## Registration of Cucharas Green Needlegrass Germplasm

Cucharas green needlegrass [*Nassella viridula* (Trin.) Barkworth] germplasm (Reg. no. GP-86, PI 632556) was released 13 Jan. 2003 as a selected class of Certified seed (natural track). This class of prevariety germplasm is eligible for seed certification under guidelines developed by the Association of Official Seed Certifying Agencies (AOSCA, 2001). Natural track designation is merited because no intentional selection was practiced on this material. Cucharas was collected and intended for use in the central Great Plains, while the existing cultivars Lodorm (Schaaf and Rogler, 1960, 1970) and AC Mallard originate in North Dakota and Manitoba, respectively. Cucharas represents an improvement in germinability over these cultivars of this predominately self-pollinating species (Johnson and Rogler, 1943). Participating in the release were the USDA-ARS and the Utah Agricultural Experiment Station.

Cucharas was collected and tested under the designation T-872. The collection was made 11 July 1993 by T.A. Jones along highway 10 near Cucharas Junction, Huerfano County, CO (37°39′45″ N, 104°42′10″ W), approximately 7 km northeast of Walsenburg. Associated plant species at the site were the native species western wheatgrass [*Pascopyrum smithii* (Rydb.) A. Löve], blue grama [*Bouteloua gracilis* (Kunth.) Lag. ex Griffiths] and fourwing saltbush [*Atriplex canescens* (Pursh) Nutt.]; the introduced species smooth bromegrass (*Bromus inermis* Leyss.); and introduced weeds such as *Kochia scoparia* (L.) Schrad., *Lepidium* sp., and *Melilotus* sp. Elevation of the site is approximately 1829 m, winterhardiness zone is 6b, and average annual precipitation is 350 to 400 mm.

T-872 was established in May 1994 at Greenville Farm, North Logan, UT, in an evaluation of 32 green needlegrass accessions from Alberta, North Dakota, South Dakota, Montana, Colorado, and New Mexico. In this comparison, T-872's nonprechilled germination was the highest for 1995-harvested seed and third highest for 1996-harvested seed. High seed dormancy is recognized as a factor limiting stand establishment in green needlegrass, and genetic variation for this trait has been established (Rogler, 1960). Studies have found maximal germination after 4 to 5 yr (McWilliams, 1950) and 7 yr (Rogler, 1960) of storage without temperature control.

T-872 was subsequently compared with Lodorm and AC Mallard (seed received from Dr. Paul McCaughey, Agriculture and Agri-Food Canada, Brandon, MB) in a test at Richmond Farm, Richmond, UT, established in April 2000. Seed yield per plant averaged over 2001 and 2003 was 5.64 g for Cucharas, 2.51 g for Lodorm, and 2.50 g for AC Mallard. The 2002 seed crop was lost to shattering. Nonprechilled germination of 2001-harvested seed was 31.9% for Cucharas, 10.8% for Lodorm, and 16.7% for AC Mallard.

Seed from the Greenville Farm evaluation (G1) was used to establish a seed increase (G2), also at Greenville Farm, in September 1998, which was harvested in 2000 and 2001. Seed of the G2 generation will be maintained by the USDA-ARS Forage and Range Research Laboratory, Logan, UT, and seed of G3 and G4 generations will be made available to growers by the Utah Crop Improvement Association. Seed through the G5 generation will be eligible for certification, but sale of Cucharas seed beyond generation G5 is expressly prohibited to limit genetic shift.

Small quantities of seed will be provided to researchers on request to the corresponding author. Appropriate recognition should be made if this material contributes to the development of a new breeding line or cultivar.

T.A. Jones,* D.C. Nielson, and S.A. Young

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## Registration of Ribstone Indian Ricegrass Germplasm

Ribstone Indian ricegrass [*Achnatherum hymenoides* (Roem. & Schult.) Barkw.] germplasm (Reg. no. GP-87, PI 632634) was released 13 Jan. 2003 as a selected class of Certified seed (genetically manipulated track). This class of prevariety germplasm is eligible for seed certification under guidelines developed by the Association of Official Seed Certifying Agencies (AOSCA, 2001). Participating in the release are the USDA-ARS, the Utah Agricultural Experiment Station, and Ducks Unlimited-Canada. Ribstone was evaluated under the experimental designation O-4.

Ribstone was selected from T-918, an accession collected 27 July 1993 by T.A. Jones north of Taber, AB, across the Oldman River from Taber Provincial Park (49°49′15″ N, 112°10′06″ W). The soil at the collection site was a nonsaline (EC = 0.02 S $m^{-1}$), slightly alkaline (pH = 7.8), sand (960 g $kg^{-1}$ sand, 20 g $kg^{-1}$ silt, 20 g $kg^{-1}$ clay). At the time of collection, this accession was noted as featuring an acute glume-pair angle, a trait previously associated with seed retention in the Indian ricegrass cultivar Rimrock (PI 478833) (Whalley et al., 1990; Jones and Nielson, 1992; Jones et al., 1998). High seed retention facilitates improved mechanical seed harvest of Indian ricegrass, a species that exhibits both indeterminate flowering and seed shattering (Jones, 1990). Associated plant species at the site were other native grass species, green needlegrass [*Nassella viridula* (Trin.) Barkw.], needle-and-thread [*Hesperostipa comata* (Trin. & Rupr.) Barkw.], blue grama [*Bouteloua gracilis* (Kunth) Lag. ex Griffiths], western wheatgrass [*Pascopyrum smithii* (Rydb.) A. Löve], thickspike wheatgrass [*Elymus lanceolatus* (Scribn. & J.G. Smith) Gould], and prairie junegrass (*Koeleria cristata* Pers.); shrubs *Rosa* sp. and *Symphoricarpos* sp.; and forbs *Opuntia* sp., *Cleome* sp., and *Dalea* sp.

Indian ricegrass is a self-pollinating species (Jones and Nielson, 1989). The T-918 accession was established at Evans Farm, Millville, UT, in May 1994 in an evaluation of 10 Indian ricegrass accessions collected in Alberta. T-918 had the highest seed yield in 1995 and 1996 and the third and sixth-highest germination following prechill in 1995 and 1996-harvested seed, respectively. Five of the 10 accessions, including T-918, were advanced to a second trial established in April 1997 at Greenville Farm, North Logan, UT. From this planting, 10 of 123 individual T-918 plants were visually selected in 1999 for acute glume-pair angle. Seed from the 10 plants was bulked

to constitute the population O-4 and used to establish a G1 seed increase at Cornish, UT in April 2000. Prechilled germination of 2002 Ribstone germplasm seed produced at Cornish was 66.2%, compared with 33.9% for Rimrock.

The intended area of use for Ribstone is on sandy soils of ecoregion #1 (dry mixed grass), characterized by brown chernozem soils (Strong and Leggat, 1992). This ecoregion occupies an area of southeastern Alberta bordered on the north by about 52°40′ N and on the west by about 112°25′ W, extending into Saskatchewan and Montana. Ribstone is the first release of Alberta material and features excellent germination and seed retention.

Seed of the G1 generation will be maintained by the USDA-ARS Forage and Range Research Laboratory, Logan, UT, and seed of G2 and G3 generations will be made available to growers by Ducks Unlimited-Canada and the Utah Crop Improvement Association. Seed through the G4 generation will be eligible for certification, but sale of Ribstone seed beyond generation G4 is expressly prohibited to limit genetic shift.

Small quantities of seed will be provided to researchers on request to the corresponding author. Appropriate recognition should be made if this material contributes to the development of a new breeding line or cultivar.

T.A. Jones,* D.C. Nielson, S.A. Young, and A. Phan

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## Registration of EL0204 Sugarbeet Germplasm with Smooth-Root and Resistance to Rhizomania

Sugar beet (*Beta vulgaris* L.) germplasm EL0204 (Reg. no. GP-238, PI 632750) was developed by the USDA-ARS, East Lansing, MI, and Salinas, CA, in cooperation with the Beet Sugar Development Foundation, Denver, CO, and released in December 2002. EL0204 shares common ancestry with previously released USDA-ARS smooth-root (SR) germplasm (Theurer, 1993; Saunders et al., 1999, 2000a, 2000b; McGrath, 2003). EL0204 provides a source for development of low soil tare parental lines resistant to rhizomania, caused by *Beet necrotic yellow vein virus*. The smooth-root (SR) character is desirable because less soil adheres to the root surface at harvest, which results in lower soil tare weights, less cost to dispose of tare dirt, and reduced spread of pathogen infested soils (Theurer, 1993). Rhizomania was identified in Michigan sugar beet samples in 2002 (Wintermantel et al., 2003).

EL0204 is a multigerm self-sterile germplasm with predominantly red hypocotyls (>95% red) and an average heterozygosity of 45.7%, determined by analysis of 166 polymorphic molecular markers (Amplified Fragment Length Polymorphisms) from 20 randomly selected plants. EL0204 has a complex pedigree involving five smooth-root developmental populations (92HS19, 92HS22, 92HS31, 92HS32, and 92HS44) as SR donors, and rhizomania resistant C80 (PI 593672) (Lewellen, 1997) as the donor of rhizomania resistance conditioned by *Rz1*, from crosses initiated by J. Clair Theurer, USDA-ARS (retired). The smooth-root developmental populations are open-pollinated progenies of 10 to 22 mother roots from each SR donor line repeatedly mass selected for the smooth-root phenotype between 1989 and 1991, and sucrose concentration of the mother roots determined in 1991 from roots grown at the Michigan State University Soils Farm (East Lansing, MI). The five smooth-root developmental populations share common ancestry through germplasm sources SP85700, and derivative materials, and 8400040 (a high sucrose percentage line provided by American Crystal Sugar Co. Moorhead, MN). The ancestry of 92HS44 also includes L19 and 46I1 germplasm, as described in previous SR germplasm releases (e.g., Saunders et al., 1999, 2000a, 2000b; McGrath, 2003). Individuals showing good expression of the SR character and higher sucrose values from the final round of selection in the smooth root developmental population were mated with individual C80 rhizomania resistance donors in 1993 by bagging their inflorescences to enforce hybridization (e.g., pair crossed). Seed was harvested from individual plants, and planted (plant-to-row) in the 1994 East Lansing steckling nursery, from which 3 to 10 $F_1$ roots from each of 26 steckling rows were mass selected for shallow root sutures. Selected $F_1$ plants were inter-pollinated with their siblings from each plant-to-row plot in the 1994 greenhouse, and $F_2$ seed was planted in the 1995 steckling nursery. Eighteen to 24 unselected stecklings from each $F_2$ family were interpollinated to yield $F_3$ seed. $F_3$ populations were planted in the Salinas, CA, rhizomania nursery in 1997, evaluated, and 123 mother roots with less diseased phenotypes were chosen for seed increase. The 123 roots were divided into two groups of 60 and 63, depending on whether the original maternal parent was the rhizomania resistance donor or was the smooth root donor, respectively. The 1998 seedlots were reselected in Salinas, CA, for resistance to rhizomania, root size, and conformation, and 74 mother roots were combined from the two subpopulations and bulk increased to produce seedlot 99-EL0204. A third cycle of phenotypic mass selection was done on 99-EL0204 to produce seed lot 00-EL0204 from 30 mother roots at Salinas, CA. Seed of 00-EL0204 was tested as 00-EL0204 at Salinas, CA, and EL0204 at Saginaw, MI, in 2001. This seed lot was increased in Oregon in 2002 for release.

EL0204 had a smooth-root score equivalent to the highly smooth-root releases SR87 (PI 607899), SR93 (PI 598075), and SR95 (PI 603947), although the smooth-root character was not as highly expressed at Salinas, presumably because of the larger root size typical of sugar beet grown in California. At Salinas (2001) under rhizomania and leaf spot (caused by *Cercospora beticola* Sacc.) pressures, EL0204 yielded 14 016 kg of sucrose $ha^{-1}$, compared with 5115 kg $ha^{-1}$ for the average of seven previous SR releases and 16 415 kg $ha^{-1}$ for the rhizomania resistant check Y090 (LSD0.05 = 2479). In a Salinas trial (2001) where no disease was present, EL0204 yielded 21 170 kg $ha^{-1}$, compared with 17 488 kg $ha^{-1}$ for the average of seven previous SR releases and 23 785 kg $ha^{-1}$ for the commercial hybrid Beta 4430R (LSD0.05 = 1447). At Sagi-