will be produced by the USDA-ARS at Logan and distributed to seed growers by the Utah Crop Improvement Association (Plants,

Soils, and Biometeorology Dep., Utah State Univ., Logan, UT 84322-4820). U.S. plant variety protection has been applied for under the 1970 act as amended in 1994. Conditions of this license specify that seed of Douglas can be marketed only as a class of certified seed.

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References and Notes

1. K.H. Asay, K.B. Jensen, D.A. Johnson, N.J. Chatterton, W.T. Hansen, and W.H. Horton, USDA-ARS Forage and Range Res. Lab., Utah State Univ., Logan, UT 84322-6300; and S.A. Young, Plants, Soils, and Biometeorology Dep., Utah State Univ., Logan, UT 84322-4820. Cooperative investigations of USDA-ARS and the Utah Agric. Exp. Stn., Logan, UT 84322-4820. Approved as Journal Paper no. 4675. Registration by CSSA. Accepted 28 Feb. 1995. *Corresponding author.

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Registration of 'Fisher' Pinto Bean

'Fisher' pinto bean (*Phaseolus vulgaris* L.) (Reg. no. CV-127, PI 586681) was developed by the Colorado Agricultural Experiment Station. It was released in August 1994 as a new pinto cultivar adapted to the rainfed production region of the San Juan Basin in southwestern Colorado. Fisher was released because it has higher yield potential than 'Cahone' (1), the most prevalent cultivar grown in the San Juan Basin.

Fisher was derived from an F_5 plant selection descended from the cross 'San Juan'/A56-240//'Yellow Jacket'/3/'Olathe'/AR83-2. San Juan was derived from a single plant selection from Yellow Jacket, a landrace grown for many years in the San Juan Basin. A56-240 was a selection from an F_2 population provided by William J. Zaumeyer, USDA-ARS, Beltsville, MD. Olathe is a commercial pinto cultivar released by Colorado State University in 1979 (2). AR83-2 was introduced from Mexico by Zaumeyer and is of unknown origin. During the final development of Fisher, single plants were progeny tested to identify and remove plants segregating for a recessive allele that conditions cream seed color. Plant rows that did not segregate for seed color were bulked and increased for Breeder seed production.

Fisher has a vine growth habit (Type III) (3). It was tested as CZ 59196 for yield and adaptation from 1987 through 1993 at the Southwestern Colorado Research Center (SWCRC), Yellow Jacket, CO. Fisher averaged 84 kg ha^{-1} higher seed yield than Cahone, during six years of tests at the SWCRC. Seed size of Fisher is slightly larger than Cahone, at approximately 35.1 and 33.5 g 100 $seed^{-1}$, respectively. Seed color and shape are similar to Cahone. Fisher is resistant to the Type, Mexican, New York 15, and US3 strains of bean common mosaic virus (M.J. Silbernagel, personal communication). Fisher is susceptible to the prevalent strains of leaf rust [caused by *Uromyces appendiculatus* (Pers.:Pers.) Unger] found in eastern Colorado. Since leaf rust has not been observed in the San Juan Basin, susceptibility should not be a problem in commercial pinto bean fields grown in the San Juan Basin. Physiological and harvest maturity are similar to Cahone.

Fisher was named after the late Adrian G. Fisher, former Superintendent SWCRC, who made the initial selections from among the early segregating generations and was responsible for yield testing and production of the first breeder seed of the cultivar.

Breeder and Foundation seed stocks will be produced and maintained by the Colorado State University Foundation Seed Project located at the Fruita Research Center, Fruita, CO. Classes of seed recognized will be Breeder, Foundation, Registered, and Certified. Application has been made for protection of Fisher under Title V of the U.S. Plant Variety Protection Act of 1970 as amended in 1994. Small seed samples of Fisher for research purposes can be obtained for at least five years from the Colorado Agricultural Experiment Station by writing to the corresponding author.

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Registration of 'Arapaho' Pinto Bean

'Arapaho' pinto bean (*Phaseolus vulgaris* L.) (Reg. no. CV-126, PI 578133) was developed by the Colorado Agricultural Experiment Station. It was released in February 1993 because it possesses field tolerance to white mold disease [caused by *Sclerotinia sclerotiorum* (Lib.) de Bary]. Arapaho has an upright plant architecture (Type II) in most environments, but in highly productive environments it may produce a vine type architecture (Type III) (1).

Arapaho was derived from an F_4 plant selection descended from the cross 'UI 114'/MO19/3/1367-1/N203//'Ouray'. UI 114 and Ouray (2) are commercial pinto cultivars released by the University of Idaho in 1965 and Colorado State University in 1972, respectively. MO19 is a selection from material of unknown pedigree introduced from Mexico. N203 (PI 203958) is a line released for root rot resistance by Oliver Norvell, Carnegie Institute of Washington, Stanford, CA. 1367-1 is an experimental line of unknown pedigree in the Colorado State University breeding program.

Arapaho was tested as CO 80-1744 from 1982 through 1991 in Colorado, and at 37 location-years throughout the USA during 1984–1985 in the Cooperative Dry Bean Nursery. When tested in the Cooperative Dry Bean Nursery, mean plant maturity, seed weight, and yield of Arapaho were 97 d, 36.7 g 100 $seed^{-1}$, and 2961 kg ha^{-1}, respectively, compared with 95 d, 36.4 g 100 $seed^{-1}$, and 2853 kg ha^{-1} for UI 114. Trials conducted in 1988 at the University of Nebraska indicated that Arapaho had 42% white mold infection, compared with a mean of 59% among 26 dry bean entries. In trials conducted at four sites in eastern Colorado in 1990, when white mold infection severely reduced grain yield, Arapaho had an average of 46% plant infection,