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AND

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RELEASE OF WHITE RIVER INDIAN RICEGRASS GERMPLASM

The USDA-Agricultural Research Service, USDA-Natural Resources Conservation Service, and the Utah Agricultural Experiment Station announce the release of White River Indian ricegrass (Achnatherum hymenoides [Roem. & Schult.] Barkworth) as a selected class, genetically manipulated track, pre-variety germplasm. This class of pre-variety germplasm is eligible for seed certification under guidelines developed by the Association of Official Seed Certifying Agencies (2001). This alternative release procedure is being utilized because propagation material of specific ecotypes is needed for ecosystem restoration, potential for immediate use is high, and potential for commercial use beyond specific restoration and reclamation objectives is probably limited (Young, 1995). Participating in the release are the USDA-Agricultural Research Service (ARS), the USDA-Natural Resources Conservation Service (NRCS), and the Utah Agricultural Experiment Station (USUAES).

White River is intended for use in restoration, reclamation, and rehabilitation of rangelands in Province M341 (Nevada-Utah Mountains Semi-arid-Coniferous Forest-Alpine Meadow Province), which includes central Nevada, as well as portions of eastern Nevada; central, southern, and eastern Utah; and western Colorado (Bailey, 1995). The parent population of White River, PI 232329, was collected 40 km east of Rangely, CO along route 64 by F.J. Herman and B.M. Leese of the USDA-ARS in 1955. Average annual precipitation at the site is 250 to 300 mm, elevation is about 1650 m, winterhardiness zone is 4a, and heat zone is 5. The site is classified by the USDA-NRCS (Anonymous, 1981) as D34 Major Land Resource Area (Central Desertic Basins, Mountains, and Plateaus), by the USDA-Forest Service (Bailey, 1995) as Province M341 (Nevada-Utah Mountains Semi-arid-Coniferous Forest-Alpine Meadow Province), and by the Environmental Protection Agency (2002) as Level III Ecoregion 20 (Colorado Plateau).

PI 232329 (small seed) was one of two seed morphs collected at the site, along with PI 232330 (large seed), the latter of which has been lost in the National Plant Germplasm System. Seed

polymorphism is common in Indian ricegrass (Jones and Nielson, 1996), and when present the larger seed morph is typically greater in seed dormancy (Jones and Nielson, 1999). PI 232329 was established at Utah State University's Evans Farm (Millville, UT) in the fall of 1992. In 1993 it had the highest seed yield (3.6 g plant-1) of 25 accessions and second highest germination (69%), following a 3-wk 5oC prechill + 2-wk 15oC germination period, of 59 accessions from Alberta, Colorado, Nevada, New Mexico, Oregon, Utah, and Wyoming. Mean and median seed yield were 1.6 and 1.3 g plant-1, respectively, and mean and median germination were 13.6 and 6.5%, respectively.

PI 232329 was tested as Acc:109 near Pinedale, Wyoming in a trial seeded 8 Oct. 1996. Stand averaged over a six-year period (1997-2002) was greater for PI 232329 (8.2%) than for Nezpar (1.9%) or Rimrock (2.8%) ($P<0.05$). For individual years PI 232329 stand exceeded ($P<0.05$) both cultivars in 1998, 1999, and 2002. In 1997 White River exceeded Nezpar ($P<0.05$) but not Rimrock. In 2000 and 2001 there were no differences ($P<0.05$) between the three entries for stand. Over all years, no differences among entries were present for vigor score ($P>0.10$). However, in 1999 Rimrock was significantly poorer ($P<0.05$) in vigor (7.0) than PI 232329 (4.0) with Nezpar intermediate (6.0) but not different from the others. In 2000 PI 232329 was significantly lower ($P<0.05$) in vigor (6.7) than Nezpar (4.7) or Rimrock (4.7). In 2002 PI 232329 was more vigorous (4.7) than Nezpar (7.7) or Rimrock (7.0). Dry-matter yield was measured only in 1999, 2001, and 2002. Differences were only significant in 2002, when Rimrock dry-matter yield was 312 kg ha-1, greater ($P<0.05$) than Rimrock and Nezpar (5 and 0 kg ha-1, respectively).

A 182-plant nursery of PI 232329 was established at Cornish Farm (Cornish, UT) in 1999 and evaluated for germination of seed harvested in 2000 and 2001 and for seed yield in 2001. From these data 32 lines were bulked to form White River (G1). G2 seed of White River was first produced in 2003 at Cornish Farm. Leaf sheaths of White River seedlings are purple, while seedling leaf sheath color is blue (glaucous) and green for Rimrock and Star Lake, respectively.

Seed of the G2 generation will be maintained by the USDA-ARS Forage and Range Research Laboratory, Logan, UT and will be made available to commercial growers for production of G3 to G5 seed by the Utah Crop Improvement Association. Seed through the G5 generation will be eligible for certification, but sale of White River seed beyond G5 is 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. The financial support of the U.S. Department of Agriculture-Forest Service Rocky Mountain Research Station for the development and seed increase of this germplasm is gratefully acknowledged.

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