UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Washington, D.C.

And

Utah Agriculture Experiment Station
Utah State University
Logan, New Hampshire

And

United States Department of Agriculture
Natural Resources Conservation Service
Bozeman, Montana

And

United States Department of Agriculture
Natural Resources Conservation Service
Ecological Sciences Division
Washington, D.C.

And

Upper Colorado Environmental Plant Center
Meeker, Colorado

NOTICE OF RELEASE OF CONTINENTAL 'BASIN WILDRYE'

The USDA Agricultural Research Service (ARS), the Utah Agricultural Experiment Station, the USDA Natural Resources Conservation Service (NRCS), and the Upper Colorado Environmental Plant Center (UCEPC) announce the cultivar release of 'Continental' basin wildrye (Leymus cinereus [Scribn. & Merr.] A. Love). Continental was tested under the experimental designation L-45.

Basin wildrye consists of two chromosome races, tetraploid (2n=28) and octoploid (2n=56), that are mostly allopatric. The octoploid race is more limited in distribution, found west of the continental divide in British Columbia, Washington, Oregon (outside of the Great Basin), and northeastern California. The tetraploid race is found elsewhere, namely Oregon (inside the Great Basin), Nevada, southern Idaho, Utah, Colorado, Wyoming, Montana, Alberta, and Saskatchewan. Two cultivars have been released to date, Trailhead (Cash et al., 1998), a tetraploid originating near Roundup, Montana, and Magnar (Alderson and Sharp, 1994), an octoploid originating in southeastern British Columbia. Washoe Germplasm, a tetraploid originating in western Montana, has also been released.

The primary characteristic limiting the use of basin wildrye has been relatively poor stand establishment resulting from inadequate germination and seedling vigor (Evans and Young, 1983). Material is needed with improved stand establishment. Because of its improved seedling vigor and establishment, the octoploid Continental is expected to be a viable alternative to the octoploid Magnar, and to increase the seeding of basin wildrye overall. Continental is intended for use in restoration, reclamation, and rehabilitation of rangelands in the Intermountain Region where Magnar is adapted. Because it was developed by bridging a genetic barrier between two chromosome races, Continental qualifies for the tertiary restoration gene pool (Jones, 2003). Use of the tertiary restoration gene pool is preferred when use of primary or secondary restoration gene pools are not feasible or not expected to succeed. Primary beneficiaries are expected to be land management agencies, ranchers, landowners enrolled in USDA conservation programs, and the seed industry.

Continental traces to a cross (L-28) generated by pollinating an induced octoploid line with the natural octoploid, Magnar. The female parent of the cross was induced by chromosome-doubling germinating seeds of Trailhead using the technique described by Jones et al. (1997). The objective of the cross was to generate heterosis between the two historically isolated chromosome races (ploidy levels), similar to the approach used to develop 'Hycrest' crested wheatgrass (Agropyron cristatum [L.] Gaertn. X A. desertorum [Fisch. ex Link] Schult.) (Asay et al., 1985). Two cycles of recurrent selection (L-44, L-45) were completed on L-28 at North Park Farm, Hyde Park, Utah, after a single generation of recombination. A 935-plant nursery of L-28 was established 3 May 2001 on 0.7-m centers. In 2002, five spikes of an unspecified number of plants with at least 10 spikes were harvested in bulk to form L-44. Nine-hundred and eighty plants of L-44 were started in the greenhouse, and the last 411 to produce a second tiller were discarded. In 2003, a 540-plant spaced-plant nursery on 0.5-m centers was established from the remaining plants. On 11 June 2004, 80 plants were selected visually based on superior vegetative vigor and upright growth habit. Heads were removed from the unselected plants before pollination, and seed was harvested in bulk as L-45.

Continental was compared to Magnar and Trailhead in fall 2004 plantings at Oak Creek (upper exclosure), Millard Co., UT; at Land's End Trail near Whitewater, Mesa Co., CO. They were compared in a fall 2005 planting at the Shell site near Pinedale, WY. They were compared in fall 2006 plantings near Bluebell, Duchesne Co., UT; and near Beaver, Beaver Co., UT. They were compared in a spring 2007 transplanting in a rain-out shelter near Providence, UT. At Oak Creek, Continental stand percentage was 42.4% on 9 May 2005, greater than ($P<0.05$) 18.6% and 11.8% for Trailhead and Magnar, respectively. On 9 May 2006, Continental stand percentage at Oak Creek was 55.8%, greater than ($P<0.05$) Magnar (15.0%) but not greater than ($P>0.05$) Trailhead (34.2%). On 8 June 2007, Continental stand percentage at Oak Creek was 59.7%, greater than ($P<0.05$) Trailhead (31.9%) and Magnar (22.2%). At Land's End on 28 June 2005, stand rating (1-5 scale with 5 being best) for Continental was 2.75, greater than ($P<0.05$) Magnar (1.75) but not greater than ($P>0.05$) Trailhead (2.25). Likewise, at Land's End on 10 May 2006, percentage stand for Continental was 65.0%, greater than ($P<0.05$) Magnar (25.3%) but not greater than ($P>0.05$) Trailhead (60.0%). At the Shell site on 5-6 July 2006, cover percentage for Continental was 28.8% greater than ($P<0.05$) Washoe Germplasm (19.4%) and Trailhead (16.0%) but not greater than ($P>0.05$) Magnar (22.9%). Near Bluebell, Continental stand percentage on 24 July 2007, was 28.3%, similar to Trailhead (26.3%) but greater than ($P<0.05$) Magnar (5.8%). Near Beaver stand percentage on 24 May 2007 was similar for Trailhead (61.7%), Continental (61.2%), and Magnar (42.8%). In a rain-out shelter trial near

Providence, UT, transplanted 25 April 2007 and harvested 14 Sept. 2007, Continental biomass was 23.6 g per plant, similar to Trailhead (22.1), but less than ($P<0.05$) Magnar (28.4). Continental (2n=56) can be differentiated from Trailhead and Washoe Germplasm (2n=28) by its chromosome number. Continental can also be distinguished from other released basin wildrye materials because it segregates for glaucousness. Of 232 Continental plants examined in the breeder seed field, 162 (69.8%) were glaucous, which fits a x2 ratio at the 5% level for 3 glaucous: 1 nonglaucous. In basin wildrye, octoploid materials, e.g., Magnar, are generally glaucous, and tetraploid materials, e.g., Trailhead and Washoe Germplasm are generally nonglaucous. Continental can be distinguished from mixtures of glaucous and non-glaucous releases because it is uniformly octoploid regardless of glaucousness, while mixtures would be variable in ploidy with glaucous plants being octoploid and non-glaucous plants being tetraploid. Breeder seed will be maintained by the USDA-ARS Forage and Range Research Laboratory, Logan, UT, and will be made available to commercial growers by the Utah Crop Improvement Association for production of foundation, registered, and certified seed. 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.

R. Paul Rasmussen — 3-10-08

Director, Utah Agriculture Experiment Station
Utah State University — Date

Dave Kost — 4/1/08

Director, Natural Resources Conservation
Service, United States Department of Agriculture
Bozeman, Montana — Date

Robert T. Eberhardt for — 4-14-08

Director, Natural Resources Conservation
Service, United States Department of Agriculture
Washington, D.C. — Date

Director, Upper Colorado Environment Plant
Center, Meeker Colorado — Date

Deputy Administrator, Agriculture Research Service U.S. Department of Agriculture	Date