

ESTABLISHING BERMUDAGRASS FROM SPRIGS OR TOPS

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Over the last couple of years, I have received many questions about how to establish bermudagrass. Hybrid bermudagrass varieties produce 20-50% more forage than seeded bermudagrasses. So, many producers seek to establish the hybrids. However, hybrid bermudagrasses produce few viable seed and must be established from vegetative plant material (e.g., sprigs or tops). Significant acreage in Georgia was planted to bermudagrass in 2015, and I suspect more will be planted this year, as well. So, how exactly is bermudagrass vegetatively established?

The Origins of Vegetative Establishment

It is important to recognize those who have painstakingly worked out the challenge of vegetatively establishing bermudagrass. Dr. Glenn Burton, plant breeder with the USDA-Agricultural Research Service at the Georgia Coastal Plain Experiment Station (GPCES) in Tifton from 1936-1997 and informally until his death in 2005, was the person who developed nearly all of the hybrid bermudagrasses we now use (e.g., ‘Coastal,’ ‘Tifton 44,’ ‘Tifton 85,’ etc.). In 1942, one of Burton's USDA-ARS bosses from Washington, DC visited Tifton and saw common bermudagrass full of seed heads growing next to Coastal with no seed heads. Coastal, like all hybrid bermudagrasses, produces few viable seed and must be established from vegetative plant material. Burton's boss wanted to know how he planned to propagate ‘Coastal.’ Burton said, “vegetatively.” The USDA boss laughed and said, “whoever heard of planting pastures vegetatively!” Burton accepted the challenge to make vegetative propagation of forage practical. Initially, Burton used a wooden stick shaped like a putty knife on one end that allowed him to push sprigs (stolons and rhizomes) into the soil like planting sweet potato vines. Sprigs have also been broadcast onto a prepared seedbed and immediately lightly-disked into the soil. This method is still used in some cases today, but it requires a large volume of sprigs (50 – 75 bushels of sprigs) from a nursery to plant a single acre of land. In this case, one acre of nursery can only sprig 4 – 6 acres. Consequently, James Stephens, a UGA agricultural engineer at the CPES, developed a precise two-row planter that allowed the sprigging rate to be cut in half (20 – 40 bu./acre). As more ‘Coastal’ bermudagrass acreage was planted, farmers innovated and developed their own methods and machines. Now, modern sprig diggers and sprigging machines do the work (Figure 1).

10 Steps to Establishing Bermudagrass

Dr. Burton was frequently asked to provide producers with a recipe for establishing bermudagrass vegetatively. He wrote an article entitled “Establishing the Tifton Hybrid Bermudagrasses,” which provided a 10-step recipe for success. In the decades since, nearly all of his advice has remained as valid today as it was when he wrote that article. However, there have been a few advancements that have been found to increase the chances of success. Below are updates to Dr. Burton’s 10 steps.



Figure 1. Modern sprig digging (above) and sprigging equipment (below).

1. Choose an appropriate site for establishment. First, the soil must be well-drained. Bermudagrass does not do well on Flatwoods soils or other land that tends to hold water or flood. Also, choose a site that is free of other bermudagrass varieties and bahiagrass and that has minimal weed pressure. Land that has been recently cropped is usually ideal. If the site currently has bermudagrass or bahiagrass on it, one would ideally grow a summer and fall crop on the land and use appropriate herbicides or chemically fallow the land (i.e., use a non-selective herbicide 2 – 4 times during the summer and fall) in the year before the bermudagrass is to be established so that it will completely eliminate the existing stand. At a minimum, one should apply a non-selective herbicide to the existing stand of bermudagrass or bahiagrass in the fall prior to establishing bermudagrass in the spring or summer. Fall applications of an herbicide are more likely to translocate to the roots, thereby improving efficacy.

2. Soil test, lime, and fertilize accordingly. Submit a soil sample and ask for recommendations for a hybrid bermudagrass hayfield, even if it is to be a pasture. If a field does not already have a soil pH of 6.0 or higher, it is not yet a candidate for being established to bermudagrass. Apply all lime (target pH of 6.5) and fertilizer that is recommended from the soil test prior to land preparations so the amendments can be worked into the soil. Ensure that 50 lbs of N, 15 lbs of P₂O₅, and 100 lbs of K₂O/acre are incorporated (no deeper than 2 inches) immediately before the bermudagrass is planted.

3. Use the false or stale seedbed preparation method. For best results, bermudagrass sprigs or tops should be planted into a conventionally-tilled, prepared seedbed. The seedbed should be prepped 6 weeks or more prior to planting. To start the seedbed preparation process, chisel or moldboard plow the soil and then disc harrow the field. Allow the soil to settle for 4 – 6 weeks. During this time, weeds will likely begin to germinate. The “false seedbed preparation method” involves killing germinated weeds by tillage. In that method, kill the weeds by lightly tilling the soil with a light drag or very shallow disc harrowing, then immediately plant the sprigs or tops, and firm the soil with a cultipacker or roller immediately to minimize moisture loss. This step can be conducted closer to the actual planting date if soil moisture can be maintained. Tillage prior to planting may cause the soil to dry excessively, cause sprigs to be planted into dry soil, and, thereby, reducing establishment success. Alternatively, one can use the “stale seedbed preparation method,” which involves herbicidal weed suppression instead of tillage. In this method, any germinated weeds are killed with a non-selective herbicide 1-7 days prior to sprigging. This requires no additional tillage and assists in the retention of soil moisture.

Though there are some so-called “no-till” sprigging machines, these implements still do significant tillage with the shank that opens a slot for the sprigs to be dropped into a furrow. These no-till spriggers can be successful, but ensuring weeds are chemically suppressed before, during, and after establishment will be crucial. No-till sprigging also tends to result in a field surface that is rough, which can cause challenges for the operation of hay equipment and be a nuisance to the equipment operator.

4. Choose an establishment method and timing. There are three establishment methods: dormant sprigging, spring sprigging, and tops.

Dormant sprigs, which include the crowns, corms, or rhizomes of bermudagrass, should be planted at a rate of at least 40 – 70 bushels of viable sprigs per acre in late winter (January – March). Most varieties can be established this way, but dormant sprigging of Tifton 85, at least above the fall line, has proven to be more risky. Dormant sprigs should be covered with at least 2 inches of soil to protect them from freezing. Delaying dormant sprigging until February will reduce the chances of winter injury and competition from winter weeds. Dormant sprig plantings may not begin to grow until March or April. It is likely that 50% or more of the dormant sprigs planted will fail to emerge. Those that do emerge may not have enough reserves to establish a live plant. Therefore, dormant sprigs should come from plants that had maximum reserves going into the winter. This can be accomplished by not allowing the stand from which sprigs will be dug to be cut or grazed after Labor Day in the fall preceding sprig digging. In addition, excessive moisture in winter limits dormant sprig survival. To estimate dormant sprig survival, dig some of the sprigs and place a known number of them in 2 – 3

buckets of soil 1 month prior to dormant sprigging. Keep the soil in the buckets moist (not wet) and in an area that is warm and subjected to at least 12-hours of light during the day. Adjust the sprigging rate based on the percentage of sprigs planted in the buckets that emerge after 14 – 21 days.

Spring sprigs with green tops and stolons are planted at a rate of 40 – 70 bu./acre. Spring sprigs can be planted anytime after the danger of a heavy freeze has passed, up until August. Early planting of spring sprigs can help that ensure the sprigs become well established during the first year and increases the likelihood they will survive a severe winter. However, planting too early (March and early April) is stressful on sprigs, as they are already low on reserves after emerging from winter dormancy. So, make sure that the sprigs are vigorous and healthy before digging. If buried too deeply, spring sprigs may not have enough reserves to emerge from the soil and will die. Planting sprigs with green leaves and stolons can help ensure sprig survival, as they can more quickly begin to photosynthesize and manufacture carbohydrate reserves.

Tops (green stolons) are planted at a rate of 60 – 100 bushels of fresh tops/acre. Tops can be planted from June until August. Stolons planted as tops must have 6 or more nodes. This usually means the stolons are 18 – 24 inches in length. A nursery area provided with 100 lbs of N, 25 lbs of P₂O₅, and 100 lbs of K₂O/acre in late March will usually produce such tops by early June. Cuttings of tops later in the season will require approximately 8 weeks of regrowth for stolon development to be sufficient. Nearly all of the recommended varieties of bermudagrass can be established from tops, but Tifton 85 ranks first and Tifton 44 last in the success obtained with such plantings. Because of their length, tops are usually not planted in the ground by a sprig planter. Tops are spread across a prepared seedbed, lightly disked into the ground, and the soil is firmed around them with a cultipacker or roller. To facilitate handling, tops are often cut with a disc hay mower (no conditioner) and immediately baled, either in small square or round bales. Small square bales of tops can be spread by hand or using a tops spreader such as the ground-driven implement pictured in Figure 2. Round bales must be unrolled and spread out (usually using a tedder) before they are harrowed into the soil. Tops that are baled must be handled and planted quickly (within 2 hrs for best results) to prevent them from overheating and dying before they are planted.



Figure 2. Square bales of bermudagrass tops are being scattered over a prepared seedbed (top) using a ground-driven tops spreader.

5. Plant only in moist soil. Sprigs or tops must be planted in moist soil to prevent them from wilting. If tops are scattered on dry soil, they can die in a few minutes. It is best to plant sprigs or tops on a cool, overcast or cloudy day, preferably with a misty rain or an imminent rainfall. Irrigation can assist spring sprigs or tops, but this is not a necessity unless planting occurs during a prolonged drought.

6. Plant pure sprigs or tops. It is recommended to buy certified planting material of the variety you want to grow. The Georgia Crop Improvement Association certifies the fields from which such planting material is taken, and they ensure that proper protocols are followed to prevent contamination from off varieties and weeds. A list of certified planting material providers is located on their website (<http://www.georgiacrop.com>). One of the most frequent complaints is that the provider of planting material used the wrong variety or it was contaminated with common bermudagrass. A proactive stance on the part of the buyer in using certified planting material can help prevent these mistakes.

7. Plant freshly harvested sprigs or tops from a well-fertilized nursery. A nursery area where dormant sprigs are to be harvested should receive 100 lbs of N, 25 lbs of P₂O₅, and 100 lbs of K₂O/acre in the September

prior to harvest. This same amount of fertilizer should be added at spring green up or within 6 weeks of harvesting of either spring sprigs or tops. The size of the crown, rhizomes, and stolons are an indicator of carbohydrate storage in and, therefore, the viability of the planting material. Sprigs of the plant's crown and rhizomes should be 3/16 – 3/8 inch in diameter. Sprigs of the plant's stolons should have at least 2 nodes (preferably 4) and be at least 1/8 – 1/4 inch in diameter at the nodes. Stolons used for establishment by tops should have at least 6 nodes and be at least 1/8 – 1/4 inch in diameter at the nodes. Dormant and spring sprigs should be planted as soon as possible but at least within 24 hours after digging. Tops should be planted within 4 hours of cutting.

8. Pack the soil well. Immediately after planting, use a cultipacker or heavy roller to firm the soil around the sprigs or tops. This will ensure that the planting material has good contact with the soil so that it can stay moist. Irrigation can help, but it is usually not necessary if these rules are followed closely.

9. Spray to control weeds. It is likely that significant weed pressure will occur after planting bermudagrass. Good weed control during the establishment phase is essential. Newly-established bermudagrass cannot compete with rapidly growing annual grasses and broadleaf weeds. A thick cover of weeds slows stand establishment by shading the emerging bermudagrass plants and preventing the bermudagrass stolons from pinning down. An application of diuron, a pre-emergence herbicide, will provide fair to good control of crabgrass, crowfootgrass, sandbur, and goosegrass, as well as providing residual control of certain annual broadleaf weeds. Diuron should be applied immediately after planting. However, diuron can severely injure bermudagrass sprigs and (especially) tops. Any green or emerged bermudagrass at the time of treatment may be significantly injured. Tifton 85 appears to be very sensitive to diuron, so its use on plantings of this variety should be avoided unless weed pressure is expected to be high. Bermudagrass planting material should be planted 2 – 3 inches deep to lessen chance of injury. If diuron is not used, an application of 2,4-D + dicamba (WeedMaster) should be applied at a rate of 2 – 4 pts/acre within 7 – 10 days after planting. This can provide excellent control of most broadleaf weeds and significant suppression of some grassy weeds. See the Georgia Pest Management Handbook (<http://www.ent.uga.edu/pmh/>) for herbicide recommendations and follow rate guidelines and grazing restrictions on product labels. Check with your County Extension Agent for additional information and current recommendations.

10. Complete steps 5 – 9 on the same day. This will ensure adequate soil moisture is available to the planting material and ensure that weeds are adequately controlled.

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