

WESTERN WHEATGRASS

Pascopyrum smithii (Rydb.)

A. Love

plant symbol = PASM

Contributed By: USDA, NRCS, Idaho State Office, Montana State Office and the National Plant Data Center



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Alternate Names

Agropyron smithii, *Elytrigia smithii*,
bluestem wheatgrass, bluejoint wheatgrass.

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 yielding forage producer, but can be utilized as native hay, especially when harvested in overflow or run in sites that collect additional moisture.

Erosion control/reclamation: Western wheatgrass is well adapted to stabilization of disturbed soils because of its strong spreading rhizomes. It should not be planted with aggressive introduced grasses, but is very compatible with slower developing natives such as bluebunch wheatgrass (*Pseudoroegneria spicata*), thickspike wheatgrass (*Elymus lanceolatus* ssp. *lanceolatus*), streambank wheatgrass (*Elymus lanceolatus* ssp. *psammophilus*), and needlegrass species (*Achnatherum* spp., *Hesperostipa* spp., *Nassella* spp., *Stipa* spp., and *Ptilagrostis* spp.).

Its relatively good drought tolerance combined with strong rhizomatous root systems and adaptation to a variety of soils makes 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 ditch banks, dikes, and roadsides.

Status

This is a native species. 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 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 system 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 claw-like and clasp the stem. The seed spike is stiff, erect and about 2 to 6 inches long. The awn-tipped (to 5mm) lemma's, palea's and glume's 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 intermittent 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, consult the



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

Plant Profile page for this species on the PLANTS Web site.

Adaptation

Western wheatgrass is similar to thickspike and streambank wheatgrasses in appearance. However, it is coarser textured, its rhizomatous trait is more aggressive, and its leaves are very rough on the upper surface and margins and 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 greater. Thickspike and streambank wheatgrasses do better on medium to coarse textured soils.

Streambank wheatgrass can be found on slightly heavy to medium 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 annual 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, buffalograss, needlegrasses,

bluebunch wheatgrass, rough fescue, Idaho fescue and prairie junegrass.

Establishment

Planting: Seed of western wheatgrass should be seeded with a drill at a depth of 1/4 to 3/4 inch or less on medium to coarse textured soils. Plant at 1/4 to 1/2 inch depth on heavy to textured soils. Single species seeding rates recommended for western wheatgrass is 8 pounds Pure Live Seed (PLS) or 24 PLS per square foot. If used as a component of a mix, adjust to percent of mix desired. For mine lands and other harsh critical areas, the seeding rate should be increased to 12 pounds PLS or 36 PLS per square foot. Mulching and light irrigation is 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 by transplanting sod. Seedling vigor is poor to fair; stands are generally slow to develop and may be non-existent the establishment year. However, good stands are typically achieved by the end of the fourth or fifth growing season. Poor germination accounts for the poor initial establishment and strong rhizome spread accounts for stand development in later years.

It is compatible with other adapted native species and can be used in seeding mixtures. It should not be seeded with strongly competitive introduced species. Under favorable conditions it can provide good weed control.

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 above seedlings 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. Be sure to read and follow label directions.

Irrigation, weed control and fertilization will improve western wheatgrass stands and aid in establishment and overall production.

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.

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 sod-bound and may need fertilization and moderate spring/fall deferment. Sod-bound stands may benefit from ripping which can 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 may also 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- 36 inches are recommended and although rhizomatous, it should be cultivated and maintained in rows. In Montana, Rosana western wheatgrass is commonly cultivated the first three years and then allowed to spread into solid stands without inter-row cultivation, for one additional year of seed production with lower inputs. Seed yields and stand longevity are reduced when between row cultivation is not practiced.

Seed fields are generally most productive for two to three 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 fertilizer and 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 is 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, Meeker, Colorado maintain Breeder and Foundation seed.

‘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.

‘Flintlock’ western wheatgrass is a broad-based 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.

‘Recovery’ western wheatgrass was selected for its improved seedling vigor and faster seedling establishment. Trials selecting for the ability to emerge from deep planting depths were a primary selection criteria demonstrating improved seedling vigor. Trials at eight locations showed Recovery to have increased numbers of seedlings over Arriba, Baton, Flintlock, Rodan and Rosana and superior stands 4- 6 years following planting. It is intended for revegetation of frequently disturbed rangelands, military training lands and areas with elevated soil erosion and repeated wildfires. USDA-NRCS-Logan-UT, US Army and USDA-NRCS-Aberdeen-ID-PMC released this

cultivar in 2009. Breeder seed is maintained by USDA-ARS and Foundation seed is produced by USDA-NRCS-Aberdeen PMC. Seed is available through the University of Idaho Foundation Seed Program and Utah Crop Improvement Association.

‘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.

‘Rosana’ western wheatgrass is a northern type collected in east central Montana near Forsyth. 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.

‘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.

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.

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