

## WESTERN WHEATGRASS

*Pascopyrum smithii* (Rydb.) A. Love  
Plant Symbol = PASM

Contributed by: USDA NRCS Idaho State Office & the National Plant Data Center



Robert Mohlenbrock  
USDA, NRCS, Wetland Science Institute  
© PLANTS

### Alternate Names

*Agropyron smithii*, *Elytrigia smithii*

### Uses

**Grazing/rangeland/hayland:** Western wheatgrass is palatable to all classes of livestock and wildlife. It is a preferred feed for cattle, horses, deer, and elk in spring and is considered a desirable feed for sheep and antelope in spring. It is considered a desirable feed for cattle, horses, and elk in summer, fall and winter. In spring, the protein levels can be fairly high and decreases as it matures and cures out. This

species is generally a relatively low forage producer, but can be utilized as native hay.

**Erosion control/reclamation:** Western wheatgrass is well adapted to stabilization of disturbed soils because of its strong spreading rhizomes. It does not compete well with aggressive introduced grasses during the establishment period, but is very compatible with slower developing natives such as bluebunch wheatgrass (*Pseuoroegneria spicata*), thickspike wheatgrass (*Elymus lanceolatus* ssp. *lanceolatus*), streambank wheatgrass (*Elymus lanceolatus* ssp. *psammophilus*), and needlegrass species (*Nasella* spp., *Stipa* spp., and *Ptilagrostis* spp.). Stands are generally slow to develop and may be non-existent the establishment year. However, over 50 percent stands are typically achieved by the end of the fourth growing season. Poor germination accounts for the poor initial establishment and strong rhizome spread accounts for stand development in later years. Its relative drought tolerance combined with strong rhizomatous root systems and adaptation to a variety of soils make this species ideal for reclamation in areas receiving 12 to 20 inches annual precipitation. Its low growth form, vigorous sod, and low maintenance requirements make it ideal for ground cover purposes. This grass can be used in urban areas where irrigation water is limited to provide ground cover and to stabilize ditchbanks, dikes, and roadsides.

### Status

This is a native species. Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status, such as, state noxious status and wetland indicator values.

### Description

**General:** Grass Family (Poaceae). Western wheatgrass *Pascopyrum smithii* (Rydb.) A. Love (formerly) is perhaps one of the best known and most common of our native grasses. It is long-lived with an extensive, very strong, rhizomatous root systems combined with a few deep roots.

Stems arise singly or in small clusters and grow from 1 to 3 feet tall. The sheaths are hairy and the purplish auricles are clawlike and clasp the stem. The seed spike is stiff, erect and about 2 to 6 inches long. The awn-tipped (to 5mm) lemmas, paleas and glumes are generally glabrous or short-hairy. The ligule is inconspicuous and leaves are flat, very rough on the

upper surface and margins, blue-green in color, with very prominent veins. Because of this bluish color, western wheatgrass is sometimes called bluestem or bluejoint wheatgrass.

### Distribution

It is a cool season perennial grass common to moist, sometimes saline to saline-sodic, medium to fine textured soils in the Great Plains, Southwest, and Intermountain regions of the western United States. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

### Establishment

**Adaptation:** Western wheatgrass is similar to thickspike and streambank wheatgrasses in appearance. However, it is coarser, its rhizomatous trait is more aggressive, and its coloration is blue-green rather than green. It is not as drought tolerant as thickspike or streambank wheatgrass.

In comparison to thickspike and streambank wheatgrasses, it greens up and heads out later and total biomass production is generally higher. Thickspike and streambank wheatgrasses do better on medium to coarse textured soils. Streambank wheatgrass can be found on slightly heavy to medium to coarse textured soils.

Western wheatgrass may be a better choice on heavy textured soils if rainfall is high enough.

Western wheatgrass tolerates saline and saline-sodic soil conditions, poor drainage, and moderately severe drought. It will tolerate spring flooding, high water tables, and considerable silt deposition. It is very cold tolerant, moderately shade tolerant, and tolerant of fire if in the dormant stage. Recovery from fire however, is slow. It will not tolerate long periods of inundation.

On native sites western wheatgrass is most abundant in the 10 to 20 inch annual precipitation zones. Seeded varieties do best with 12 to 20 inches of precipitation. The natural geographic range of western wheatgrass is from southern Ontario and northern Minnesota, west to British Columbia, and

south to west central California and western Texas from 1000 to 9000 feet elevation. Western wheatgrass is a component of many native plant communities and grows in association with blue grama (*Bouteloua gracilis*), buffalograss (*Buchloe dactyloides*), needlegrasses (*Stipa* spp.), bluebunch wheatgrass (*Pseudoroegneria spicata*), rough fescue (*Festuca scabra*), Idaho fescue (*Festuca idahoensis*), prairie junegrass (*Koeleria cristata*), and basin wildrye (*Elymus cinereus*).

**Planting:** Seed of western wheatgrass should be seeded with a drill at a depth of  $\frac{3}{4}$  to  $\frac{1}{2}$  inch or less on medium to fine textured soils. Single species seeding rates recommended for western wheatgrass is 6 to 12 pounds Pure Live Seed (PLS) or 13 to 26 PLS per square foot. If used as a component of a mix, adjust to percent of mix desired. For mined lands and other harsh critical areas, the seeding rate should be increased to 18 to 23 pounds PLS or 40 to 50 PLS per square foot. Mulching and light irrigations are beneficial for stand establishment.

The best seeding results are obtained from seeding in very early spring on heavy to medium textured soils or in late fall on medium to light textured soils. Late summer (August - mid September) seedings are not recommended unless irrigation is available. It can also be established using sod. Seedling vigor is poor to fair; stands are generally slow to develop and may be non-existent the establishment year. However, over 50 percent stands are typically achieved by the end of the fourth growing season. Poor germination accounts for the poor initial establishment and strong rhizome spread accounts for stand development in later years.

It is moderately compatible with other species and can be used in seeding mixtures. It should not be seeded with strongly competitive introduced species. Under favorable conditions it can become a good weed barrier.

Stands may require weed control measures during establishment, but application of 2,4-D should not be made until plants have reached the four to six leaf stage. Mow when weeds are beginning to bloom to reduce seed development. Grasshoppers and other insects may also damage new stands and use of pesticides may be required.

### Management

Western wheatgrass "greens up" in March to early April and matures in mid-July to August. It makes good spring growth, fair summer growth and good fall growth if moisture is available.



B&W  
Texas A&M Univ. (1997)

Western wheatgrass is palatable to all classes of livestock and wildlife. It is a preferred feed for cattle, horses, deer, and elk in spring and is considered a desirable feed for sheep and antelope in spring. It is considered a desirable feed for cattle, horses, and elk in summer, fall, and winter. In spring, the protein levels can be fairly high and decreases as it matures and cures out. This species is generally a relatively low forage producer, but can be utilized as native hay in areas where it is dense. Irrigation will improve western wheatgrass stands and aid in stand establishment. Weed control and fertilization help with stand establishment and overall production.

Established stands can withstand heavy grazing. Rotational grazing systems on western wheatgrass are recommended and 40 to 50 percent of the annual growth (3 to 4 inch stubble) should remain following grazing. Stands of western wheatgrass should not be grazed until they have firmly established. Six inches of new growth should be attained in spring before grazing is allowed in established stands.

Western wheatgrass is a low maintenance plant requiring little additional treatment or care. However, on better sites, stands can become sodbound and may need attention in the form of fertilization and moderate spring/fall deferment. Stands may also benefit from ripping if sodbound conditions occur to increase forage production. Care should be taken to avoid excessive tillage, because stands may be damaged.

Once established, western wheatgrass is very competitive with weedy species. Its primary pests include grasshoppers, ergot, and stem and leaf rusts.

*Environmental Concerns:* Western wheatgrass is long-lived, spreads primarily via vegetative means (rhizomes), but also may spread via seed distribution. It is not considered "weedy", but can spread into adjoining vegetative communities under ideal climatic and environmental conditions.

### **Seed Production**

Seed production of western wheatgrass has been very successful under cultivated conditions. Row spacing of 24 to 36 inches are recommended (although rhizomatous, it should be maintained in rows). Cultivation will be needed to maintain rows.

Seed fields are productive for three to five years. Average production of 75 to 150 pounds per acre can be expected under dryland conditions in 14 inch plus

rainfall areas. Average production of 150 to 300 pounds per acre can be expected under irrigated conditions. Harvesting is best completed by direct combining or swathing in the hard dough stage, followed by combining of the cured windrows. Stands are prone to lodging and careful application of irrigation is recommended. Seed is generally harvested in late July to mid August.

### **Cultivars, Improved and Selected Materials (and area of origin)**

Foundation and registered seed are available through the appropriate state Crop Improvement Association or commercial sources to grow certified seed.

'Arriba' western wheatgrass was released for dryland hay production, grazing, and conservation seedings in the western part of the Central Great Plains and Southwestern United States. It was collected from native plants growing near Flagler, Colorado. Seed is commercially available and the USDA, NRCS Plant Materials Center, Los Lunas, New Mexico maintain Breeder and Foundation seed.

'Flintlock' western wheatgrass is a broadbased cultivar derived from seed collections made in Kansas and Nebraska. It is recommended for conservation seeding, dryland hay production, and grazing in the Central Great Plains. Seed is commercially available.

'Barton' western wheatgrass was a native collection from clay bottomlands in central Kansas. It is a strongly rhizomatous, leafy accession with intermediate growth between the northern and southern types. Barton is high in forage and seed production. Commercial seed is available. Breeder and Foundation seed is maintained at the USDA, NRCS Plant Materials Center, Manhattan, Kansas.

'Rosana' western wheatgrass is a northern type collected in east-central Montana near Forsythe. It was selected for seedling vigor and ease of establishment. Rosana is recommended for reseeding depleted rangelands and the reclamation of disturbed land in the Northern Great Plains and Intermountain regions. Rhizomes produce a tight sod. Seed is commercially available. Breeder and Foundation seed is maintained at the USDA, NRCS Plant Materials Center, Bridger, Montana.

'Rodan' western wheatgrass is a northern type originating from seed collected on the Missouri River bottom in central North Dakota. It was selected for drought-tolerance, leafiness, and forage vigor. It is moderately rhizomatous and forms dense swards.

Leaves are thinner and less heavily veined than other released cultivars. It was developed by USDA, ARS, Northern Great Plains Research Center, Mandan, North Dakota, in cooperation with USDA, NRCS Plant Materials Center, Bismarck, North Dakota, and the North Dakota Agricultural Experiment Station. Seed is commercially available. Breeder and Foundation seed is maintained at USDA, NRCS Plant Materials Center, Bismarck, North Dakota.

'Walsh' western wheatgrass was released by Agriculture Canada, Lethbridge, Alberta. It was selected for rhizome development, freedom from disease, and improved forage and seed yields. It is a northern type originating from seed collected in the Northern Great Plains of southern Alberta and Saskatchewan, Canada. Seed is commercially available.

Contact your local Natural Resources Conservation Service (formerly Soil Conservation Service) office for more information. Look in the phone book under "United States Government." The Natural Resources Conservation Service will be listed under the subheading "Department of Agriculture."

#### References

Alderson, J. & W.C. Sharp 1994. *Grass varieties in the United States*. Agriculture Handbook No. 170. USDA, SCS, Washington, D.C.

Carlson, J.R. & M.E. Barkworth 1997. *Elymus wawawaiensis: a species hitherto confused with Pseudoroegneria spicata (Triticeae, Poaceae)*. Phytologia 83:312-330.

Cronquist, A., A. H. Holmgren, N. H. Holmgren, J. L. Reveal, & P. K. Holmgren 1977. *Intermountain flora*. Vol. 6. The New York Botanical Garden. Columbia University Press, New York, New York.

Hitchcock, A. S. 1950. *Manual of the grasses of the United States*. USDA, Washington, DC.

Powell, A.M. 1994. *Grasses of the Trans-Pecos and adjacent areas*. University of Texas Press, Austin, Texas.

USDA, Forest Service 1996. *Fire effects information system*. Version: 000413. <<http://www.fs.fed.us/database/feis/>>. Rocky Mountain Research Station, Fire Sciences Laboratory, Missoula, Montana.

USDA, NRCS 2000. *The PLANTS database*. Version: 000413. <<http://plants.usda.gov>>. National Plant Data Center, Baton Rouge, Louisiana.

#### Prepared By & Species Coordinator

*Daniel G. Ogle*

USDA, NRCS, Idaho State Office, Boise, Idaho

Edited 05dec00 jsp;10feb03 ahv; 060802 jsp

For more information about this and other plants, please contact your local NRCS field office or Conservation District, and visit the PLANTS Web site <<http://plants.usda.gov>> or the Plant Materials Program Web site <<http://Plant-Materials.nrcs.usda.gov>>

*The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).*

*To file a complaint of discrimination write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice or TDD). USDA is an equal opportunity provider and employer.*

*Read about [Civil Rights at the Natural Resources Conservation Service](#).*