

# Bahiagrass and Dallisgrass for Forage

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## Bahiagrass

Bahiagrass (*Paspalum notatum*) is a warm-season, sod-forming, perennial grass that spreads by seed and short, stubby rhizomes. Bahiagrass is native to South America and was accidentally introduced into the United States in the late 1930s and has since spread throughout the southeast U.S. It is less cold tolerant than bermudagrass and is commonly found in Arkansas from I-40 southward. However, some scattered fields of a cold-tolerant variety exist in north Arkansas (see varieties section).

Bahiagrass is grown primarily for pasture, but it may also be used for hay. It is very drought tolerant and can survive well on dry, rocky, shallow sites where even bermudagrass grows poorly. Bahiagrass is easy to maintain because it is tolerant of close grazing, low fertility and is generally free from diseases or insect pests. Weed invasion tends to be lower in bahiagrass compared to bermudagrass due to its extremely dense sod. It is also more shade tolerant than bermudagrass.



**Figure 1. Bahiagrass seedheads have a two-fingered or forked appearance.**



**Figure 2. Bahiagrass leaves tend to be long and narrow and concentrated near the soil surface. Leaves do not grow up on the seedstalk.**



**Figure 3. Bahiagrass spreads by short "J" shaped rhizomes that form a thick sod.**

Hay quality and yield are generally lower than for other forage grasses at similar levels of forage maturity. However, it does respond well to improved grazing and fertility management. Grazing livestock may spread viable seed in manure which can easily allow bahiagrass to become a weed in other pastures where it may not be wanted.

## Varieties

Several varieties are available, but only those that may be adapted to regions of Arkansas are listed here.

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**Pensacola** bahiagrass was introduced into the United States from South America in the late 1930s, probably in ballast discarded from ships visiting the port at Pensacola, Florida. E. H. Finlayson, a county Extension agent, found this cultivar growing in vacant lots near Pensacola's docks. It is the most widely grown variety in the southeast United States and Arkansas. It has long, narrow leaves and tall seed stalks. It is more winter hardy than the common and Argentine varieties. Growth begins early in spring and continues until mid-summer when the seedheads mature. Late summer growth is slow and low quality. Pensacola is fairly resistant to ergot.

**Tifton-9** was a selection from Pensacola released in 1987 by the Georgia Coastal Plain Experiment Station. It is less tolerant of close grazing than Pensacola but has much greater seedling vigor. Tifton-9 has a more upright growth habit and does not develop a dense sod like other varieties. It produces about 10 percent more forage than Pensacola. Due to its greater seedling vigor, it can be established with only 8 to 10 pounds of seed per acre if drilled. A higher seeding rate may result in quicker stand development.

**AU Sand Mountain** was developed and released by Auburn University from plants found on the Sand Mountain Research and Extension Center in north-east Alabama. This variety is more winter hardy than other currently available bahiagrass varieties.

**TifQuik**, a variant of Tifton-9, is a newer variety that has superior seedling vigor and quicker stand formation. The yield potential and other characteristics of TifQuik are essentially the same as Tifton-9.

**UF-Riata** was developed and released by the University of Florida. This variety has a different photoperiod response than other varieties, which results in it having a longer growing season. It tends to grow later in the fall and earlier in spring. It has matched the yield of Tifton-9 and TifQuik in trials at Tifton, Georgia.

**Wilmington** is the most cold-tolerant variety of bahiagrass. Although seed is no longer commercially available, it is noted here because several fields of Wilmington with good stands are scattered across north Arkansas in Boone, Baxter and Randolph counties. Reports are that those fields were planted in the early 1970s. Other varieties of bahiagrass do not persist that far north.

## Planting Methods

The best time to plant bahiagrass is in spring, after danger of frost has passed, until June 1. Dormant plantings made during winter are less preferred because stands have higher risk of weed invasion and take longer to fill in. Seeding rates vary

with variety and planting method. When using Pensacola or a Pensacola-type variety, the seeding rate should be 12 to 15 pounds of seed per acre when the seed are drilled into a prepared seedbed.

When broadcasting seed onto a prepared seedbed or using no-till methods, increase the seeding rate of Pensacola-type varieties to 18 to 20 pounds per acre. Tifton-9 and TifQuik have much better seedling vigor than Pensacola-type varieties, allowing lower seeding rates. As a result, the seeding rate for Tifton-9 and TifQuik is 8 to 10 pounds per acre on prepared seedbeds and 12 to 15 pounds per acre when broadcasting or planting with a no-till drill.

Bahiagrass can be drill or broadcast planted on a tilled, prepared seedbed or can be no-till drilled into a killed sod. Bahiagrass seed size is small, so planting depth should be no more than ½ inch. About 50 to 60 percent of seed germinate within 30 days after planting, but some may not germinate until the year after planting. TifQuik seed germinate faster, and most seed will germinate within 2 weeks after planting under favorable conditions.

New seedings are often made for two typical scenarios – on new cleared land and when renovating old, thin pastures. Land that has just been cleared of timber normally has low weed pressure and is often an ideal site for establishing bahiagrass. The site should be cleared of all stumps and timber slash to allow use of planting and harvesting equipment later. Such sites may need substantial applications of lime, phosphorus and potassium based on soil tests.

Tillage will likely be needed to prepare a high-quality seedbed. Old, thin pastures tend to suppress a large seedbank of various weeds. When the old sod is removed by spraying or tillage, the latent seedbank erupts into a heavy stand of aggressive weeds (broad-leaf and grass) that may require a year or more to properly control. To establish a new forage successfully, you must plan ahead to properly address this problem.

The most reliable method of killing an old pasture sod is to use the spray-smother-spray (SSS) method. The SSS method involves spraying an actively growing sod in spring with a nonselective herbicide (e.g., glyphosate), then planting a summer annual forage (sorghum/sudan or pearl millet) that serves as a smother crop while providing summer forage. The summer annual forage provides heavy shade and competition for weeds, and it can be harvested for hay or grazed.

It is best to harvest the last growth of the summer annual in September as hay to leave short, even stubble. Spray the stubble again to kill any remaining sod, weeds and summer annual plants. A small grain (wheat or rye) can be then no-tilled into

the sprayed sod for winter forage or the field can be left fallow until spring. Spray to kill the sod or winter annual after grazing in spring. Bahiagrass can be then drilled into the killed small grain stubble or on a prepared tilled seedbed.

## **Fertility Management**

Since bahiagrass is a warm-season grass, fertilization should be timed to occur just before active growth begins in mid-spring. This typically is when night temperatures are near 60°F for about a week and often occurs around early May. Applying fertilizer before temperatures have warmed will result in more weed competition and lower fertilizer efficiency. When submitting soil samples for planting bahiagrass and for hay or pasture production, ask for recommendations for warm-season grasses.

Bahiagrass has lower yield potential than bermudagrass, so hay production recommendations should be for no more than 2 or 4 tons of hay per acre. Fertilizer applications can be split according to the harvest schedule. If only two harvests will be made for the year, apply half the total fertilizer recommendation for each cutting. Apply one-third of the total recommendation for each cutting if three harvests are planned.

Since bahiagrass tolerates low fertility and management, producers often neglect proper fertilization in hay fields. Bahiagrass responds to fertilizer application, especially if soil potassium is low. Low potassium fertilization leads to thin stands and low hay productivity.

## **Grazing**

Bahiagrass makes good summer pasture for most classes of livestock. Forage quality is best in early summer and declines in late summer. Bahiagrass grass grows from late spring through September and stops growth in fall when night temperatures drop into the low 50s.

Bahiagrass produces most of its forage close to the soil surface. It is estimated that 60 percent of the total yield is produced within 2 inches of the soil surface. Because the leafy portion is low-growing, the forage should generally be grazed short for best utilization and animal performance. Bahiagrass will tolerate close, continuous grazing, although it responds well to rotational grazing management.

## **Stockpiling for Fall Grazing**

The last growth of the year from late August through early October can be stockpiled for grazing starting in late October through December, which is well after normal growth has stopped for the year. Stockpiling is basically the same management as would be used for producing a last hay cutting of the

year, but the livestock are used to harvest it instead of investing extra harvest expense in hay which would be fed back to the livestock during November and December anyway.

Demonstration results showed stockpiled bahiagrass forage yields of 2,000 to 2,500 pounds of dry matter per acre. To stockpile bahiagrass, clip or graze the pasture (or hayfield) to a 1- to 2-inch stubble by mid-August and apply 50-60 pounds of nitrogen fertilizer per acre in mid-August (apply P and K as directed by soil test). Allow the grass to grow until October. Grazing can begin in October and can continue until the forage is consumed or through December.

Some producers in south Arkansas have found that waiting until early September to begin stockpiling bahiagrass produces a more vegetative forage that is consumed more readily by livestock although yield is lower than if the stockpile process were started earlier. Arkansas Extension farm demonstrations showed an average savings of \$20 per animal unit by grazing stockpiled forage instead of feeding hay. Grazing stockpiled forage also saves substantial time compared to harvesting and feeding hay. Demonstration and survey results showed a time savings of 110 hours for stockpiling a 40-acre pasture for fall grazing compared to harvesting the field for hay and feeding in the late fall.

## **Hay Harvest**

Bahiagrass will produce an acceptable hay crop, but yield is lower than for bermudagrass. In a 6-year variety trial at the Southwest Research and Extension Center at Hope, Pensacola bahiagrass produced an average 87 percent of the yield produced by common bermudagrass and only 57 percent of the yield by the hybrid Tifton 44 bermudagrass.

Forage quality of bahiagrass hay is usually lower than for bermudagrass and other forages, but if well managed, it can be of good quality that matches nutritional needs of several classes of livestock. Bahiagrass hay quality in an Arkansas Beef Improvement demonstration in Dallas County averaged 10.4 percent crude protein and 59.7 percent TDN over three cuttings under well-managed hay production.

Hay should be harvested when the leafy portion of the forage reaches 10 to 12 inches tall. Subsequent harvests can be made on a 30- to 35-day interval to maintain highest forage quality.

## **Overseeding Winter Forages into Bahiagrass**

Winter annual forages such as small grain or ryegrass may be autumn seeded into bahiagrass stands. A common procedure used is to mow or graze the bahiagrass to at least a 2-inch stubble height in mid-September, disk the bahiagrass stand lightly,

broadcast seed and fertilizer, then harrow or drag the field to cover the seed. Or the winter annual forage can be no-till drilled into the short sod during October when bahiagrass is becoming dormant and noncompetitive. The winter annual forage should be fertilized at establishment if fall grazing is desired. Additional fertilizer can be applied in February for spring grazing of the winter annual forage.

## Dallisgrass

Dallisgrass (*Paspalum dilatatum*) is a fast-growing perennial warm-season grass used primarily for pasture. It has wide, smooth leaves and a deep root system. It is found statewide and typically grows in low-lying moist soils. It is especially well adapted in the south half of Arkansas. Forage quality and palatability are very good for most grazing livestock. Livestock will graze it very closely unless rotational grazing is used.

Hay yield of dallisgrass is similar to common bahiagrass. In a 6-year variety trial at the Southwest



**Figure 4.** Dallisgrass has wide, drooping leaves which tend to crowd out bermudagrass in wet soils.



**Figure 5.** Dallisgrass is very palatable and is grazed closely by livestock in continuous grazing management.

Research and Extension Center at Hope, common dallisgrass yielded 80 percent of the yield for Pensacola bahiagrass. It is very competitive in wet soils and tends to invade bermudagrass or other forages growing in those sites. Dallisgrass is often considered a contaminant or weed in bermudagrass grown for horse hay because it often turns a dark brown color when baled, resulting in poor eye appeal of the hay.

## Planting Methods

Seeding rates and planting methods are similar to bahiagrass, except dallisgrass is not well adapted to droughty sites like bahiagrass. Typically dallisgrass would be planted on sites considered too wet for other common forages.

Dallisgrass can be drill or broadcast planted on a tilled, prepared seedbed or can be no-till drilled into a killed sod. Seed size is small so planting depth should be no more than ½ inch. Recommended planting time is in spring, after danger of frost has passed, until June 1. The seeding rate should be 12 to 15 pounds of seed per acre when the seed are drilled into a prepared seedbed or 18 to 20 pounds per acre when broadcast planting.

## Ergot Poisoning and Dallisgrass Stagers

Ergot infection in dallisgrass seedheads is a cause for concern and requires attention under certain circumstances. Ergot infection occurs every year to some degree in Arkansas, especially following summer rainy periods. Prevalence of ergot contamination is the primary reason dallisgrass seed is not commercially produced in the U.S.

Ergot poisoning in dallisgrass can cause a syndrome or toxicosis called dallisgrass staggers when animals consume infected seedheads. The ergot fungus, named *Claviceps paspali*, infects the flowers of dallisgrass, and the growing fungus replaces the seed. The fungus only affects seedheads – the other parts of the plant are nontoxic.

In summer, infected dallisgrass seedheads are often covered in a “honeydew” exudate from the fungus that leaves a sticky film on hands and clothing after walking through fields (Figure 6). As the fungus develops in the seedhead, hard dark or orange colored sclerotia develop from late summer to fall (Figure 7). The sclerotia serve as the overwintering structure and drop to the soil in late fall. When weather warms the following summer, the sclerotia germinate and produce spores which infect dallisgrass seedheads during the blooming period.

The most common scenario of ergot poisoning occurs when cattle that have not been exposed to dallisgrass are brought onto a farm and are turned



**Figure 6. Honeydew on dallisgrass seedhead infected with ergot.**



**Figures 7. Dallisgrass seedhead infected with ergot. Sclerotia from the ergot fungus turns dark or orange in seedheads in late summer/fall.**

into a field that is at the full seedhead stage and infected with ergot. Cattle have the tendency to selectively graze seedheads, which leads to a very high dosage of ergot alkaloids. Even on farms where cattle are previously exposed to dallisgrass, poisoning can occur when animals are hungry and are turned into a field full of seedheads. Symptoms are much less common in herds with long-term exposure to dallisgrass in mixed grass pastures.

Visual symptoms associated with dallisgrass staggers involve the animal's nervous system. In the very early stages of toxicosis, the only sign seen may be trembling of various muscles after exercise. As toxicity progresses, muscle tremors worsen so that the animal becomes uncoordinated and may show continuous shaking of the limbs and nodding of the head. When forced to move, the severely affected animal may stagger, walk sideways and display a "goosestepping" gait. Uncoordination can be severe enough that the animal will fall down when attempting to walk. Some animals may be found down and unable to stand. Diarrhea may be noted in some affected animals. Death can occur in severe cases.

There is no cure for ergot poisoning, but removing animals from infected pastures when symptoms are first noticed usually results in recovery in 3 to 5 days. Mowing or shredding stems with a brushhog helps to prevent animals from selectively grazing seedheads. Ergot toxicity from dallisgrass hay is uncommon, probably because the total intake of leaves and stems in hay dilutes ergot content in the diet.

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