

Establishing Bermudagrass for Forage

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General Characteristics

Bermudagrass (*Cynodon dactylon*) is a perennial warm-season grass introduced from Africa. It is a popular species used as forage and turf throughout the southern United States and is widely grown for hay and pasture in Arkansas.

This deep-rooted, sod-forming grass spreads by means of stolons, rhizomes and seed. It is highly productive and withstands drought and close grazing. It grows to a height of 15 to 24 inches and can be harvested for hay every 28 days throughout summer under sufficient rainfall. Due to its dense growth habit, bermudagrass is poorly suited for wildlife habitat.

About 80 percent of total growth occurs between May 15 and September 15. After breaking winter dormancy in spring, significant growth begins in May and continues during summer months, with adequate moisture, until cooling nighttime temperatures in fall cause a sharp decline in growth rate. Bermudagrass goes dormant after fall frost occurs.

Several important factors should be considered when establishing and using bermudagrass as a forage – selection of an adapted variety, establishment options and methods and cultural management requirements for maintaining stands and production. The purpose of this publication is to provide information that will help producers make decisions on establishing bermudagrass for forage.

Establishment

Bermudagrass is adapted to a wide range of soil conditions but is best suited to a well-drained site. Plants may survive in poorly drained soils, but production potential is limited. Bermudagrass is not adapted in areas that frequently become waterlogged. It is extremely drought tolerant; however, it is not as productive in arid conditions. Therefore, site selection is important in order to optimize production potential.

There are two basic types of bermudagrass – those that can be established from seed and those that must be established as vegetative clones from fresh cuttings or sprigs.

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Varieties that can be established from seed and have a dense, low-growing stature are often referred to as “common” bermudagrass. But the wide diversity of types makes this term difficult to apply because some common types do not produce viable seed and must be established from sprigs. Many available common varieties were selected from naturally occurring ecotypes in producer fields.

Varieties that must be established from vegetative material and were developed in managed plant breeding programs are referred to as “hybrid.” Hybrid varieties produce little or no viable seed and generally produce higher forage yields than common varieties. Although all varieties can be grazed or harvested for hay, hybrids are generally used when hay production is the major enterprise.

Establishment From Sprigs and Cuttings

Nearly all varieties can be established from sprigs (sometimes cuttings), but some can be established from seed as well. Sprigs are vegetative plant parts containing stolons, crown buds and rhizomes. Sprigs may be planted from late winter through early summer if soil moisture is available to promote bud germination and growth of the young plants. Sprigging can begin as early as late February and can continue through May. New spring growth draws on root carbohydrate reserves in the sprigs, so digging sprigs for early planting will ensure the highest root carbohydrate levels for vigorous growth and establishment. Furthermore, the sprigs dug early will be mostly rhizomes and root crowns, which are the sources of new buds. Good weed control measures must be planned for late winter sprigging because of the length of time before the sprigs will start to grow later in spring. Most sprigs dug after spring growth has begun will contain a substantial amount of leafy growth, which has a very short life. However, successful stands can be achieved by using sprigs harvested

after growth has begun, and it is not unusual for sprigging to extend into June.

Bermudagrass should be sprigged into a smooth, clean-tilled, firm seedbed. Sprigs are typically planted with commercial planters that place the sprigs into rows spaced 20 to 30 inches (Figure 1). The sprigger cuts a shallow furrow, drops in the sprigs and firms the soil over the sprigs with press wheels. New stands can also be established by broadcasting sprigs with equipment such as a manure spreader and then incorporating them into the soil by lightly disking. The soil should be firmed after disking with a cultipacker or field roller (Figure 2).



Figure 1. Bermudagrass sprigger planting sprigs in rows on a conventionally tilled seedbed.



Figure 2. Using a cultipacker roller to firm and smooth the seedbed.

Sprigs should be planted in moist soil about 1 to 2 inches deep (Figure 3). Ideally, parts of many sprigs will be visible above the soil surface. Planting at lower depths to reach moist soil is a frequent



Figure 3. Sprig planted at the proper depth in a well-firmed seedbed.



Figure 4. Roots emerging from bermudagrass cuttings. Note that the roots emerge at the nodes.

practice, but planting too deep can increase risk of establishment failure. Sprigs should be planted as soon as possible after digging to maintain quality. Those stored in a pile for extended periods may become desiccated or may go through spontaneous heating, both of which reduce sprig viability.

A minimum sprigging rate of 20 bushels of sprigs per acre is usually recommended. Heavier sprigging rates of 30 to 40 bushels per acre generally achieve better initial stands and faster sod cover, especially with slow-spreading varieties. One bushel of sprigs (1 bushel = 1.25 cubic feet) contains approximately 1,000 sprigs, and a cubic foot contains about 800. However, wide variation can be expected depending on the density of the load. Fresh cuttings or clippings can be planted to establish some varieties. Establishment from cuttings refers to green topgrowth that is cut like hay, gathered while still green, quickly spread over the seedbed and lightly incorporated in the soil. Fresh cuttings should be planted the same day they are cut to achieve the best results. Bermudagrass intended for cuttings should be about 18 inches tall and have several nodes on each stem. Cuttings can be spread in rows or broadcast with a manure spreader. The cuttings should be incorporated with a disk to cover nodes on the stems. New roots emerge at the nodes when planted in moist soil (Figure 4). The soil should be firmed with a

cultipacker or field roller after disking to improve soil contact and establishment success. This technique is inexpensive but less reliable than sprigging.

Establishment From Seed

Many varieties can be established from seed, but only a few seeded forage varieties are winter-hardy enough to use statewide. Non-winter-hardy varieties often have good seedling vigor, spread quickly after seeding and produce good seeding-year yield. However, they produce numerous fibrous roots but few of the rhizomes needed for winter survival. In contrast, winter-hardy varieties have lower seedling vigor, spread more slowly and produce low to moderate seeding-year yields compared to non-hardy types. But, they produce many rhizomes, which improves winter survival over non-hardy types. Winter-hardy varieties often produce lower seed yields than non-hardy types, which increases seed cost. Seed companies often develop variety blends that include seed of a Giant-type, non-winter-hardy cultivar, with a winter hardy cultivar. Variety blends provide faster sod cover and higher seeding-year yield. The Giant bermuda cultivar in the blend will die after one or two winters, leaving the winter-hardy cultivar.

Bermudagrass seed germinates when soil temperature reaches 65 degrees F, so mid- to late-spring planting dates are recommended.

Typically, bermudagrass seed is planted between May 1 and June 15. Later plantings may be adversely affected by dry summer weather or may not develop an adequate root system for winter survival.

Bermudagrass seed are tiny with about 2 million hulled seed or about 1.5 million unhulled seed per pound. Hulled seed germinates in about 5 days in warm soil, but germination time may be 7 to 10 days for unhulled seed. Commercial varieties are often a 50:50 mixture of hulled and unhulled seed. Mixtures of hulled and unhulled seed provide a longer germination window, thereby giving a greater chance of establishment success if seed are planted during adverse conditions.

Seeding rates are 4 to 8 pounds of pure live seed per acre. Seed companies increasingly are coating seed with finely ground limestone and germination enhancers to improve seedling establishment. The lime coating makes up about half the weight of the seed lot, so coated seed contains roughly 800,000 seeds per pound. Research has shown that even though seed coatings reduce the actual number of seed per pound by half, they improve seedling survival enough so that coated seed can be planted at the same rate as uncoated seed with no reduction in stand.

A smooth, well-tilled, firm seedbed with adequate soil moisture is required for successful establishment. Light stimulates germination, so a planting depth of 1/4 inch or less is recommended. Rough, cloddy seedbeds or poorly tilled fields with strips of sod remaining do not allow good seed-to-soil contact and make it possible for seed to be planted too deep. Planting too deep is a common cause of establishment failure.

Seed can be drilled or broadcast on a conventional tilled seedbed or planted with a no-till drill on killed grass sod. When preparing a tilled seedbed, proper seedbed firmness is achieved when an adult's footprint in the field is about one-fourth inch deep.

Failing to firm the seedbed adequately before planting can result in excessively deep seed placement and poor seedling emergence. Setting the proper seeding depth and drill calibration is essential whether using conventional or no-till drills. Often the calibration settings issued with the drill are not accurate for small-seeded forages like bermudagrass. For step-by-step instructions on calibrating drills or broadcast planters, refer to FSA3111, *Calibrating Drills and Broadcast Planters for Small-Seeded Forages*. Your county agent can assist you with a check of your drill's calibration.

No-till planting is an option where steep topography or rocky soils are concerns. Planting dates and seeding depth are the same for no-till as for conventional tilled plantings. However, existing vegetation must be controlled with herbicides instead of tillage for initial weed control. No-till planting requires more advanced planning than conventional methods with regard to weed control and soil fertility. Planning should be done far enough in advance to reduce the weed seed bank in the soil and to get perennial weeds under control. This may require multiple applications of a nonselective herbicide. Lime and fertilizer can only be surface applied in no-till plantings. Surface-applied materials take longer to move into the root zone than when plowed in, so building low fertility levels must be done well in advance of planting.

For broadcast planting, seed is often mixed with a small amount of phosphorus or potash fertilizer and spread on a prepared seedbed. Seed mixed with fertilizer should be planted the same day to avoid damage from prolonged fertilizer contact. Seed will not spread as far as the fertilizer, so the spreader must be driven almost track-to-track to achieve uniform stands. To avoid planting too deep, broadcast seed should not be covered with tillage equipment. The seedbed should only be firmed with a roller or cultipacker before and

after broadcasting the seed. The sequence should be roll or cultipack the field, make sure the seedbed is well firmed, broadcast the seed, then roll or cultipack the field again to cover the seed. Rolling broadcast seed into a loose, soft seedbed will push the seed too deep and will lead to establishment failure.

Fertility Management at Establishment

Good fertility at establishment will lead to faster field coverage and may allow for limited grazing or hay production during the first growing season. Target soil test fertility levels for establishment are a pH of 5.5 or greater and P and K levels of at least 60 and 200 pounds per acre, respectively. For best results, recommended rates of limestone should be applied six months to one year in advance of planting to allow time for the seedbed pH to adjust. For conventional planting, recommended rates of phosphorus and potash fertilizer should be applied and incorporated into the seedbed at planting time.

Nitrogen fertilizer should not be applied at planting to reduce weed competition. When stolons have reached a length of 3 to 6 inches, nitrogen should be applied at a rate of 30 to 50 pounds per acre (Figure 5) A second application of 30 to 50 pounds N per acre can be applied 30 days later (until September) if adequate soil moisture is available.



Figure 5. Stolons forming on a new bermudagrass plant. Nitrogen fertilizer should not be applied to new stands until stolons are 3 inches or longer.

Weed Control

Weed control is a major factor for successful establishment. Bermudagrass is very intolerant of shade, especially in the seedling stage. Grassy weeds such as crabgrass and foxtail are common problems and are difficult to control in new stands. Therefore, it is critical to reduce the weed population before planting. Flash grazing or mowing during the establishment phase can help control weeds.

For weed identification and recommended herbicides, consult with your county agent or ask for the publication MP44, *Recommended Chemicals for Weed and Brush Control*.

Weed Control in Seeded Bermudagrass

Do not apply 2,4-D to newly seeded areas until the grass is well established. Do not apply Weedmaster, Grazon P+D or GrazonNext until the bermudagrass is well established and has developed a good secondary root system and growing conditions are favorable. Do not apply a herbicide containing metsulfuron until the bermudagrass has been established for at least two months.

Weed Control in Sprigged Bermudagrass

A preemergence application of diuron will help control weeds for six to eight weeks after application. If possible, diuron should be applied immediately after sprigging. Diuron should be applied at 1.0 to 1.5 pounds of active ingredient per acre. The 1.0 pound per acre rate is adequate for most Arkansas soils unless there are high levels of clay and/or organic matter present. Use the low rate on sandy soils. Rainfall of 0.25 to 0.5 inch within 7 to 10 days is needed to activate diuron. The sooner rainfall or overhead irrigation occurs after application, the better weed control will be. If the preemergence

timing is missed, diuron may be applied early postemergence (weeds less than 1 inch tall) at 1 pint per acre plus 0.25 percent nonionic surfactant

Most cases of bermudagrass injury from diuron have been the result of overapplication. Do not overlap the coverage when spraying or make additional passes to dress the ends of the field. Flag or stake the field or use a foam marking or GPS guidance system to avoid overlaps. Use a sprayer with good agitation. Without agitation, diuron will settle to the bottom of the tank. Since the suction is located there, it is possible to apply most of the herbicide on the first couple of rounds and under apply on the rest of the field. There is always some risk involved in using herbicides because a wide range of environmental factors influence herbicide

behavior. Extremes in rainfall, temperature and soil types cannot always be anticipated. Diuron may cause some initial yellowing, but the bermudagrass typically grows out of the injury. Diuron is not labeled for use on established bermudagrass.

Weedmaster (2,4-D + dicamba) applied at 2 to 4 pints per acre immediately after sprigging will suppress weeds for two to three weeks. Performance will depend on weather conditions, especially rainfall. This treatment is safer than diuron but provides less residual weed control. Grazon P+D at 1.5 pints per acre or less may be used on sprigged bermudagrass once the runners have reached 6 inches in length and the growing conditions are favorable.

Printed by University of Arkansas Cooperative Extension Service Printing Services.

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