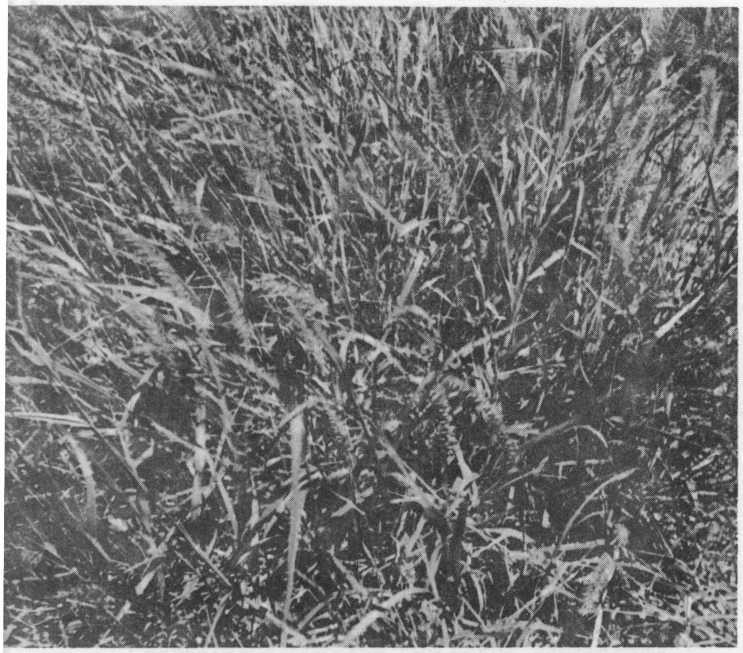

L-213

# Buffelgrass

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Buffelgrass (Pennisetum ciliare) is a perennial warm-season bunch grass. Texas introductions are mainly from South Africa, but the grass is also native to North Africa and the southern Mediterranean area. Plantings were made at Texas Substations as follows: Angleton, 1917; Temple, 1918; Chillicothe, 1928; and Tyler, 1932. New introductions were planted in 1946 in the Soil Conservation Service Nursery at San Antonio. One of the 1946 introductions, accession T-4464, is the strain that has been available for field plantings. Blue buffel, accession T-3782, is another strain from the same Nursery that is being increased. There are many other strains, but T-4464 and blue buffel are of most concern. The Experiment Station has under observation and test over 20 additional strains that differ in height, stem size, leafiness, root system, seedhead color and other seedhead characteristics.

## Description

T-4464 has a bright green foliage, and the purplish seedheads are borne at the ends of the stems and branches. The plants are rather leafy and are bushy under good growing conditions. The root system is fibrous, and the plants grow from a knotty crown.

Blue buffel has bluish-green foliage and light colored seedheads. The stems are usually a little larger and less leafy than those of T-4464. The root system is rhizomatous with short, strong underground rootstocks. New plants come from these rhizomes, as well as from the seed, much the same as in Johnsongrass and other grasses with this type root system.

## Adaptation

*Area* of adaptation of T-4464 appears to be south of an east-west line through Waco, except where winter temperatures approach zero. The grass is sensitive to frost and established stands have been killed by 0 to 10-degree temperatures. Blue buffel is reported to be more cold tolerant than T-4464, but the northern limit of its climatic adaptation is not known.

*Soils* ranging from clays to sands have supported good growths of buffelgrass. T-4464 seems a little better suited to sandy loam soils, while blue buffel is reported to be better adapted to heavier soils than T-4464.

*Use* of buffelgrass is as a grazing and hay crop. It should be kept in a state of semi-cultivation, as it is not suitable as a range plant. The grass should not be expected to thrive and spread in competition with well-adapted grasses in a mixed pasture. T-4464 works well in rotation with annual crops. A well-managed buffel planting should add considerable organic matter to a soil when grown two to four years, but just as any other crop likely will deplete the soil if not fertilized properly.

## Establishment

*Time of planting* buffelgrass for all except South Texas is in the spring, after the soil is warm enough for cotton or peanut planting. Plantings in deep South Texas may be made in the fall, if sufficient moisture is available for stands to be obtained 60 to 70 days before frost. Fall plantings in South Texas are desirable, because there is less weed competition then.

*Seedbeds* for buffelgrass should be firm and free of growing plants. When the grass is to be planted on sand that blows, it may be desirable to grow a crop of sorghum or Sudangrass the previous season, with the stubble left standing. The stubble will give the young buffel plants some protection against the blowing sand.

*Rate of seeding* to give a good stand of plants in 36 to 40-inch rows is about two pounds of good quality unhulled (in the bur) seed. Hulled seed (grain) may be planted at the rate of 6 to 8 ounces. Unhulled seed may be planted with any picker-wheel type cotton planter. The seed spout should be smooth and straight as possible to prevent clogging. Unhulled seed are often mixed with one to three parts by volume of cottonseed hulls to get better distribution. Hulled seed may be planted with vegetable seeding equipment, such as the Planet Jr. type. Both unhulled and hulled seed should be covered 1/4 to 1/2 inch. When seeding in moist soil, the soil should be firmed over and around the seed with a roller. Dry plantings have been very

*Table 1. Average yield of hay, percent phosphoric acid and protein and protein produced per acre from grasses grown under irrigation at San Benito* and Winter Haven**.*

| Location | Grass | Hay yield (Lbs. per acre) | Percent $P_2O_5$ | Percent protein | Protein (Lbs. per acre) |
|---|---|---|---|---|---|
| San Benito | Buffel | 34,120 | .33 | 10.69 | 3,650 |
| | Coastal Bermuda | 32,960 | .39 | 11.81 | 3,890 |
| | Rhodes | 30,470 | .35 | 10.34 | 3,150 |
| Winter Haven | Buffel | 22,030 | .72 | 13.50 | 2,970 |
| | Coastal Bermuda | 27,790 | .64 | 15.25 | 4,240 |
| | Rhodes | 18,730 | .81 | 13.23 | 2,480 |
| | Blue Panic | 23,290 | .91 | 18.23 | 4,250 |

*Outfield test of Weslaco Substation. Seven clippings from May 1952, to April 1953. Fertilizer applied was approximately 128-80-0.

**Eight clippings from March to November 1953. Fertilizer applied during the year was approximately 292-156-0. Irrigation water was applied 13 times, 3 inches per irrigation, for a total of 39 inches.

*Table 2. Protein and phosphoric acid contents of irrigated warm-season grasses, Winter Haven, 1953.*

| Grass | Percent protein | | | Percent phosphoric acid | | |
|---|---|---|---|---|---|---|
| | June 3 | Sept. 15 | Nov. 12 | June 3 | Sept. 15 | Nov. 12 |
| Buffel | 18.12 | 11.25 | 11.12 | .96 | .54 | .65 |
| Coastal Bermuda | 18.12 | 13.88 | 13.75 | .68 | .55 | .70 |
| Rhodes | 19.00 | 9.75 | 10.94 | .99 | .66 | .78 |
| Blue Panic | 21.06 | 15.38 | 18.25 | 1.03 | .81 | .88 |

*Table 3. Yield, 1953, and yield and protein and phosphoric acid content of buffelgrass grown on Upland at College Station in 1952.*

| Strain | 1953 | 1952 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Hay yield | Yield | Percent protein | | | Percent phosphoric acid | | |
| | (Lbs. per acre) | (Lbs per acre) | June 12 | July 15 | Oct. 8 | June 12 | July 15 | Oct. 8 |
| 156,546* | 6,300 | 2,530 | 18.8 | 10.8 | 10.4 | .68 | .21 | .27 |
| T-4464 | 5,740 | 2,320 | 21.3 | 10.6 | 9.9 | .67 | .22 | .26 |

Fertilizer applied was 58-50-25 in 1952 and 71-72-36 in 1953
*Has characteristics similar to blue buffel.

satisfactory. *Unhulled T-4464 seed should be about one year old before planting, because they have a dormancy period. Unhulled blue buffel seed have a shorter dormancy period, but seed six months to a year old are to be desired for planting.* The dormancy period for hulled seed is reported to be much shorter.

*Fertilization* often will be necessary for satisfactory establishment. Phosphorus will be needed often and sometimes potash. Nitrogen should always be considered a requirement, although it might be applied best after the plants have started growing to avoid some weed competition. The best means of determining the type and amount of fertilizer needed for any soil is through a soil test. County agricultural agents can supply details on soil tests and general fertilizer recommendations.

## Management

*Grazing* management of buffelgrass is difficult because of its growth habit. It sets seed throughout the growing season and grows rapidly under favorable conditions. Rotation grazing of small blocks with relatively large numbers of animals is necessary to get good utilization of forage produced during the peak growing period. Two years' research results with both types at College Station indicate the need for such intensive grazing management with this grass. Without restricted grazing, the growth will get ahead of the grazing animals and the result will be lower quality grazing and a great deal of forage wasted by trampling and being refused by the animals. A system of rotation grazing will require cross-fencing, which may be with portable electric fences. With proper cross-fencing, blocks not needed for grazing may be used for hay. Observations indicate that buffelgrass should set a seed crop and approach maturity during the growth period immediately before frost in the fall. The grass is normally later in starting spring growth than such grasses as Coastal Bermuda and blue panic. Buffel stands allowed to set a seed crop and approach maturity before going dormant in the fall have started growth

as much as four weeks earlier in the spring than plantings not allowed to make the fall growth. The apparent reason is that the fall growth allows the plant to build up food reserves in the root system, resulting in early spring vigor. After the fall growth has been made, it could be utilized moderately. In some cases 50 to 90 percent of stands have been lost by not allowing the fall growth.

*Cultivation* will be necessary to control weeds while stands are becoming established. It will be needed in old stands to control seedlings and prevent a solid stand. If plants are allowed to become established or spread to the point that the middles are filled, production likely will become unsatisfactory. There will be too many plants in a broadcast stand for good growth, except with extremely high fertility and ample irrigation.

*Fertilization* usually will be necessary to maintain good production. Without proper fertilization, buffelgrass can severely deplete the soil with its extensive root system and feeding ability. Many reports indicate yields from established stands often decrease from year to year. This may be partially overcome with proper fertilization. Approximately 30-10-30 is removed with each ton of grass hay. This is the equivalent of 150 pounds of ammonium sulphate, 50 pounds 20 percent superphosphate and 50 pounds 60 percent muriate of potash. The grass can use 30 pounds of actual nitrogen each time it is grazed or clipped, if moisture is available. The nitrogen is applied easily in the middles as a sidedressing. Phosphoric acid requirements should be supplied, as buffelgrass frequently is deficient in phosphoric acid after spring growth. Potash sometimes will be needed. Annual phosphorus and potash requirements may be supplied usually in one spring application. A soil test will show the type and amount of fertilizer needed.

*Hay* from buffelgrass is generally good quality when cut before the plants mature. The protein and phosphoric acid content of the plants decrease as maturity advances. .(See Tables 2 and 3.) Buffelgrass grown under dryland conditions on soils naturally low in phosphorus may be deficient in phosphoric acid, especially during dry periods. (See Table 3.) Forage containing less than .33 percent phosphoric acid is considered deficient and not adequate for body maintenance in cattle. The results of two years of research at College Station show that best yields were obtained by allowing the grass to approach maturity before cutting. These results are consistent with bunchgrass growth habit. Delayed harvest resulted in lower protein content, but that obtained was generally satisfactory.

*Seed harvested* from buffelgrass has provided the primary income from some stands. Both T-4464 and blue buffel are prolific seed producers. The most successful seed harvest operations have been with especially designed harvesters and by hand.

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