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Published in Crop Sci. 45:1167-1168 (2005).

Registration of 'Mustang' Altai Wildrye

'Mustang' Altai wildrye [*Leymus angustus* (Trin.) Pilger], (Reg. no. CV-240, PI 634756) was developed by a research team at the USDA-ARS, Forage and Range Research Laboratory at Utah State University, Logan, UT, and was released on 4 March 2004 in cooperation with the Utah Agricultural Experiment Station. Mustang was evaluated in field trials as M5 and DT-3185. Mustang is recommended for use on arid and semiarid rangelands as a winter forage and a revegetation grass in the Intermountain Region and Northern Great Plains of western USA.

The parental germplasm from Mustang was derived from selections within PI 499650 (DT-3185; 79%), 'PrairieLand' (7%) (Lawrence, 1976), 'Eejay' (7%) (Lawrence et al., 1991a), and 'Pearl' (7%) (Lawrence et al., 1991b). PI 499650 was collected 10 Aug. 1983 by Drs. Douglas R. Dewey and William Tai approximately 50 km southwest of Urumqi on the road to South Mountain, Xinjiang Province, People's Republic of China, at an elevation of 1600 m.

PI 499650 was identified as a superior accession from an evaluation nursery in 1989 near Logan, UT, that contained collections from Russia and all Plant Introductions of Altai wildrye in the National Plant Germplasm System. Spaced-plant source nursery of PI 499650 consisting of 825 plants was established at Bluecreek, UT, in 1990. On the basis of vegetative vigor in 1991, open-pollinated (OP) seed from 112 plants were selected. On the basis of a selection index that included total seed yield and 100-seed weight, seed from 14 single OP plants were selected and 58 seedlings from each plant were established in 1992 at the Evans Research Farm, Logan, UT, in a completely randomized design with 58 replications to initiate cycle-2 selection.

On the basis of vegetative vigor and retention of green leaves under drought, OP seed from 84 cycle-2 plants were selected in 1994. With additional emphasis placed on seed

yield, 100-seed weight, and seedling emergence from a 7.6-cm planting depth (Maguire, 1962), this number was reduced to 66 selected plants. Open-pollinated progeny from these 66 plants were established with representative plants of cultivars PrairieLand, Eejay, and Pearl at Richmond, UT, in 1995. On the basis of vegetative vigor in 1997, OP seed from 65 cycle-3 plants were selected (7%), which included selections from PrairieLand, Eejay, and Pearl. These selections were subsequently screened for seedling vigor (emergence from a deep planting depth) in 1997. On the basis of superior emergence from a deep planting depth, 723 seedlings were recovered representing the 14 best plants and were subsequently established in 1998 at Bluecreek, UT, where equal quantities of seed was bulked from each plant to produce Breeder seed starting in 1999. Breeder seed was produced as described above in 2000, 2001, 2002, and 2003.

Mustang is significantly taller, with longer flag leaves that are oriented higher on the culm than PrairieLand, Eejay, and Pearl. In addition, Mustang is green in color with wider flag leaves and longer inflorescences. Mustang Altai wildrye is a dodecaploid ($2n = 12x = 84$) and has the same ploidy level as the commercially available cultivars PrairieLand, Eejay, and Pearl.

Amplified fragment length polymorphisms (AFLP) (Vos et al., 1995) were used to compare Mustang with other released cultivars of Altai wildrye. The neighbor-joining tree demonstrated that all but one of the 24 Mustang samples group together relative to PrairieLand, Eejay, and Pearl (Page, 1996; DeHaan et al., 2002). The average number of fragments detected in Mustang was not significantly different from Eejay or Pearl (Excoffier et al., 1992; Leonard et al., 1999). However, the average number of fragments in Mustang was significantly less than PrairieLand. Mustang displays more DNA variation than Eejay, Pearl, or PrairieLand. The E.ACAG//M.CTTG primer combination distinguished Mustang from the other cultivars.

Mustang Altai wildrye was evaluated in the Northern Plains Regional Trials (NPA) at Bluecreek, UT; Green Canyon, UT; Mead, NE; Sidney, NE; Mandan, ND; and Miles City, MT, for dry matter forage production, initial stand, and persistence. When combined over six locations and 3 yr, Mustang Altai wildrye (3026 kg ha⁻¹) produced significantly more forage dry matter than cultivars PrairieLand (2394 kg ha⁻¹) and Pearl (2247 kg ha⁻¹) Altai wildrye, Magnar (2220 kg ha⁻¹) and Trailhead (2214 kg ha⁻¹) basin wildrye [*Leymus cinereus* (Scribn. & Merr.) A. Love], and Bozoisky-Select (2525 kg ha⁻¹), Mankota (2434 kg ha⁻¹), and Tetra-1 (2118 kg ha⁻¹) Russian wildrye [*Psathyrostachys juncea* (Fisch.) Nevski]. Within locations, Mustang Altai wildrye consistently produced (not always significant) more dry matter forage than commercially available Altai wildrye cultivars. Combined over six locations and 3 yr in the NPA trials, Mustang Altai wildrye had superior seedling establishment (83%) compared to Pearl (68%) and PrairieLand (64%) Altai wildrye. After 4 yr at Mead and Sidney, NE; Mandan, ND; and Miles City, MT, Mustang (71%) Altai wildrye was more persistent than PrairieLand (39%) and Pearl (50%).

Seedling vigor of Mustang Altai wildrye, as indicated by seedling emergence from a deep planting depth (7.6 cm), was better than PrairieLand and comparable to Pearl. Individual seed weight of Mustang was comparable to PrairieLand and Eejay, but significantly lighter than Pearl. At 100% purity, there are approximately 138 888 seeds kg⁻¹.

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 made available for certified seed production on a

nonexclusive basis to seed producers by the Utah Crop Improvement Association. U.S. Plant Variety Protection will not be pursued for Mustang. It is requested that appropriate recognition be made if this cultivar contributes to the development of a new breeding line or cultivar.

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Published in *Crop Sci.* 45:1168–1169 (2005).

REGISTRATIONS OF GERMPLASMS

Registration of FC201, a Heterogeneous, Disease-Resistant, Monogerm, O-type Sugarbeet Population

Sugarbeet (*Beta vulgaris* L.) germplasm FC201 (Reg. no. GP-246, PI 634018) was developed by the USDA-ARS at Fort Collins, CO, and Salinas, CA, in cooperation with the Beet Sugar Development Foundation (BSDF), Denver, CO. FC201 is a segregating population with a high frequency of the *Rz1* allele conferring resistance to rhizomania caused by *Beet necrotic yellow vein virus*. It is segregating for resistance to root-rotting strains (AG-2-2) of *Rhizoctonia solani* Kühn and to the sugarbeet root aphid (*Pemphigus betae* Doane), has moderate resistance to *Cercospora* leaf spot (caused by *Cercospora beticola* Sacc.), *Aphanomyces* root rot (caused by *Aphanomyces cochlioides* Drechsl.), and *Beet curly top virus*. FC201 is a heterogeneous population from which to select disease-resistant, monogerm, O-type parents to infuse multiple disease resistance on the female side of hybrids. There is no CMS equivalent. FC201 is released from Salinas seed production 01-FC1014 and has been tested as 00-FC1014 and 01-FC1014.

FC201 is an O-type germplasm segregating for self-sterility (*S*^s), hypocotyl color (50% *rr*) and monogermity (90% *mm* in seed harvested from monogerm plants). It is the F₄ of the cross 'C890'aa (Lewellen, 1998) × 'FC708' (Hecker and Ruppel, 1981) (23 F₁ plants) bulked with the cross 'C859'aa (Lewellen, 1995) × 'FC708' (Hecker and Ruppel, 1981) (18 F₁ plants). Seed from both F₁ populations was combined for bulk increase of the F₂ after germination testing to make the parental contribution 25% from C890, 25% from C859, and 50% from FC708. The F₂ seed was planted in Salinas and selected for rhizomania resistance, agronomic performance, and percentage sucrose. The F₃ population was a bulk increase of 25 monogerm plants selected from 600 grown in the field under severe rhizomania conditions and increased in the greenhouse. Seed from the F₃ production was sent to Oregon for steckling production and the F₄ was an increase at Salinas of about 250 stecklings without selection; seed from only male-sterile plants was harvested. Half-sib family grow-outs indicated that the male-sterility was genetic male-sterility (*aa*) and genetic-cytoplasmic male-sterility (CMS). Progeny testing could be used to identify and separate genetic-male sterility from CMS and to produce a near equivalent CMS counterpart to the male fertile, O-type.

FC201 was tested at Fort Collins, CO, in 2002 and 2003 for resistance to *Rhizoctonia* root rot under strong disease pressure (Ruppel et al., 1979). In 2002, the FC201 population was not significantly different from the susceptible check or from the highly resistant check, and individual roots (approximately 30%) were scored as resistant; that is, DI < 3 (DI of 0 = no root rot and 7 = all plants dead). In 2003, the FC201 population was not significantly different from the susceptible check and significantly different from the resistant checks, but again individual roots were scored as resistant. In a greenhouse test for resistance to sugarbeet root aphid at Shakopee, MN, in 2003 again, although the population was not different from the susceptible control, there were a number of roots which were scored as 1 (1 = free from aphids to 4 = heavily infested with aphids).

When tested at Fort Collins, CO, and Rosemount, MN, in 2002 and 2003 for resistance to *Cercospora* leaf spot (Ruppel and Gaskill, 1971), the scores were intermediate (significantly more resistant than the susceptible check and significantly less resistant than the resistant check). Intermediate resistance also was seen when FC201 was tested at Shakopee, MN, in 2002 and 2003 for resistance to *Aphanomyces* root rot. In the BSDF curly top nursery at Kimberly, ID, in 2003, FC201 had a DI of 5.0 over three replications (not statistically analyzed) compared to 'US H11' with a DI of 3.3 and 'Monohikari' with a DI of 7.0 (1 = no damage to 9 = plant dead). When FC201 was tested for O-type, restorer genes were present at a very low frequency.

In observation and evaluation tests at Salinas in 2002 and 2003, FC201 was moderately susceptible to powdery mildew (caused by *Erysiphe polygoni* DC.); intermediate in reaction to *Erwinia* root rot [caused by *Erwinia carotovora* (Jones) Bergey et al. subsp. *betavasculorum* Thomson et al.] with 60 to 70% resistant plants; and moderately susceptible to intermediate for bolting tendency in fall plantings. Sucrose concentration was intermediate to a group of monogerm populations and inbred lines. The canopy of FC201 is dark green with leaf shape similar to FC708.

Breeder seed of FC201 is maintained by USDA-ARS and will be provided in quantities sufficient for reproduction on written request to Sugarbeet Research, USDA-ARS, Crops Research Laboratory, 1701 Center Ave., Fort Collins, CO 80526-2083. Genetic material of this release will be deposited