

## SIDE-OATS GRAMA

*Bouteloua curtipendula*

(Michx.) Torr.

Plant Symbol = BOCU

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



Alan Shadow, East Texas Plant Materials Center, Nacogdoches, Texas

### Uses

**Forage:** Side-oats grama produces high quality, nutritious forage that is relished by all classes of livestock throughout the summer and fall, and it remains moderately palatable into winter. This makes it one of the most important range grass species.

**Erosion Control:** Weaver and Albertson (1944) described the role of side-oats grama in the recovery of grasslands following the drought of the 1930's. It was one of the few grasses that covered large areas bared by the loss of other grasses during the drought period. Side-oats grama is recommended in grass mixtures for range and pasture seeding, for earth fill and bank stabilization, for other critical areas and recreational plantings. Successful seeding can be obtained in rocky, stony or shallow soil sites. In fact side-oats is often found in nearly pure stands on caliche outcrops, stony hillsides and breaks (Harlan, 1954).

**Wildlife:** Side-oats provides some forage for antelope and deer when actively growing. Elk will use this grass as forage throughout the year. Leithead et al. (1971) indicated that the seed of this species was consumed by wild turkeys.

### Status

**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>>

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:** Side-oats grama is a deep rooted, perennial grass. The plants crown will spread very slowly by means of extremely short, stout rhizomes. A mid-grass in height, it has rather wide leaves and a very distinct inflorescence consisting of a zigzag stalk with small compressed spikes dangling from it at even intervals. The short spikes dangle from one side of the stalk, thus providing the plant with its common name. In the vegetative state the grass is easily recognized by the long, evenly spaced hairs attached to the margins of the leaf near its base. Side-oats grama possesses the C-4 photosynthetic pathway common to warm-season grasses (Waller and Lewis, 1979).

**Distribution:** For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site. One of the most widely distributed of the grama grasses. It has a widespread distribution eastward from the Rocky Mountains to near the east coast except in the southeast.

**Habitat:** Side-oats grama grows effectively in the dryer mid-grass prairie section of the Great Plains that has an annual rainfall of 12-20 inches. This species occurs naturally in mixed stands with blue grama (*Bouteloua gracilis*) and little bluestem (*Schizachyrium scoparium*). This grass is better adapted to calcareous and moderately alkaline soils than to neutral or acidic soils (Leithead et al., 1971)

### Adaptation

Side-oats is adapted to a broad range of sandy to clayey textured soils; it is least tolerant of loose sands and dense clays. The best stands of side-oats are found on medium to fine texture upland soils. This species has shown varying tolerance to soil salinity from weak to moderate. Side-oats is moderately drought tolerant, but less than blue grama. It is moderately tolerant of semi-shaded conditions and can be found in open woodlands. It will sustain damage from wildfires when actively growing and under drought stress conditions, but is fairly tolerant of fire in a dormant state. It is also fairly tolerant of spring flooding. It probably has the widest range of adaptation of any of the warm-season perennial grass plants. It grows in combination with tall warm-season

grasses such as big bluestem (*Andropogon gerardii*) and switchgrass (*Panicum virgatum*) all the way to the short grass plants such as buffalo grass (*Bouteloua dactyloides*) and blue grama (*Bouteloua gracilis*). Thus, it can successfully grow in a variety of climates and habitats in the continental U.S.

### **Establishment**

Seed improved cultivars of this grass no deeper than ¼ inch on fine textured soils and ¾ inch on coarser textured soils. Planting with a grass seed drill on a firm, weed free seedbed at the rate of 2.5 to 5.0 pounds of pure live seed (PLS) is encouraged. Broadcasting at a higher seeding rate (50 to 100 percent increase) can be utilized on a previously prepared seedbed that will be culti-packed after seeding is completed. Increased seeding rate should also be used on bare areas, harsh sites, or on areas that require denser or quicker stand establishment. Seeding is more likely to be successful if moisture conditions are good and if mulch is used to retain moisture on the seeding site. Most seed germinates within 7 days under good field conditions. Seedling vigor is good when compared to other warm season grasses. Field germination, emergence and establishment of this species are better than other grama grasses. Protection from grazing is encouraged while seedlings are in the juvenile stage of growth.

### **Management**

As a mid-grass, side-oats grama is intermediate in many respects between the tall and short grass species. Side-oats grama is not as resistant to grazing pressure as is blue grama due to its taller growth habit. Side-oats seedlings are vigorous and stands tend to establish quickly and can often be utilized for forage production the second year after planting. Side-oats grama is usually included in range mixes and should be managed as native rangeland. Management should include proper livestock stocking rates and correct season of use.

### **Pests and Potential Problems**

Grasshoppers can be destructive of seedling stands. Some stem and leaf rust occurs in wet years and Mankin (1969) found several leaf spot and root rot fungi occurred on side-oats grama.

### **Seeds and Plant Production**

Seed production experiments conducted in Nebraska in the 1950's found that side-oats grama response to nitrogen fertilization was dependent on moisture conditions during critical growth periods (Newell et al., 1962). Seed yields measured as whole spikes were substantially increased over unfertilized check plots by all rates of nitrogen applied. Under drought

conditions the application of 60 and 90 pounds of nitrogen yielded whole spike yields of approximately equal amounts. Under favorable moisture conditions nitrogen fertilization improved the quality of the caryopsis by increased weight per 1000 caryopsis over unfertilized plots.

Seed of side-oats grama normally found on the open market consists of either whole spikes or individual florets, or mixtures of these, which vary widely in their content of germinable caryopsis. Thus, seeding rates of side-oats must be computed on the basis of purity and viability of the seed lot. Purity analysis of side-oats can be complicated by the inclusion of adhering glumes and spike fragments as part of the seed unit. As long as the seed unit has a germinable caryopsis in the spike it is considered viable and used in the computation of pure live seed by the seed analyst. Thus a spike may contain several germinable caryopses, but is counted only as one for the purpose of germination percentage.

The effect of burning on seed yield was studied by Newell et al. (1962) in fertilized and unfertilized plots. Although the seed yield results were numerically larger from both levels of fertilized plots when burned, the differences could not be proven to be statistically different. This finding is noteworthy since it proves that proper burning, if not conducted too late in the spring, does not reduce seed yield. Burning is a proven method of cleaning the field for the new seed crop year. Burning has also been known to help control cool season weeds and reduce disease inoculums for the new crop.

Thus, side-oats grama may be grown for seed in cultivated rows, and will respond to timely fertilization and irrigation applications.

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

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."

'Butte' was selected at Nebraska AES, Lincoln, USDA-ARS and SCS cooperatively by E.C. Conard and L.C. Newell. It represents native collections from Holt and Platte Counties in Nebraska that were combined and tested as Nebraska 37. Repeated field plantings revealed superior germination and establishment characteristics when compared with other sources.

'El Reno' was released cooperatively in 1944 by the SCS, Manhattan, Kansas Plant Materials Center and Kansas AES. The original seed was collected in a field location near El Reno, Oklahoma in 1934. The material was outstanding for leafiness, forage production and vigor. It also ranked well for disease resistance, seed production, and winter hardiness. It is widely used in range seedings and is adapted to Kansas, Oklahoma and northern Texas.

'Haskell' was released in 1983 by the James E. "Bud" Smith Plant Materials Center, Texas AES and USDA-ARS. The seed for this release was originally collected in 1960 by J.C. Yearly, Jr. in Haskell, Texas. It was selected based on rhizome production and adaptation as far south as the Rio Grande Valley in Texas. It is also known for its high forage palatability and prolific seed production.

Killdeer was informally released in the late 1960's by the Bismarck Plant Materials Center in Bismarck, ND. It is composed of seed collected from native stands in 1956 near Bowman, Bowman County and Killdeer, Dunn County, North Dakota. Killdeer possesses outstanding vigor, leafiness, fair seed production, freedom from disease and persistence in a cold, semi-arid environment.

'Niner' was released in 1984 by SCS and the New Mexico and Colorado AES. The original seed for the release was collected by G.C. Niner and J.A. Anderson in 1957 west of Socorro, New Mexico. Niner was a bulk increase of the collection made by Niner and Anderson.

Pierre was informally released in 1961 by the Bismarck Plant Materials Center and the South Dakota AES. The original seed for the release was collected in 1954 in Stanley County west of Pierre, South Dakota. The release is described as outstanding in vigor, leafiness, freedom from disease, seedling vigor and persistence in a semi-arid environment.

'Premier' was released in 1960 cooperatively by Texas AES and USDA-ARS and NRCS. The original seed was collected in 1953 from a single plant growing between Cuauhtemoc and Chichuahua, Mexico. The release is described as having good seedling vigor, good seed yield, drought tolerance, upright growth form and leafiness.

'Trailway' was cooperatively released in 1958 by Nebraska AES and USDA-ARS. The original seed was collected in 1953 in northern Holt County by L.C. Newell. The release is described as winter

hardy, long lived, late maturing with a somewhat indeterminate heading and flowering response. Requires most of the growing season to mature a crop in eastern Nebraska and may fail to produce seed in areas with a shorter growing season.

'Vaughn' was released in 1940 by the New Mexico AES and SCS Plant Science Division. The original seed was collected from native stands in 1935 near Vaughn, New Mexico. The release is described as slightly variable, but all have erect leaves, good seedling vigor and easy to establish.

Northern, Central and Southern Iowa Germplasms were released in 1995 as source identified releases by the Elsberry Plant Materials Center, University of Northern Iowa, Iowa Department of Transportation, Iowa Crop Improvement Association, and Tallgrass Prairie Center (Iowa). They are all composite lines from collections made in Northern, Central and Southern Iowa. Northern Missouri Germplasm was released in 2008 as a source identified release by the Elsberry Plant Materials Center.

## References

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## Prepared by and Species Coordinator

Richard Wynia, USDA NRCS Manhattan Plant Materials Center, Manhattan, Kansas

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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