

BULBOUS BLUEGRASS

Poa bulbosa L.

Plant Symbol = POBU

Contributed by: USDA NRCS Plant Materials
Center, Pullman, Washington



Dave Skinner, Pullman PMC

Alternate Names

Winter bluegrass

Uses

Cultural: Bulbous bluegrass is currently considered to be a weedy species, but was used in the mid 1900's as a grass for turf, pasture and erosion control.

Grazing: In early spring, when lush and green it is thought to be a desirable forage species. However, it matures quickly and does not provide a significant amount of forage for livestock.

Wildlife: The bulblets of bulbous bluegrass contain high levels of starch and fat, and therefore are

attractive to rodents and birds (Locke & Burrill, 1994).

Status

Consult the PLANTS Web (<http://plants.usda.gov>) site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Weediness

Bulbous bluegrass is often the first invading species on disturbed shallow soils that are moist during the winter and early spring (Locke & Burrill, 1994).

The grass is known to move from marginal sites to nearby fields of crop and hay. It is easily controlled with early season cultivation using implements such as a spiketooth harrow or viber shanks and herbicides for grass control.

Description

General: Grass Family (Poaceae). Bulbous bluegrass is an introduced, short-lived perennial cool-season grass. It is the only grass known to have true bulbs (Halperin, 1933). The bulbs are normally dormant from mid-May through early October. When the weather begins to cool, leaves emerge from the bulbs. Growth is slow during the winter months, and by early March the plant is typically around 3 inches tall. As weather becomes warmer, it grows to a height of 6 to 24 inches. Leaf blades are narrow, flat or loosely rolled, with membranous ligules about 1/8 inch long. Few culms are produced per plant. Flowers are usually modified to bulblets with a dark purple base. The panicle has a plume-like appearance from the long, slender lemma (some refer to them as bracts) attached to each bulblet. The bulblets typically mature around early May, and soon after the grass senesces. The bulblets produced within the inflorescences germinate after a period of dormancy lasting a few months up to 2 years.

The formation of bulblets in bulbous bluegrass is a type of apomictic vivipary. The lowermost floret of the spikelet usually has a developed lemma, but lacks a palea. The lemmas of the second and third florets are long and leaf-like and are attached to a bulblet, which develops from the floral parts (Gould & Shaw, 1983).

Bulbous bluegrass reproduces primarily through asexual means in North America (USDA, 1948;

Hitchcock, 1971; Gaines & Swan, 1972; Cronquist, 1977). However, it is believed to reproduce primarily through sexual means in its native habitat of Europe and mid East Asia (Youngner & McKell, 1972). This phenomenon may be explained by differences in climate. Youngner (1960) conducted a study to determine the effects of day length and temperature on reproductive structures of bulbous bluegrass, and found high temperatures (70-80°F) and long days (16 hrs.) following inflorescence initiation promoted seed production, whereas cool temperatures (68°F or less) and short days (8 hrs.) promoted bulblet production. Long days and cool temperatures or short days and high temperatures produced panicles with both seeds and bulblets.

Sexual reproduction of bulbous bluegrass may occur more frequently in North America than originally expected. Novak & Welfley (1997) used bulbous bluegrass to evaluate genetic diversity within and among populations of an introduced, vegetatively reproductive species, and found the diversity to be surprisingly high at both the species and population levels. They concluded the diversity likely resulted from a combination of sexual reproduction, the autopolyploid nature of the species, and multiple introduction events.

Bulbous bluegrass was introduced to North America accidentally, as a contaminant of alfalfa and clover seed. The grass was also introduced intentionally, for research purposes. In 1906 the USDA Office of Foreign Plant Introduction received bulblets of bulbous bluegrass from Russia (Vinall & Westover, 1928). The bulblets were grown by the Arlington, VA Experimental Farm in 1907, 1908 and 1909, and at Pullman, WA in 1907. At that time the grass was reported as having no particular promise, and the investigations soon ended.

Bulbous bluegrass was re-evaluated in 1915 after the groundskeepers at the state capitol in Richmond, VA asked the USDA for assistance identifying the grass and determining methods to eradicate it. The groundskeepers considered the grass to be undesirable since it performed poorly in the summer months. The USDA grew the grass in a greenhouse and determined the grass to be *Poa bulbosa*. They advised the groundskeepers not to eradicate it, but instead manage it as winter grass in combination with Bermuda grass for the summer months (Vinall & Westover, 1928).

In 1916 bulblets of the grass were distributed by the USDA to several experiment stations. Commercial production of the grass followed, and in 1928,

Medford, OR was considered the center of production (Vinall & Westover, 1928). During this time, bulbous bluegrass was used to compliment Bermuda grass in pastures and turf, but new evaluations were beginning to demonstrate the grass did not tolerate frequent clipping, and actually outcompeted Bermuda grass when both were grown together.

Bulbous bluegrass was still thought to have value in 1948, when it was recommended to replace cheatgrass on poor condition sites and as an understory species in seed mixtures in southern Idaho (Hull & Stewart, 1948).

The Pullman Plant Materials Center (PMC) evaluated bulbous bluegrass for use in critical area plantings in the 1950's. In 1956, P-4784 was released but the bulblets failed to retain acceptable levels of germination. Consequently, P-4784 was not distributed to growers.

As recently as 1997, the merits of bulbous bluegrass were still being considered, when it was included in a study to determine optimal species for low-input sustainable turf grass in the upper Midwest. The grass performed poorly and was not recommended for this use (Diesburg, 1997).

Distribution: Bulbous bluegrass grows in nearly all temperate and subtropical regions throughout the world. In North America, it inhabits roadsides and hay and crop fields. It tends to be more common in western states than eastern states.

Adaptation

Bulbous bluegrass is best adapted to areas that have dry summers, mild winters, and winter rainfall. It is typically found within the 12" – 40" precipitation zones.

Establishment

This species is not recommended for seeding.

Mechanical Control

Spring tillage is very effective in controlling bulbous bluegrass. Fall tillage is less effective. Haying and mowing are not effective because the seed heads are frequently shorter than the cutting height. Burning is not effective because it rarely reduces the number of bulblets in the soil.

Environmental/Cultural Control

Infestations can be prevented by using crop seed, hay and straw that is free of bulbous bluegrass bulblets or seed. In addition, cleaning equipment before moving

from a site infested with bulbous bluegrass and controlling weeds along fence rows and roadsides will prevent its spread.

Within crop fields where bulbous bluegrass has established, it can be controlled by rotation with a spring crop or to permanent pasture or alfalfa. In uncropped areas, bulbous bluegrass can be managed by establishing a stand of competitive perennial grass.

Intensive spring grazing can reduce bulbous bluegrass populations providing that intensive grazing is applied over a period of several growing seasons. Consult with the NRCS or a Certified Rangeland Management Specialist to determine if this practice could adversely impact other grazing plants and/or soil conditions.

Chemical Control

There is a wide range of chemicals available to control bulbous bluegrass. Contact your local agricultural extension agent or county weed specialist to learn what products work best in your area and how to use them properly. Always read and follow label and safety instructions.

Biological Control

No biological controls are known.

Cultivars, Improved and Selected Materials Including Area of Origin

The Pullman Plant Materials Center (PMC) evaluated bulbous bluegrass for several years in the 1950's. P-4784, an ecotype collected near the Washington-Idaho state line exhibited very robust late maturing growth. It was released in 1956 in cooperation with the Idaho Agricultural Experiment Station. The Pullman PMC grew P-4784 for several years but the bulblets failed to retain acceptable levels of germination. Consequently, P-4784 was not distributed to growers. All seed stock of P-4784 was destroyed in 1976 based on its poor seed storage characteristic and its weedy nature. Currently no seed is commercially available.

Illustrations and Photographs

Burrill, L. C., et al. 1996. Weeds of the West, 5th ed., T.D. Whitson, editor. University of Wyoming. Larimie, WY. pp. 482-483.

Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, P.K. Holmgren. 1977. Intermountain Flora, vol. 6. Columbia University Press, New York. p. 235.

Gaines, X.M. and D.G. Swan. 1972. Weeds of Eastern Washington and Adjacent Areas. C.W. Hill, Spokane, WA. pp. 54-55.

References

Burrill, L. C., et al. 1996. Weeds of the West, 5th ed., T.D. Whitson, editor. University of Wyoming. Larimie, WY. pp. 482-483.

Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, P.K. Holmgren. 1977. Intermountain Flora, vol. 6. Columbia University Press, New York. pp. 234-235.

Diesburg, K.L., et al. 1997. Species for low-input sustainable turf in the U.S. upper Midwest. Agron. J. 89:690-694.

Gaines, X.M. and D.G. Swan. 1972. Weeds of Eastern Washington and Adjacent Areas. C.W. Hill, Spokane, WA. pp. 54-55.

Gould, F.W. and R.B. Shaw. 1983. Grass Systematics, 2nd ed. Texas A & M University Press, College Station, TX. p. 82.

Halperin, M. 1933. The taxonomy and morphology of bulbous bluegrass, *Poa bulbosa vivipara*. J. Am. Soc. Agron. 25:408-413.

Hitchcock, A.S. 1971. Manual of the Grasses of the United States, 2nd ed., vol. 1. Dover Publications, New York. p. 122.

Hull, A.C. and G. Stewart. 1948. Replacing cheatgrass by reseeding with perennial grass on southern Idaho ranges. J. Am. Soc. Agron. 40:694-703.

Locke, K. and L.C. Burrill. 1994. Bulbous Bluegrass. Pacific Northwest Extension Publication.

Novak, S.J. and A.Y. Welfley. 1997. Genetic diversity in the introduced clonal grass *Poa bulbosa* (Bulbous bluegrass). Northwest Sci. 71:271-280.

United States Department of Agriculture. 1948. The Yearbook of Agriculture: Grass. U.S. Government Printing Office, Washington D.C. pp. 687 – 688.

Vinall, H.N., and H.L. Westover. 1928. Bulbous bluegrass, *Poa bulbosa*. J. Am. Soc. Agron. 20:394-399.

Youngner, V.B. 1960. Environmental control of initiation of the inflorescence, reproductive structures

and proliferations in *Poa bulbosa*. Am. J. Bot. 47:753-757.

Youngner, V.B. and C.M. McKell. 1972. The Biology and Utilization of Grasses. Academic Press, New York. pp. 390-391.

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