

BLUEBUNCH WHEATGRASS *Pseudoroegneria spicata* **(Pursh) A. Löve** Plant Symbol = PSSP6 and PSSPS

Contributed By: USDA, NRCS, Idaho Plant Materials Program



Loren St. John; USDA-NRCS, Aberdeen PMC

Alternate Names *Agropyron spicatum*, *Elytrigia spicata*

Uses

Grazing/rangeland/wildlife: Bluebunch wheatgrass can be used for native hay production and will make nutritious feed, but is better suited to grazing use. Bluebunch wheatgrass is palatable to all classes of livestock and wildlife. It is preferred forage for cattle and horses year-round, but it is considered coarse in summer. It is preferred forage for sheep, elk, deer, and antelope in spring. It is considered desired forage for elk in summer.

It is desirable forage for sheep in summer, desirable feed for sheep, elk, deer, and antelope in fall and desirable forage for sheep, elk, and deer in winter (Ogle and Brazee 2009). In spring, the protein levels can be as high as 20 percent decreasing to about 4 percent protein as the forage matures and cures. Digestible carbohydrates remain about 45 percent throughout the active growth period.

Erosion control/reclamation: Bluebunch wheatgrass is very drought resistant, persistent and adapted to stabilization of disturbed soils. It is very compatible with slower developing native species, such as thickspike wheatgrass (*Elymus lanceolatus*), western wheatgrass (*Pascopyrum smithii*), and needlegrass species (*Achnatherum* spp., *Nassella* spp., and *Hesperostipa* spp.). It does not compete well with aggressive introduced grasses. Its drought tolerance, combined with extensive root systems and good seedling vigor, make this species ideal for reclamation in areas receiving 10 to 20 inches annual precipitation. 'Secar' and 'Discovery' compete well in areas as low as 8 inches annual rainfall. They can be used in urban and low water use areas to stabilize ditchbanks, dikes, and roadsides.

Status

Consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status.



Jeanne R. Janish © The New York Botanical Garden

Description

General: Grass Family (Poaceae). Bluebunch wheatgrass is a perennial native bunchgrass. Bluebunch wheatgrass is highly variable and grows to 1.5 to 4 feet (0.4 to 1.2 m) tall with seed spikes 3 to 8 inches (76 to 200 mm) long. The auricles are pointed and semi-clasping to nearly lacking. Leaves are lax, cauline, flat to in-rolled, 0.6 to 0.25 inches (4 to 6 mm) wide, and green to blue in color. The sheath is generally glabrous. Reproductive stems are erect, slender, and sometimes wiry with a wavy rachis. The lemma awns range from being short to prominent and divergent except on the beardless type where the awn is lacking (Hitchcock 1950).

Distribution

Bluebunch wheatgrass is common to the northern Great Plains, Northern Rocky Mountains and the Intermountain regions of the western United States. It is a long-lived cool-season native grass with an extensive root system with strong tillers. Bluebunch wheatgrass spreads by seed; in high rainfall zones it may spread by short rhizomes (Anderton and Barkworth 2009). For current distribution, consult the Plant Profile page for this species on the PLANTS Web site.

Adaptation

Bluebunch wheatgrass does best on medium to coarse-textured soils, but can be found on heavy to medium to coarse-textured soils over 10 inches deep including fairly sandy sites. It can be found on thin, rocky sites and on very steep slopes. It will tolerate weakly saline conditions. It does not grow on highly acidic sites. It is cold tolerant, moderately shade tolerant, and highly fire tolerant (USDA Forest Service 1996). It is not tolerant of high water tables, poor drainage, and periods of extended inundation.

On native sites, bluebunch wheatgrass is most abundant in the 10 to 20 inch annual precipitation zones. Most commercially available varieties do best with 12 to 20 inches of precipitation (exception 'Secar' and 'Discovery' 8 to 18 inches and Anatone 10 to 20 inches - estimated) and will tolerate up to 35 inches on very well drained soils with southerly aspects. The elevation range is from 500 to 10,000 feet above sea level. It is a major component of many native plant communities and generally occupies 20 to 60 percent of the overall composition by weight.

Species often associated with bluebunch wheatgrass include: the big sagebrush complex, juniper, ponderosa pine, needlegrasses, bluegrass complex, bottlebrush squirreltail, prairie junegrass, thickspike wheatgrass, Idaho fescue, arrowleaf balsamroot and tapertip hawksbeard.

Establishment

Planting: This species should be seeded with a drill at a depth of 1/2 inch or less on medium-textured soils, 1/4

inch on fine-textured soils and 3/4 inch or less on coarse-textured soils. The single-species seeding rate recommended for this grass is 8 pounds Pure Live Seed (PLS) per acre or 24 PLS per square foot. If used as a component of a mix, adjust to percent of mix desired. When broadcast seeding and for mine lands and other harsh critical areas, the seeding rate should be 150 to 200 percent of the drill rate or 36 to 48 PLS seeds per square foot. Seedlings are weaker than most introduced wheatgrasses and a clean, firm, weed-free seedbed is required for establishment (cheatgrass, medusahead, ventenata and other annual weed competition can cause stand failure).

The best seeding results are obtained from seeding in very early spring on heavy to medium-textured soils and in late fall on medium to light-textured soils. Late summer (August - mid September) seeding is not recommended unless irrigation is available.

Bluebunch wheatgrass establishes fairly quickly for a native grass and stands should be given 2-3 years to ensure establishment. It is compatible with other native species and should be used in seeding mixtures. It should not be seeded with strongly competitive introduced species.

Bluebunch wheatgrass makes good spring growth, fair summer growth, and good fall regrowth if moisture is available. Seedling vigor is fair to good.

Stands may require weed control measures during establishment. Application of 2,4-D should not be made until plants have reached the four to six-leaf stage. Mow weeds at or prior to their bloom stage. Grasshoppers and other insects may also damage new stands and pesticides may be needed.

Management

Bluebunch wheatgrass has good palatability to livestock and wildlife. Established stands do not tolerate heavy continuous grazing.

Stands of bluebunch wheatgrass should not be grazed until they are firmly established (usually two growing seasons) and have headed out. Six inches of new growth should be attained in spring before grazing is allowed in established stands. The growing point of bluebunch wheatgrass is fairly high and stands can easily be overgrazed. It is recommended that this grass be grazed under a rest or deferred rotation grazing system to ensure plants remain healthy. Spring grazing should occur no more than one out of three years and no more than 40 percent utilization should occur during rapid growth. Heavy early spring grazing is especially damaging and grazing should be delayed until at least mid-boot stage. No more than 60 percent utilization should occur after seed ripens.

Once established, bluebunch wheatgrass is competitive with weedy species, but it can be crowded out by aggressive introduced species.

Environmental Concerns:

Bluebunch wheatgrass is long-lived and spreads via seed. It can slowly spread vegetatively in precipitation zones above 18 inches annual rainfall. It is not considered a "weedy" or invasive species, but can spread into adjoining vegetative communities under ideal climatic and environmental conditions. Most seedlings do not spread from original plantings. It is a cross-pollinating species and is known to cross with other ecotypes of bluebunch wheatgrass, quackgrass, thickspike wheatgrass and bottlebrush squirreltail. These natural crosses broaden the gene pool and do not dominate a site or crowd out the native ecotypes. In many cases the resulting progeny are sterile (Anderton and Barkworth 2009).

Seed Production

Seed production of bluebunch wheatgrass has been very successful under cultivated conditions. Row spacing of 24 to 36 inches are recommended under irrigation and 36 inches under dryland conditions. Seeding rates of 3 to 4 PLS per acre are recommended. Cultivation will be needed to maintain rows and weed-free conditions. Seed fields are productive for three to four years. Average production of 75 to 100 pounds per acre can be expected under dryland conditions. Average production of 150 to 250 pounds per acre can be expected under irrigated conditions. Harvesting is best completed by swathing, followed by combining of the cured rows. The seed heads readily shatter and require close scrutiny of maturing stands. If direct combined, harvest at 30 percent moisture and dry seed down to 12 percent moisture (if stored in bins) or 15 percent moisture (if stored in sacks). Debearding may be required during processing. Seed is generally harvested from mid-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.

Bluebunch Wheatgrass Releases

Anatone Selected Class Germplasm bluebunch wheatgrass (*P. spicata* spp. *spicata*) was selected from seed originating near Anatone, Washington by the Forest Service Shrub Sciences Laboratory. It was released by the Forest Service Shrub Science Laboratory, BLM, Aberdeen Plant Materials Center, Idaho-Utah AES, ARS and the Utah Division of Wildlife Resources in 2003. Anatone germplasm establishes rapidly and has the ability to survive and thrive under dry conditions at or above 10 inches rainfall. It is intended for use on valley and foothill rangelands for re-establishment of native plant communities, vegetative firebreaks, and critical area stabilization and reclamation purposes. Certified seed is

available. Generation 1 seed is produced by Aberdeen PMC.

'**Goldar**' bluebunch wheatgrass (*P. spicata* spp. *spicata*) was selected from seed collected on Mallery Ridge of the Umatilla National Forest in Asotin County, Washington by the Aberdeen Plant Materials Center. It was released by Idaho-Utah AES, ARS and the PMC in 1989. 'Goldar' is noted for rapid establishment, high forage production, and the ability to survive and thrive under dry conditions at or above 12 inches rainfall. It is best adapted for use on higher rainfall foothill and mountain rangelands for re-establishment of native plant communities, vegetative firebreaks, and critical area stabilization and reclamation purposes. Certified seed is available and Breeder and Foundation seed is maintained by Aberdeen PMC (Alderson and Sharp 1994).

P-7 Selected Germplasm bluebunch wheatgrass (*P. spicata* spp. *spicata*) was generated by open-pollinating 25 native populations of bluebunch wheatgrass from Idaho, Nevada, Oregon, Utah, Washington and British Columbia resulting in high genetic diversity. ARS and the Utah Agricultural Experiment Station released P-7 in 2001. Its full range of adaptation is not fully understood, but it is expected to survive and thrive under dry conditions at or above 12 inches rainfall. It is intended for use on valley, foothill and mountain rangelands for re-establishment of native plant communities, vegetative firebreaks, and critical area stabilization and reclamation purposes. Certified seed is available and Breeder seed is maintained by USDA-ARS, Logan, Utah..

'**Whitmar**' beardless wheatgrass (*P. spica* spp. *inermis*) is the awnless form of bluebunch wheatgrass. It was selected by Pullman PMC from seed native to the Palouse grasslands near Colton, Washington. Idaho-Oregon-Washington AES and Aberdeen-Corvallis-Pullman PMCs released 'Whitmar' in 1946. It performs best above 12 inches rainfall in high winter-low summer precipitation areas. 'Whitmar' was selected for forage quality, seedling vigor, and good seed production and is intended for use on rangeland for re-establishment of native plant communities and for reclamation. Certified seed is available and Breeder seed is maintained by Pullman PMC (Alderson and Sharp 1994).

Snake River Wheatgrass Releases

'**Discovery**' Snake River wheatgrass (*Elymus wawawaiensis*) was released in 2008. It was developed from four accessions that were found to have improved vigor in comparison to Secar. These accessions were crossed and seed was harvested in bulk to generate Discovery.

Discovery was compared to Secar in seeded trials at two sites in the Intermountain Region and four sites in the Great Plains (Jones, 2008). Stand frequency of Discovery in the Intermountain locations for year 2 was 49.3%

compared to 27.4% for Secar. Forage yield of Discovery for years 2 to 4 was 108.0% greater than Secar. No significant differences were observed at the Great Plains locations. Discovery was also compared to Secar in a transplanted trial at Millville, Utah where it produced 18% greater straw weight across two densities the summer after establishment.

The populations used to generate Discovery trace to materials collected in Whitman and Asotin counties in southeastern Washington and Idaho County in central Idaho.

Breeder seed is maintained by the USDA-ARS Forage and Range Research Laboratory, Logan, UT, and is available to growers through the Utah Crop Improvement Association for production of Foundation, Registered, and Certified generations.

'Secar' is the first release of Snake River wheatgrass (*Elymus wawawaiensis*). It was released as a bluebunch wheatgrass, but cytological examination later determined it to be Snake River wheatgrass (Carlson and Barkworth 1997). The collection site for Secar is along the Snake River Gorge near Lewiston, Idaho. The Idaho-Oregon-Montana-Wyoming AES, Washington Agriculture Research Center, and Pullman Plant Materials Center released Secar in 1980.

It is one of the most drought-tolerant native perennial grasses available and can survive down to 8 inches rainfall. It is a bunchgrass with fair to good seedling vigor and establishes well under droughty conditions.

While Secar is considered to be highly drought tolerant as a mature plant, drought often reduces the stand during establishment. 'Secar' is intended for use on rangeland to re-establishment of native-plant communities and for cropland retirement plantings. Certified seed is available and Breeder seed is maintained by Pullman PMC. Foundation seed is available through the Washington State Crop Improvement Association (Alderson and Sharp 1994).

References

- Anderton, L.K. and M.E. Barkworth (Eds.) 2009 *Grasses of the Intermountain Region*. Intermountain Herbarium p 60.
- Alderson, J. & W.C. Sharp 1994. *Grass varieties in the United States*. Agriculture Handbook No. 170. USDA, SCS, Washington, D.C.
- Barkworth, M.E., L.K. Anderson, K.M. Capels, S. Long and M.B. Piep. 2007. *Manual of grasses for North America*. Intermountain Herbarium and Utah State University Press, Logan, Utah.

- 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.
- Jones, T.A., 2008. *Notice of Release of Discovery Snake River Wheatgrass*. USDA, ARS, Logan, Utah. 7 p.
- Hitchcock, A. S. 1950. *Manual of the grasses of the United States*. USDA, Washington, DC.
- Miller, R.P., J.M. Seufert, and M.R. Haferkamp. 1987. *The ecology and management of bluebunch wheatgrass (Agropyron spicatum): A review*. Oregon Agric. Exp. Sta. Bull. No. 669.
- Ogle, D. and B. Brazee. 2009. *Estimating Initial Stocking Rates*. Idaho Range Technical Note No. 3. Appendix B. USDA-NRCS. Boise, Idaho.
- 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

Daniel G. Ogle USDA, NRCS, Boise, Idaho

Loren St. John USDA, NRCS, PMC, Aberdeen, Idaho

Dr. Thomas A. Jones USDA, ARS, Forage and Range Laboratory, Logan, Utah

Citation

Ogle, D.G., L. St John and T.A. Jones. 2010. Plant guide for bluebunch wheatgrass (*Pseudoroegneria spicata*). USDA-Natural Resources Conservation Service. Idaho and Washington Plant Materials Program.

Published June 2010

Edited: 07nov08 taj; 9june10 lsj; 9june10 jab; 10june10 dgo

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

PLANTS is not responsible for the content or availability of other Web sites.

USDA IS AN EQUAL OPPORTUNITY PROVIDER AND EMPLOYER