REGISTRATION OF GERMPLASM

Registration of RWR-Tetra-1
Tetraploid Russian Wildrye Germplasm

RWR-Tetra-1 Russian wildrye [Psathyrostachys juncea (Fisch.) Nevskii] germplasm (Reg. no. GP-75, PI 599302) was developed and released in 1997 by the USDA-ARS Forage and Range Research Laboratory in cooperation with the Utah Agricultural Experiment Station at Utah State University (USU). This 26-line composite was released as source material for genetic studies and for the development of improved cultivars of tetraploid (2n = 4x = 28) Russian wildrye. Most Russian wildrye found in natural populations are diploids (2n = 2x = 14) (1). RWR-Tetra-1 traces to 10 parental accessions of Russian wildrye that were initially obtained by K.H. Asay, D.A. Johnson, and M.D. Casler during a collection expedition to Kazakhstan in 1988. Four of these accessions, AJC538, AJC539, AJC540, and AJC601, were identified as natural tetraploids, and the remaining lines, AJC595, AJC596, AJC597, AJC598, AJC599, and AJC600, were described as induced tetraploids. The 10 parental tetraploid accessions of RWR were donated by the N.I. Vavilov Institute of Plant Industry (VIR), St. Peterburg, Russia. The accessions have been entered in the National Plant Germplasm System (NPGS) as PI numbers 565063 to 565072.

The 10 parental accessions were initially evaluated from 1989 to 1992 at the USU Evans Experimental Farm, which receives 330 to 558 mm annual precipitation (1). The 10 parental accessions have significantly heavier seeds, greater seedling vigor, taller stature, and longer and wider leaves than standard diploid Russian wildrye cultivars and the tetraploid cultivar Tetracan. The parental accessions also had better water-use efficiency than the diploid cultivars as determined by C isotope discrimination measurement (1). The unselected tetraploid accessions were equivalent to diploid cultivars in forage and seed yield, phenological development, and forage quality (1).

The 10 parental accessions of RWR-Tetra-1 were established in a space-planted breeding nursery (Cycle-0 population) at the USU Blue Creek Experimental Farm (mean annual precipitation of 369 mm) in northwestern Utah in 1990, where they were evaluated for vegetative vigor, seed size, forage yield, and response to biotic and abiotic stresses. Open-pollinated seed from selected clones was screened for seedling emergence from deep (7.6 cm) plantings in the greenhouse.

The Cycle-1 population consisted of 20 half-sib families (total of 2160 plants) that traced to open-pollinated seed of selected accessions, AJC538, AJC539, AJC540, AJC596, AJC597, AJC598, AJC599, AJC600, and AJC601. The Cycle-1 population was established in 1992 as a space-planted nursery at the USU Evans Experimental Farm. Selection for vegetative vigor, yield, and yield-related characters were evaluated. Dry matter production, yield, and yield-related characters were evaluated for the Cycle-1 population. A Cycle-2 population consisting of 40 half-sib families was established. Seed was harvested from selected plants for the Cycle-2 population.

In environments with 450 to 500 mm of annual precipitation, dry matter production was equal to current cultivars. Yields were evaluated on harsh sites (250 to 350 mm of annual precipitation) and under closer row spacings (0.5 vs. 1.0 m), yielding no significant differences. In environments with 500 to 600 mm of annual precipitation, yields were equal to current cultivars (1). When RWR-Tetra-1 was evaluated on harsh sites (250 to 350 mm of annual precipitation) and under closer row spacings (0.5 vs. 1.0 m), yields were equal to or greater than existing diploid cultivars. Spike characteristics are similar to existing diploid Russian wildrye.

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Seed stocks of RWR-Tetra-1 are maintained by the USDA-ARS, Forage and Range Research Laboratory, Utah State University, Logan, UT 84322-6300, and are available upon request. Genetic material of this germplasm is also available for research purposes, including the commercialization of new cultivars. It is requested that recognition be made if this germplasm contributes to the development of a new breeding line or cultivar.


References and Notes