Buffelgrass—South Texas Wonder Grass

C. Wayne Hanselka

Grass is a precious resource in the hot, dry south Texas brush country. Historically, desirable climax grasses such as plains bristlegrass, pink pappusgrass, and windmillgrasses have been heavily grazed, making them scarce on most ranges. Some range sites support hardy turfgrasses such as curlymesquite or buffalograss. Forage quality is low in winter and during the frequent drouths. Brush species such as guajillo, colima, guayucan, and others provide some quality browse during stress periods. Overall, however, grass production and quality is low with consequent low livestock carrying capacities.

It is often necessary for the rancher to provide supplemental feeds to keep cattle in good condition. In fact, emergency feed during drought is often necessary for cattle survival. It is obvious that a high producing, nutritious forage grass is necessary for the advancement of livestock ranching in the region. Buffelgrass fills this void.

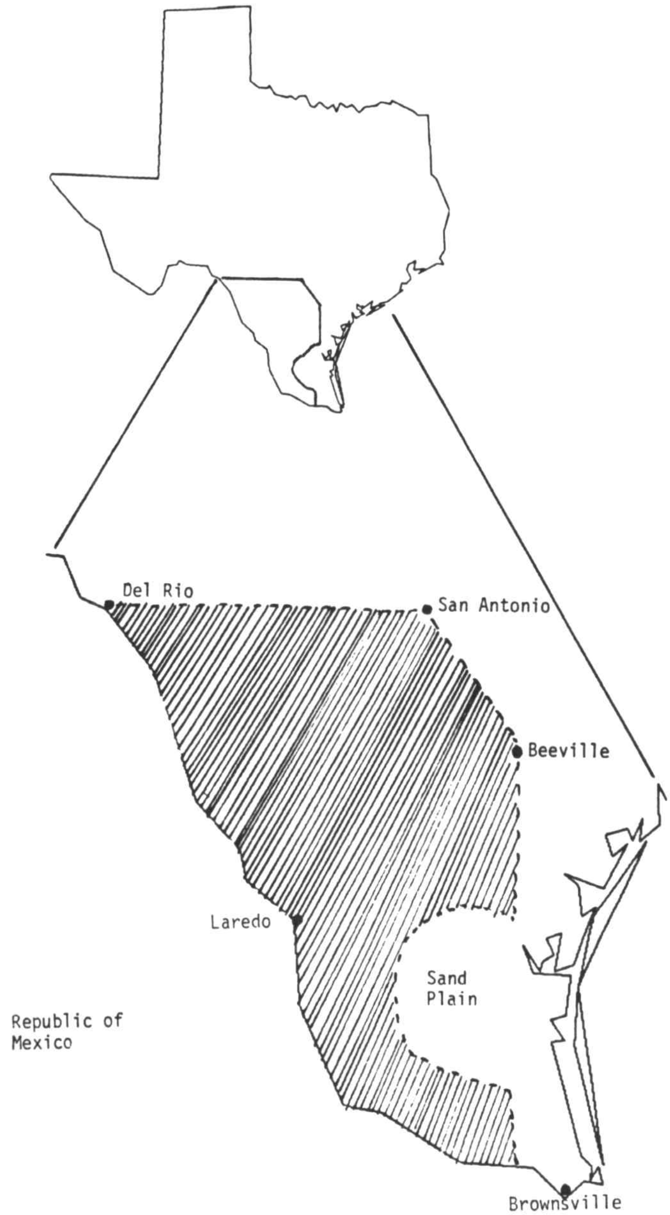
A hardy native of South Africa, buffelgrass was first introduced into Texas as early as 1917. Those early plantings failed because they were too far north and on "heavy" clay soils. In 1947 it was successfully grown at San Antonio, and subsequent trials in the lower brush country were resounding successes. Efforts were made to quickly get seed to commercial growers and distributors. By the time seed became commercially available, south Texas was in the seven-year drouth of the early 1950s. However, buffelgrass established itself and thrived despite the dry weather. The grass has since spread throughout the area and is presently growing on more than 1.7 million acres.

Texas Distribution and Origins

Buffelgrass is not cold-tolerant and is restricted to south Texas by freezing winter temperatures farther north. The general area of adaptability is bounded on the north by U.S. Highway 90 from Del Rio to San Antonio. From San Antonio, this imaginary line arcs to the southeast to Beeville before turning south. It then parallels the coast about 40 miles from the shoreline. The southern range of buffelgrass extends well into northern Mexico.

Dr. E.C. Bashaw, an USDA-ARS plant breeder and buffelgrass expert headquartered at Texas A&M University, believes buffelgrass originated in the Transvaal and Cape Provinces of South Africa. Buffelgrass then spread northward throughout the drier regions of Africa and into the arid grasslands of western India. The soils and climatic conditions in its native countries and in southwest Texas and Mexico are similar, thus the excellent performance of buffelgrass here is not surprising.

The author is Extension Range Specialist, Rt. 2, Box 589, Corpus Christi, Texas 78410.



Distribution of buffelgrass in Texas.

Adaptations

Buffelgrass grows readily on the sandy loam soils that are widely spread in south Texas. However, there are areas within this region that are not suitable for stand establishment. High salinities, deep sand, tight clay, or poor surface drainage severely inhibits buffelgrass. High water tables also present problems in maintaining stands. As a result, buffelgrass does not do well on the coastal plain or on the large areas of salty soils and deep sandy sites in the region.

The lack of cold tolerance exhibited by buffelgrass is complicated by infrequent freezes in south Texas. These may occur suddenly and temperatures may drop from the 70's to freezing within a few hours. Stands are likely to be freeze-damaged when this occurs. A hard freeze in 1983-84 destroyed large acreages of the grass in south Texas.

Buffelgrass is relatively free of disease and insect pests in the U.S. although the spittlebug is a major problem in Mexico. Fortunately, this insect has not been reported north of the U.S.-Mexico border. When spittlebug infestations are high, large portions of infested buffelgrass stands may be lost. In the 1960's, grasses on over a million acres of Mexican rangeland were destroyed by the pest. The resulting losses to cattlemen amounted to more than 500 million pesos annually.

Production and Nutritional Characteristics

A variety of factors will influence the total production of a buffelgrass stand. Soil depth and texture, temperatures, precipitation and soil moisture, and extent of top removal are examples of such environmental agents. Total buffelgrass production is directly related to soil basal cover and plant density.

Soil type and its associated moisture relationships and fertility will also determine potential forage production. As discussed earlier, the grass produces best on sandy loam soils and is marginal on clay loams. It produces poorly on sands because of low water holding capacities and fertility of sandy soils.

Buffelgrass production is also very responsive to precipitation and temperature. Measurements have shown that the average total production of buffelgrass pastures under average rainfall is more than double that of a drouth year. Buffelgrass responds quickly to spring precipitation once soil temperatures are above 75° F. Likewise, fall rains allow dramatic autumn production. The "dog day" months of July, August, and September are usually dry with little or no production.

Buffelgrass has allowed a threefold increase in cattle stocking rates in south Texas.

Production declines over the winter months are due to low temperatures. Spring growth begins when the minimum air and soil temperatures rise. Low soil moisture will inhibit initiation of spring growth but temperature controls the process.

Buffelgrass forage quality is closely related to the phenology and maturity of the plant and will vary with plant and environmental conditions. In late summer, plants are usually under drouth stress with little or no new growth. Crude protein, total digestible nutrients, phosphorus, etc., levels are low, reflecting this stress. Autumn rains result in grass growth, the quality of which may remain high through the winter months. Cooler weather will reduce production so, although quality is adequate in winter, the quantity is low. The new spring growth is very nutritious but quality declines as the plant matures.

Nutritional quality is also affected by environmental and management factors. Buffelgrass pastures allow increased carrying capacity, but not necessarily better nutrition, than native mixed-brush range. A shortage of grass on brushy range requires energy supplementation, whereas a lack of brush on buffelgrass pastures requires crude protein supplementation. Forbs are an important nutrient source on both types of pastures. On both ranges, animal numbers must be seasonally balanced with the forage supply and supplemented accordingly.

Phosphorus levels fluctuate greatly in response to rainfall but are generally low. Phosphorus supplements should be supplied free-choice year-round. Calcium, potassium, magnesium, and sodium are usually adequate year-long.

Prescribed burning can be used to improve short-term forage quality and intake of buffelgrass. Even with fertilization and/or irrigation, and burning, buffelgrass foliage decreases in quality with age and season.

Establishment, Maintenance, and Management

Buffelgrass has demonstrated an ability to establish, persist, and produce under semi-arid conditions. However, there are reasons for excellent buffelgrass stands. Site selection for seeding is very important, with slightly alkaline sandy loam soils being the best suited. Seedbed preparation is normally done in conjunction with mechanical brush control. Seed are broadcast at a rate of two pounds (PLS) per acre on the soil surface at the same time as the last mechanical operation. Best seeding times in Texas are just prior to the May and September rains. Weed control and fertilization are not normally practiced except where hay or seed will be produced. The resulting stand should not be grazed until the grass has produced its first seed crop.

A buffelgrass stand is considered to be well established when plant densities are 5 to 10 plants per square yard and the plants have an established root system. Plant population densities will decrease with time to 3 to 5 plants per square yard. Plants will become root-bound over time and forage production will decline. Old stands of buffelgrass should be renovated by discing or deep chiseling every 4 or 5 years.

Adaptablity and production characteristics of buffelgrass has allowed an increase in cattle stocking rates on south Texas ranges from approximately 30 to 10 acres per animal unit. The grass is tolerant to short periods of overuse but continuous heavy grazing dramatically lowers root growth and forage production. With short rest periods and moderate grazing the root systems remain strong and forage production is increased.

In both wet and dry years, the more dry matter that can be left on the ground, the more dry matter the plants will produce. Overall, at least 700 pounds per acre (8 inches of stubble, depending upon plant density) should be left on the ground at all times. This is more critical in dry years than in wet ones. Properly used plants are also less susceptible to freeze damage and winter kill. With the grass cut short, production will vary more with the climatic fluctutions even with longer rest periods. A properly designed and installed grazing system should allow cattle to consume the desired forage and to stimulate new growth for the next year. A 4 pasture-1 herd system in Zapata County allowed a 75% increase in stocking over time while allowing buffelgrass cover to increase. Short duration and seasonal grazing have been used successfully, realizing a 25% increase in stocking rate over continuous grazing.

One disadvantage of high dry matter production and dense growth habit is that a dense buffelgrass stand is not good bobwhite quail habitat. If quail or other wildlife species are an important range commodity, buffelgrass should be planted in strips or small blocks. It should be managed in such a way that it remains sparse and a thick litter layer should not be allowed to build up.

Future is Bright

While buffelgrass is widely adapted throughout south Texas, several problems remain. The most widely recognized problem is the susceptibility of buffelgrass to winter freeze damage. Presently, researchers are working toward improving the cold tolerance of buffelgrass by selecting for plants with vegetative buds that are deeper in the soil. The varieties "Nueces" and "Llano" have this characteristic extending the range of buffelgrass northward about 75 miles.

Although the incorporation of these traits in buffelgrass has improved its cold tolerance, "Nueces" and "Llano" are poor seed producers. The plants tend to remain vegetative, and considerably less seed is harvested than in common buffelgrass. In fact, the poor seed production of "Llano" has made seed difficult to obtain and very expensive.

A buffelgrass breeding program is continuing with new plants being collected in Africa. Dr. Mark Hussey at Texas A&M University believes that projected developments hold even greater importance in store for the grass. This is true not only for south Texas but also for those areas farther north. Improved winter hardiness will also improve stand persistence in the current area of use.

In the 40 years since the first producer planting, buffelgrass has changed from an unknown to the most important grass in south Texas. This is due primarily to continued interest, research, and education efforts by the Texas Agricultural Experiment Station, the Texas Agricultural Extension Service, and the Soil Conservation Service; basic research and variety development by the USDA Agricultural Research Service; ingenuity of the seed production industry; and the producer's continuing interest in, demand for, and acceptance of new developments. Buffelgrass is truly the wonder grass of south Texas.

Hornflies May Need New Control Methods

Plastic ear tags impregnated with insecticides have become a common management tool for controlling hornflies on cattle during the summer pasture season. Increased weight gain of calves and yearlings from season-long hornfly control and the ease of ear tag application have made this control method popular. Unfortunately, biological characteristics of the hornfly and properties of the insecticide-impregnated ear tags have combined to produce flies that are no longer killed by the insecticides presently incorporated into tags. The hornflies have developed insecticide resistance. Cattlemen should consider modifications to their hornfly control practices even if control with ear tags has proven successful in the past. Use of alternate control methods will slow down the spread of resistance.

Insecticide resistance of hornflies was first observed in the southeastern United States and has rapidly spread northward. Ear tag failure was first reported in western Canada during 1986. Several locations in Manitoba, Saskatchewan, and British Columbia reported that insecticidal ear tags were not giving the expected, season-long control of hornflies. All of the locations reporting failure were within 60 miles of the Canada-United States border.

In 1987, Lethbridge Research Station staff, in cooperation with technical service staff from one of the ear tag manufacturers, initiated work to document what appeared to be insecticide resistance in hornflies. Hornflies were obtained from a site where tag failure had been reported. These hornflies were found to be resistant to the insecticide in the tags. The resistant flies were not killed until exposed to insecticide concentrations eight to fifteen times higher than concentrations that killed susceptible, laboratory-reared flies.

Reports in 1988 suggest that insecticide resistance in hornflies is spreading. These observations have been verified by limited testing, which confirmed insecticide resistance in flies from a variety of areas.

Ear tag manufacturers are combating the problem by developing new chemicals, formulating ear tags with more than one chemical, and by developing new application technologies. Producers also have an important role in preventing or slowing down the spread of resistance in hornfly populations. Cattlemen should use the maximum tagging rate recommended by the manufacturer as this ensures maximum insecticide deposition on cattle, hence maximum fly killing. Tags should not be applied before the fly season, and all tags should be removed in the fall after fly activity has stopped. Used tags should be collected and disposed of in a safe manner. The most effective strategy is for cattlemen to use different insecticides and application technologies every second or third year. **D.D. Colwell,** Parasitologist, Agriculture Canada Weekly Letter, No. 2849.