

INTRODUCED

BLUESTEM GRASSES

For Cultivated Pastures

TEXAS A&M UNIVERSITY
TEXAS AGRICULTURAL EXTENSION SERVICE
J. E. Hutchison, Director, College Station, Texas

Introduced Bluestem Grasses for Cultivated Pastures

A. C. Novosad, Extension Pasture Specialist
J. N. Pratt, Extension Agronomist
Texas A&M University

SEVERAL GRASSES of the bluestem group have been introduced and grown in Texas under trial or observation as warm-season perennial forage plants. Eight of the more important grasses in the group are:

Angletongrass, *Andropogon nodosus*

Medio bluestem, *Andropogon nodosus* var.

Pretoria 90 bluestem, *Andropogon annulatus*

Gordo bluestem, *Andropogon species*

Kleberg bluestem, *Andropogon annulatus*

Caucasian bluestem, *Andropogon caucasicus*

Australian bluestem, *Andropogon intermedius*

K.R. bluestem, *Andropogon ischaemum*
var.

DESCRIPTION

ANGLETONGRASS was introduced from India and grown at the Angleton Experiment Station in 1915. The stems are purplish-green with bearded nodes, relatively few leaves and grow 2 to 4 feet high. Few upright stems are produced, and these bear seedheads with usually three to five purplish branches. The grass produces long runners that root at the nodes to form a coarse, open turf with good growing conditions. Angleton begins growth relatively late in the spring and

makes its most rapid growth in late spring and early fall.

MEDIO BLUESTEM is a variety of Angletongrass. The two grasses are similar in appearance and growth habit. Medio is leafier with smaller stems, a darker color and fewer seedhead branches. It generally is not as tall as Angletongrass. Rapid growth comes rather late in the spring. The grass sometimes becomes chlorotic on highly alkaline soils. Medio was found by the Soil Conservation Service growing in the Medio Creek watershed in Bee County, Texas.

PRETORIA 90 and GORDO BLUESTEM are recent introductions from South Africa. Pretoria 90 is a tall bunchgrass with coarse, leafy stems and a grayish-green color. Gordo bluestem, formerly known as Pretoria 62, is shorter-growing, has purplish-green stems and green leaves, and a few stems tend to lie prostrate the first growing season, putting down roots from the nodes or joints that touch the soil.

KLEBERG BLUESTEM grows in clumps with numerous slender stems 1 to 3 feet high, depending on moisture and fertility. Most of the leaves are near the base. The stems, green until they become straw colored at maturity, have white-bearded nodes and bear seedheads with two to 10 purplish branches. There is no record of its introduction to Texas; it is native to India, China, North Africa and Egypt. The grass was found growing in Kleberg County, Texas, by Wick Diaz, King Ranch agronomist, who increased it.

CAUCASIAN BLUESTEM is an upright bunchgrass with fairly fine stems that may reach a height of 4 feet when the purple seedheads are mature. Most of the leaves are near the base, and the

lower leaves contain some red color. The grass was introduced from Europe or Asia, or both.

AUSTRALIAN BLUESTEM is a tall bunchgrass with slender stems that bear 4 to 6-inch seedheads made up of few-to-many greenish-purple branches. The lower leaves are long, while the upper are short, pointed and rough-edged, and all the leaves have a pungent odor and taste. The grass is found in India, China and Australia.

K.R. BLUESTEM grows in semiprostrate leafy tufts and sends up slender seedstalks two or more times each year. The mature seedstalks are yellowish-brown, bear seedheads with two branches and are 1 to 4 feet high, depending on growing conditions. The leaves grow mainly near the base and often are attacked by a leaf disease. This species was introduced from India, Turkey, China and Turkestan and probably others as Turkestan bluestem, yellow bluestem or beardgrass and East Indies bluestem. K.R. is a selection made by the Soil Conservation Service from a volunteer stand on the King Ranch.

ADAPTATION

ANGLETONGRASS and MEDIO BLUESTEM are best adapted to the heavy neutral-to-alkaline soils on the Rio Grande Plain and Coast Prairie. They have been grown to a limited extent in the southern part of the Blackland Prairie and on fertile bottom soils in East Texas, although they have been less satisfactory there. Both are likely to winterkill consistently north of Waco. These grasses have a fairly high moisture requirement for good production. They are used for grazing and hay and are excellent for

use in waterways and other wet areas. They are fairly tolerant of salt. Both are palatable when making good growth, although they are sometimes low in protein or phosphorus or both.

PRETORIA 90 and GORDO BLUESTEM have not been grown extensively enough for their soil and climatic adaptation to be known definitely. They have made good growth on heavy soils on the Rio Grande Plain and Coast Prairie when moisture was ample. Pretoria 90 appears to produce better than Gordo on fertile sandy loam soils in the same area. Both seem capable of producing good grazing and hay under conditions of high moisture and fertility in the areas named. See Table 1. These grasses probably will not consistently survive the winter north of Waco.

KLEBERG BLUESTEM and AUSTRALIAN BLUESTEM have not been grown widely, but they appear adapted to the clay and loam soils on the Rio Grande Plain and western Coast Prairie. Both can be used for grazing, and the taller Australian bluestem can be used for hay.

CAUCASIAN BLUESTEM and K.R. BLUESTEM are adapted to soils ranging from clay to sand. K.R. bluestem may be grown on the Blackland Prairie, Grand and North Central Prairies, East and West Cross Timbers, western Coast Prairie, Rio Grande Plain, Central Basin, eastern Edwards Plateau and southeastern Rolling Plains. Caucasian bluestem may be grown in these areas and on the Rolling and High Plains. Both grasses are excellent for soil building. The tender growth in spring, early summer and fall is fairly palatable, but palatability is low when the plants are making little growth due to drouth or when approaching maturity.

More desirable pasture grasses are available for planting in most areas. Caucasian bluestem shows promise for grazing and soil improvement in North Texas and on the Rolling and High Plains. K.R. bluestem is valuable for seeding on thin, severely eroded or rough areas where it is difficult to establish a cover of more desirable grasses. Usually it produces less forage than the more desirable grasses when growing conditions are favorable.

ESTABLISHMENT

SEEDBEDS for these grasses should be clean and firm, because the seedlings are small and grow slowly at first. Loose, unsettled seedbeds are more likely to dry out below the plant roots when the young plants are beginning growth. Fast-growing weeds and weedy grasses may choke out the seedling plants. Where wind and blowing soil are likely to damage the seedling plants, it may be best to plant in a dead stubble of sorghum or Sudangrass grown the year before the grasses are to be seeded.

FERTILIZER should be applied as needed for rapid grass growth. For row plantings, place the fertilizer in a band 2 to 3 inches below and the same distance to the side of the row. Fertilizer for drilled plantings may be banded between the drill rows at the time the grass is planted. Banding permits maximum use of the fertilizer by the grass plants and helps prevent phosphorus tie-up by lime. When the field is likely to become extremely weedy after planting, it may be best to delay fertilizer application until the grass is growing rapidly.

TIME OF PLANTING varies with moisture conditions and location. The

Best planting time for areas south of San Antonio appears to be early fall when enough moisture is available for germination and growth. Competition from weeds is less likely to be a problem in fall plantings. Such plantings should be made at least 6 weeks before frost. Spring plantings are better for the rest of the State. They should be made as early as possible to avoid summer weed competition but late enough to avoid spring freezes and serious competition from winter weeds. Where summer weeds are likely to be serious, it may be best to delay spring planting until one or two crops of weeds have been killed.

METHOD OF PLANTING depends on material and equipment available and seedbed conditions. Attempts to obtain stands by seeding these grasses often fail. Broadcasting seed hay is one of the surest methods. The seed hay may be cut and hauled loose, or it may be baled. Hammermilling the seed hay permits more even distribution. After seed hay is broadcast on the seedbed, it should be pressed into the soil with a cultipacker or a disk set straight.

Angletongrass often is sprigged or sodded to insure stands. Medio bluegrass occasionally is planted in this manner. Rooted runners or crowns are planted 2 to 3 feet apart in shallow furrows 36 to 42-inches apart. They are covered lightly and the soil firmed around them with the foot or tractor wheel.

Close drilled or row seedings of these grasses may be made with most grass drills. Cotton planters equipped with picker wheel-type boxes may be used to make plantings in 36 to 42-inch

rows when the seed have been mixed with cottonseed hulls or similar material. A four or five-hole corn plate may be used when the planter box is such that the cottonseed agitator can be set on top of the plate. Cottonseed hulls or similar materials are not necessary when the corn plate is used. The seed should be covered 1/4 to 3/4 inch deep, depending on the soil, and firmed with press wheels or rollers.

PLANTING RATES for these grasses are given in pounds of pure live seed (PLS) per acre. The seed units or spikelets are chaffy and often a low percentage contains a viable seed. Percent purity frequently is low also. Because of this

TABLE 1. HAY YIELDS PER ACRE FROM INTRODUCED BLUESTEM GRASSES AT FOUR LOCATIONS

Grass	Angleton ^{1/}	San Benito ^{2/}	Winter Garden ^{3/}	College Station
Angletongrass	11,980	19,070	15,240	
Medio bluescem	9,620	14,120		5,200
Pretoria 90 bluestem	11,800	28,570		13,300
Gordo bluestem				9,100
Australian bluestem		19,950	15,850	

^{1/}Average of 1956-57 growing seasons; Lake Charles clay; 240-120-60 per acre applied during 1956 and 192-144-64 during 1957

^{2/}Average of 1956-57 growing seasons; Laredo sandy clay loam; irrigated

^{3/}1953 season; Crystal loamy fine sand; irrigated

^{4/}1957 season; Miller clay in Brazos River bottom; 60 lb. nitrogen per acre in two applications; one 3-in. irrigation

*These data were supplied by experiment station personnel at Angleton, Weslaco, Crystal City and College Station.

variation, planting rates cannot be expressed simply in pounds of seed material per acre. Instead, PLS content must be determined for each lot of seed and this figure used to calculate the amount of seed to plant per acre. Percent purity and germination are given on the seed tag, or when the seed have not been tested, they can be determined at a seed testing laboratory.

Percent PLS is determined by multiplying percent purity by percent germination. The amount of seed material needed to give 1 pound of PLS is calculated by dividing the percent PLS into 100. The amount of seed material needed per acre is determined by multiplying the number of pounds required to give 1 pound of PLS times the PLS seeding rate.

For example, the suggested seeding rate for a grass is 0.5 pounds PLS per acre and the seed tag on the seed material reads 20 percent purity and 45 percent germination.

$20 \text{ percent purity} \times 45 \text{ percent germination} = 9 \text{ percent PLS}$

$100 \div 9 = 11 \text{ pounds of seed material required to give 1 pound PLS}$

$11 \times 0.5 = 5.5 \text{ pounds of seed material per acre to get 0.5 pound PLS per acre}$

Suggested PLS per acre planting rates for these eight grasses:

- Perennial - 0.4 to 0.5 in 36 to 42-inch rows
- Grass 1.4 to 1.6 drilled
- Alfalfa - 0.4 to 0.5 in 36 to 42-inch rows
- System 1.2 to 1.5 drilled

Pretoria 90 - 0.6 to 0.8 in 36 to 42-inch rows
and 1.4 to 1.6 drilled

Gordo bluestem

Kleberg - 0.4 to 0.6 in 36 to 42-inch rows
bluestem 1.3 to 1.5 drilled

Caucasian - 0.3 to 0.4 in 36 to 42-inch rows
bluestem 1.0 to 1.2 drilled

Australian - 0.4 to 0.6 in 36 to 42-inch rows
bluestem 1.3 to 1.5 drilled

K.R. bluestem - 0.3 to 0.4 in 36 to 42-inch rows
1.0 to 1.3 drilled or broadcast

CARE of new plantings often determines whether a good stand is established and how quickly it is established. Row plantings should be cultivated for weed control. When Angletongrass and Medio bluestem runners begin to meet in the middles, cultivation should be stopped and the weeds controlled by mowing. Drilled and broadcast stands should be mowed as needed for weed control. Or, weeds may be controlled by spraying with 2,4-D, as outlined in B-892, "Weed Control in Texas Pastures," after the grass plants have four to six leaves.

New stands of these grasses should not be grazed until they are well established. Angletongrass and Medio bluestem may be grazed when a good ground cover is obtained. The other grasses probably should not be grazed the first growing season, unless growing conditions are good and clump development is usually rapid.

MANAGEMENT

GRAZING management often determines whether stands of these grasses are maintained. Angletongrass and Medio bluestem are able to withstand heavier

grazing than the others. Pretoria 90 and Gordo bluestem are the most sensitive of the eight to grazing because they have fewer leaves near the crown and they are more completely defoliated by grazing. They probably should not be grazed or cut closer than 8 to 12 inches. Australian bluestem should be grazed or cut no closer than 6 to 8 inches.

Grazing should be managed so that more than two-thirds to three-fourths of the leaves of any of the eight grasses are removed or so that the plants remain healthy. Heavier grazing will result in poor animal performance. Continuous over-grazing results in weak, weedy stands and eventual loss of stand.

HAY of good-to-fair quality may be obtained if these grasses are cut every 4 to 6 weeks when growing conditions are favorable. They should always be cut before they pass the boot stage. Cutting at the early bloom stage gives fair quality hay, but quality declines rapidly after this stage. The drop in quality is especially rapid in K.R. and Caucasian bluestem after they pass the boot stage.

FERTILIZATION will be necessary to maintain vigorous stands and obtain good yields on many soils. A soil test is the best way to determine the amount and kind of fertilizer needed.

SEED PRODUCTION and quality vary among these grasses, as well as with soil moisture, humidity, temperature and location. The seed may be harvested by direct combining if the combine is properly adjusted. However, considerable seed material generally is lost with the chaffings. More seed can be obtained by windrowing, curing and threshing the seed material. When seed are to be harvested

for planting in the same vicinity, probably the most practical procedure is to cut the seedstalks and broadcast them over the area to be planted. Curing the seed material and running it through a hammermill permits easier handling and allows better distribution on the new area. The skills necessary for successful grass seed production and harvesting can be obtained only through experience.

Authors acknowledge the assistance of E. M. Trev, former Extension pasture specialist, in the preparation of this publication.

Cooperative Extension Work in Agriculture and Home Economics, Texas A&M University and United States Department of Agriculture cooperating. Distributed in furtherance of the Acts of Congress of May 8, 1914, as amended, and June 30, 1914.