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Registration of Star Lake Indian Ricegrass Germplasm

Star Lake Indian ricegrass germplasm [*Achnatherum hymenoides* (Roem. & Schult.) Barkworth] (Reg. no. GP-91, PI 636100) was released 1 June 2004 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-ARS, the Utah Agricultural Experiment Station, the USDA-Natural Resources Conservation Service (NRCS), and the U.S. Department of the Interior-Bureau of Land Management (BLM). Star Lake germplasm was tested under the designation T-593 ES.

Star Lake is intended for use in restoration, reclamation, and rehabilitation of rangelands and mined lands in the Colorado Plateau (#20) and Arizona–New Mexico Plateau (#22) Level III ecoregions (Environmental Protection Agency, 2002), which encompass large portions of eastern Utah, western Colorado, northern Arizona, and northwestern New Mexico. Existing cultivars of Indian ricegrass originate at White Bird, ID ('Nezpar') (Booth et al., 1980); Billings, MT ('Rimrock') (Jones et al., 1998); and Pueblo, CO ('Paloma').

The parent population of Star Lake, T-593, was collected 7 July 1988 by T.A. Jones, D.C. Nielson, and R.D.B. Whalley in northeastern McKinley County, New Mexico, near the Continental Divide alongside highway 197, 24 km northwest of Torreon (35°53′ N 107°28′ W). Elevation at the site is 2059 m, average annual precipitation is approximately 250 mm, and winter hardiness zone is 5b. The site is classified by the USDA-NRCS (Anonymous, 1981) as Major Land Resource Area D36 (New Mexico and Arizona Plateaus and Mesas), by the USDA-Forest Service (Bailey, 1995) as Province 313 (Colorado Plateau Semi-Desert Province), and by the Environmental Protection Agency (2002) as Level III Ecoregion 22 (Arizona/New Mexico Plateau). Soil collected at the site was 8.0 pH, 0.05 S m^{-1} electrical conductivity, and sandy loam texture by feel. The site was occupied by big sagebrush (*Artemisia tridentata* Nutt.), rabbitbrush (*Chrysothamnus* sp.), globemallow (*Sphaeralcea* sp.), and cheatgrass (*Bromus tectorum* L.).

After the collection was cleaned, it was noted that T-593 consisted of three seed morphs differing in size and shape. These were termed small elongate (T-593 ES; later named Star Lake), large globose (T-593 GS), and jumbo globose (T-593 JS) (Jones and Nielson, 1999). These true-breeding morphs were twice increased separately in North Logan, UT (G1 and G2 generations). Averaged over 2 yr, seed mass of Star Lake, T-593 GS, and T-593 JS was 2.33, 3.37, and 8.62 mg, respectively, and lemma/palea thickness was 52/49, 93/83, and 181/148 μm, respectively. Because thickness of the lemma and palea is a factor contributing to seed dormancy (Huntamer, 1934; Zemetra, 1979), germination of Star Lake, T-593 GS, and T-593 JS seed of similar age and production environment was 66, 20, and 0%, respectively, averaged over six comparisons by the procedure described by Jones and Nielson (1992).

Seed of Star Lake and 29 other accessions from southern Utah, northern New Mexico, and northern Arizona was harvested from plots at Kaysville, UT, in 1996 and germinated without scarification (3 wk 5°C prechill + 2 wk 15°C germination period) according to Jones and Nielson (1992). Counts were made 13 Mar. 1997. Star Lake was highest in germination (77.0%), with the overall germination mean and median being 11.1 and 1.5%, 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 Star Lake 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.

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