

## BLUE GRAMA

*Bouteloua gracilis* (Willd. ex Kunth.) Lag. ex Griffiths  
Plant Symbol = BOGR2

Contributed by: USDA NRCS Plant Materials Center, Manhattan, Kansas.



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### Uses

**Forage:** A highly palatable grass for livestock on a year long basis. It is used sparingly by antelope and other wildlife species. Blue grama rates with buffalograss as one of the most important forage plants of the short-grass prairie (Weaver, 1926)

**Erosion control:** Blue grama can be used in mixtures with other grasses for use in erosion control situations. It is commonly used as a low maintenance turf planting, such as rough areas of a golf course or between rows in multiple row wind break plantings and in locations prone to drought. It is also used in surface mine re-vegetation plantings.

### Status

Please consult the PLANTS Web 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).

### Description

**General:** Blue grama is a major warm season grass found throughout the Great Plains. It is found on the plains, prairies, and foothills of most western states. It is short (6 to 24 inches) stature and perennial with a prolific root system. This species has some

phenotypic plasticity since in the southern states it grows normally as a bunch grass, but in the northern states and in the mountains, or in areas under heavy grazing pressure it is a sod former. Phenotypic plasticity is the ability of an organism to alter its physiology or morphology in response to changes in environmental conditions (Schlichting, 1986). Blue grama possesses the C-4 photosynthetic pathway for carbon fixation (Waller and Lewis, 1979).

**Distribution:** For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site. Blue grama is a major species of the western Great Plains and southwestern United States. It is also found growing in Mexico and the Canadian Provinces of Alberta, Saskatchewan and Manitoba.

**Habitat:** Blue grama is most effective when grown in the dryer parts of the northern and southern Great Plains and southwestern region of the U.S. It naturally grows in mixed stands, primarily with buffalograss (*Bouteloua dactyloides*), needle-and-thread (*Hesperostipa comata*), western wheatgrass (*Pascopyrum smithii*), and green needlegrass (*Nassella viridula*) in a short grass prairie setting. It will be associated with other species such as prairie sandreed and sand sagebrush in a sandier habitat.

### Adaptation

Blue grama demonstrates good drought, fair salinity and moderate alkalinity tolerance. It grows well on soil types as varied as sandy to clayey in texture; however its growth is not as vigorous on true sands or clays. Blue grama is not tolerant of frequent flooding or submergence. It is also intolerant of shade and acidic soils. It is variably tolerant of fire and can be damaged if burned during active growth, especially under drought conditions. Blue grama grows at elevations of 3,500 feet up to 7,000 feet in New Mexico and has been reported growing at 10,000 feet. Forage production is best where annual precipitation is 12 to 14 inches and occurs during the warmest part of summer.

### Establishment

Proper seedbed preparation is always necessary when trying to establish any native grass or wildflower species. For the best results seed of blue grama should be drilled on a firm and weed free seed bed with a depth band and packer wheel equipped native grass drill. Depth of seeding should be ¼ to ½ inch.

### United States Department of Agriculture-Natural Resources Conservation Service

Plant Materials <<http://plant-materials.nrcs.usda.gov/>>

Plant Fact Sheet/Guide Coordination Page <<http://plant-materials.nrcs.usda.gov/intranet/pfs.html>>

National Plant Data Center <<http://npdc.usda.gov>>

Broadcasting the seed is an alternative planting option. However, the seed should then be incorporated to provide seed to soil contact or at least pressed into the soil with a cultipacker. Seeding rate varies depending on the planting site and method. Drill planted seeding rates are 25 to 40 pure live seeds (PLS) per square foot or 1 to 3 pounds PLS per acre. The seeding rate should be increased by 50 to 100 percent for broadcasting, harsh sites, south and west exposures, and where early or dense cover is required.

Blue grama cultivars have a large number of seeds per pound somewhere between 700,000 and 800,000 seeds/pound. Suitable planting dates are April to mid-May in the central Great Plains, slightly earlier in the southern Great Plains and June 15 to July 15 in the southwestern U.S. Wilson et al. (1976) found that blue grama seedlings avoid drought in three ways: 1) by increasing water uptake, 2) by adjusting leaf area, and 3) by reducing transpiration. The relative importance of each depends on the morphological stages of the seedling development and severity of drought conditions.

Briske and Wilson (1980) studied the extent and timing of adventitious (permanent) root development in blue grama seedlings. They discovered that if blue grama seedlings did not initiate and develop adventitious roots within 6 to 10 weeks after emergence they often died. Seedling death was caused by the expansion of leaf area beyond the ability of the seedlings seminal roots to provide adequate moisture. Without adventitious root development an increased transpiration stress was causing seedling and stand mortality. To develop adventitious roots the seedlings require a period during which the soil surface will continuously remain moist for 2 to 4 days. This moisture requirement is caused by the growth form of blue grama seedlings (Hyder et al., 1971) that elevates the point of adventitious root growth to a point very near the soil surface. Weaver and Zink (1945) reported that blue grama seedlings grown without adventitious roots died after 8 weeks. Weaver (1926) explained that the root structure of established blue grama plants are exceedingly fine and spread widely in the surface soil, often to distances of 12 to 18 inches.

### **Management**

Once established this grass is palatable to livestock year around. Growing points of this grass are low and near the grounds surface, thus close grazing by livestock can be allowed. To obtain the best forage yields, grazing should be deferred once every two to three years. Blue grama cures well on the stem

making it a good grass for deferred grazing during its dormant period. Weed control can be accomplished by mowing, controlled grazing or herbicide applications.

### **Pests and Potential Problems**

Grasshoppers damage blue grama stands and consume forage. The white grub larvae of the common green June beetle (*Cotia nitida*) feed on roots and can cause stand loss. Mankin (1969) detailed several leaf and tar spot and rust diseases common on blue grama found in South Dakota. Harlan et al. (1956) warned of thrip and gall midge infestations occurring in blue grama seed production fields.

### **Seeds and Plant Production**

To consistently produce grass seed of any species the most important first step is to obtain a uniform, clean stand of grass. Skips and thin spots in the row invite weeds and other competing species which will cause trouble later. Weeds must be controlled the year of seeding and in subsequent years. However, careful weed control the initial year of seeding will provide a more uniform stand in the seed field and less work in subsequent years.

Cultivation and herbicide applications along with hand weeding in the row will provide an even stand of grass that after the first year will provide reduced labor when harvesting, cleaning and processing the seed crop. The most important factor in producing blue grama seed is time of bloom. In Oklahoma, blue grama should bloom in September to fill completely (Harlan et al. 1956). If growth is promoted by early rain then seed field should be mowed several times or grazed heavily. The first inflorescences should be removed and the stand should be encouraged to remain vegetative until fall.

The first irrigation should be applied in mid-August along with the first nitrogen fertilization.

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

Contact your local Natural Resources Conservation Service (NRCS: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."

'Lovington' was released as a cultivar in 1963 by New Mexico AES and the Los Lunas Plant Materials Center. The original source of the material was a field harvest in 1944 near Lovington, New Mexico. It

was bulk increased and tested as A-12424. It has uniform size, leafiness, excellent seedling vigor and fast establishment characteristics.

'Hachita' was a cooperative release between the Los Lunas PMC and Colorado and New Mexico AES's in 1980. Source material was originally collected in 1957 south of Hachita, New Mexico in a 250mm precipitation zone at an altitude of 1220 meters. It is the most drought tolerant of blue grama materials tested in New Mexico.

'Alma' was a cooperative cultivar release with USDA Agriculture Research Service, Los Lunas New Mexico PMC, and the Colorado and New Mexico AES's in 1992. The cultivar was a composite of 270 plants from Hachita, Lovington and PMK-1483. The material was screened initially for heavier caryopsis weights, increased seedling vigor and greater emergence from deeper soil depths. Its intended use was for rangeland improvement and go back cropland seeding in southern and central Great Plains.

Bad River Ecotype blue grama was a selected release from the North Dakota PMC, North Dakota Association of Conservation Districts and the North and South Dakota AES in 1996. Its origin is Haakon County in central South Dakota on the floodplain of the Bad River. The intended use is the Northern Great Plains, USDA Plant Hardiness Zone 3. Bad River establishes readily and has consistent plant performance compared to native harvest materials.

## References

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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>>

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