

## PLANT MATERIALS TECHNICAL NOTE

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### INDIAN RICEGRASS *Achnatherum hymenoides*

#### A Native Conservation Grass for Use in the Northern Great Plains and Rocky Mountains

Roger M. Hybner, Research Agronomist, NRCS Bridger Plant Materials Center



Figure 1. Rimrock Indian ricegrass field at the Bridger Plant Materials Center

#### General Description

Indian ricegrass is a short-lived perennial, cool-season, bunchgrass with densely tufted culms typically growing one to three feet tall. The leaf blades are slender, usually rolled and with membranaceous ligules (1/4-inch long). The diffuse panicle has dichotomously branched, thin pedicels. The floret glumes remain on the inflorescence after seed drop giving the inflorescence a characteristic appearance in the fall. The seeds are dark brown to black in color, subtended by white pilose hairs. Indian ricegrass has deep, extensive, fibrous roots, capable of adjusting to shifting sands by elongating basal internodes and producing adventitious roots at these nodes.

#### Adaptation or Range

Indian ricegrass' adaptation extends from the northern Great Plains west across the Rocky Mountains to the Columbia Plateau and Snake River Plain, south into Mexico, and north through the prairies of southern Alberta and Saskatchewan into the Yukon. It prefers sandy soils that are neutral to mildly saline, with low water-holding capacity, and with few rock fragments. Indian

ricegrass is moderately tolerant of alkaline soils and is drought tolerant. It does best with average annual precipitation ranging from eight to 14 inches, but is found in areas with as little as six inches, as well as on sites well above 14 inches. Its elevation range is from 2,000 to 10,000 feet, but it does not grow well above approximately 7,000 feet in elevation. It is very winter hardy and survives late season fires without damage once it is dormant. It commonly grows in association with big sagebrush (*Artemisia tridentate* complex), saltbush (*Atriplex* spp.), winterfat (*Krascheninnikovia lanata*), juniper (*Juniperous* spp.), needle and thread (*Hesperostipa comata*) and other needlegrasses, bluebunch wheatgrass (*Pseudoroegneria spicata*), Snake River wheatgrass (*Elymus wawawaiensis*), thickspike and streambank wheatgrass (*Elymus lanceolatus*), western wheatgrass (*Pascopyrum smithii*), and blue grama (*Bouteloua gracilis*).

## Conservation Uses

Indian ricegrass can be used in range renovation, wildlife enhancement, critical area seedings, and restoration plantings. Spring growth is initiated in late April and is relished by both livestock and wildlife. It is a preferred feed for cattle, horses and elk in all seasons. It is preferred by sheep, deer and antelope in the spring, late fall and winter. Crude protein levels during the growing season range from 11% in early June to 5% in late August. Dormant winter forage levels decrease to four percent. Indian ricegrass is readily utilized as winter forage in the high deserts of Wyoming.

Indian ricegrass can be used in seed mixtures for the reclamation of disturbed sandy sites where, with needle and thread grass, it is considered a natural early seral or pioneer species. On sand dune sites, Indian ricegrass can be the major grass component of the establishing plant community with natural reseeding occurring over time. Indian ricegrass produces an abundance of plump seed with protein levels of 15 to 17 percent. This seed is excellent food for upland game birds and songbirds. Small mammals cache the seeds for winter utilization. Indian ricegrass can be planted with, or adjacent to, taller plants for food and cover for a wide variety of wildlife. Indian ricegrass was commonly used as a food source by Native Americans in the Southwest and Great Basin regions. Flour made from seed of Indian ricegrass (know as Wye or Wai to the Paiute, Shoshone and Ute tribes) was used to make a mush with a pleasing, nutlike flavor. Montana State University-Bozeman has determined flour derived from Rimrock Indian ricegrass is gluten free. This flour ("Montina") is commercially available for use by people who are gluten intolerant.

The tufted growth form and attractive seed heads make Indian ricegrass a favorable species for roadside, campground and Xeriscape® plantings.



Figure 2. Indian ricegrass.



Figure 3. Indian ricegrass seedhead.

### **Ease of Establishment**

Seeds have a thick seed coat and embryo dormancy making them long-lived but slow to germinate. Stands may require two to five years to fully establish. Seed dormancy is reduced with time (four to six years) and cold:moist chilling (stratification). Therefore, dormant fall planting (after October 15<sup>th</sup>) is the standard recommendation because it provides natural stratification over winter with the additional benefit of early spring precipitation providing soil moisture for establishment. Seed four to six years old may have less dormancy than freshly harvested lots and can sometimes be used for an early spring seeding. A current seed test will determine the percent dormant or hard seed in a given lot. Seeding Indian ricegrass from June to September is not recommended.

### **Stand Establishment**

The recommended seeding rate for a full, single species stand of Indian ricegrass is eight pounds pure live seed (PLS) per acre based on approximately 162,000 seeds per pound and a target of 24 PLS per square foot (equal to 24 PLS per linear foot at 12-inch row spacing). Plant into a firm weed-free seedbed to a depth of one-half to one inch on medium- to fine-textured soils, or one to three inches on coarse-textured soils. On coarse-textured soils with low moisture-holding capacity, the deeper planting often places the seeds in moist soil, prevents desiccation, and therefore supports germination and establishment. Deeper placement may also facilitate stratification and reduce seed predation by rodents.

Seedling vigor is fair to good. Grazing of new stands should be deferred until plants are reproductive, at least until late summer or fall of the second growing season. Stands benefit from moderate grazing in the winter and early spring, but livestock should be removed while there is still enough growing season moisture to promote recovery. Allow four inches of stubble to remain after grazing or harvesting. Indian ricegrass stands decline rapidly when overgrazed. Plants are short-lived, and stand perpetuation depends on seed production and the maintenance of a viable seed

bank in the soil. Rest or deferment of grazing every two to three years is recommended to allow seed production and enhance seed accumulation in the soil. After nine years of this management, the seed bank should have a wide range of dormant and non-dormant seeds ensuring long-term stand survival.

### **Limitations**

Indian ricegrass is very sensitive to over-grazing. It does not tolerate poorly-drained soils, extended periods of inundation, winter flooding, and it is not shade tolerant.

### **Cultivars, Improved and Selected Materials:**

'Rimrock' was collected north of Billings, Montana, from a sandy site at 3,600 feet elevation averaging 10 to 14 inches annual precipitation. It was released in 1998 by the Bridger Plant Materials Center (PMC) in cooperation with the Agricultural Research Service in Logan, Utah, and the Montana and Wyoming Agricultural Experiment Stations. The acute angle of the floret glumes retains mature seed longer in the inflorescent reducing wind or rain seed shatter better than 'Nezpar' and 'Paloma'. Rimrock is also more persistent in medium- and heavy-textured soils than Nezpar or Paloma.

'Nezpar' was collected from west central Idaho and released by the Idaho PMC in 1978. It is adapted to gravelly to sandy to loamy soils with greater than seven inches annual precipitation in the Northwest and intermountain regions. It notably has abundant leaves, robust stems, and elongated seeds that are small, dark, and nearly hairless. Less than 50 percent of seed is dormant or hard. Seedling vigor is excellent.

'Paloma' was collected from south central Colorado from a medium-textured soil at about 5,000 feet elevation and released in 1974 by the New Mexico PMC and the New Mexico Agricultural Extension Service. It is adapted to the Southwestern regions of the United States and considered the best Indian ricegrass for that region. It is very drought tolerant and has good seedling vigor. Seed production is good, and plants are long-lived providing good forage and good re-growth and spring recovery. It is not the preferred cultivar for Montana and Wyoming plantings.

### **Additional Information**

Plant Guide for Indian ricegrass, *Achnatherum hymenoides*, electronic availability at <http://plants.usda.gov>.

Plant Fact Sheet for Indian ricegrass, *Achnatherum hymenoides*, electronic availability at <http://plants.usda.gov>.

For proper seed source selection, see Montana Plant Materials Technical Note MT-67, *Seed Source Selection, Use of Certified Seed, and Appropriate Seed Release Class Improve Conservation Planting Success* on the Montana NRCS or national Plant Materials web sites.

For Seeding Rates and Recommended Cultivars, see Montana Plant Materials Technical Note MT-46 (Revision 3) at the Montana NRCS web site under publications.

For the proper cultural practices and grazing guidelines, see MSU EB-19: *Dryland Pastures in Montana and Wyoming – Species and Cultivars, Seeding Techniques and Grazing Management*. Electronic availability at <http://www.plant-materials.nrcs.usda.gov/pubs/mtpmcpu1138.pdf>.