COASTAL BERMUDA GRASS

GLENN W. BURTON

Although Bermuda grass, Cynodon dactylon, is now distributed throughout the tropical and subtropical parts of the world, the best evidence points to Asia and particularly to India as the land of its origin. There, because it furnishes feed for the sacred cow, Bermuda grass long has been considered a special gift of God, and, like the cow, has been held sacred. In the United States, particularly in the Southeast, it has been a serious pest in cultivated fields for years. It is easy to understand, therefore, why farmers, dependent upon cotton and tobacco for a livelihood, developed a hatred for Bermuda grass. Only recently, with the growing interest in livestock production and soil conservation, have they begun to recognize the merits of this grass. Pasture specialists agree that Bermuda grass is the best upland pasture grass for the Southeast. As a plant to prevent soil erosion it is unsurpassed and is now being planted on land no longer suited for cultivation. Many farmers who have fought Bermuda grass for years are now planting it. That it will enjoy a greater use and a better reputation in the future seems certain.

ORIGIN OF COASTAL BERMUDA GRASS

In 1929 J. L. Stephens of the Georgia Coastal Plain Experiment Station found an unusual Bermuda grass plant growing in an old cotton field near Tifton, Georgia. It was characterized by having rather long decumbent stems, few seedheads, and an abundance of large stolons and rhizomes (above- and below-ground runners). This plant was increased by planting the runners and was found to be superior to common Bermuda grass for both hay and pasture purposes. Stolons of this selection have been distributed to a number of Georgia farmers under the name of Tift Bermuda.

In 1937 two tall growing strains of Bermuda grass from South Africa, common Bermuda and Tift Bermuda, were planted close enough together that some natural crossing could occur. Sufficient seed was collected from these parents in 1937 to produce over 5,000 seedling plants in 1938.

During the summer of 1938 each of these seedling plants (kept separate by wide spacing and cultivation) was studied carefully in an effort to select the best individuals. These studies revealed that a number of these plants were much different than self pollinated progenies of their female parent, indicating that they were hybrids. One of these offtype "hybrid" plants having Tift Bermuda as its female parent carried the selection number 35. This selection, which has been

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1 Cooperative investigations at Tifton, Georgia, of the Division of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, U. S. Department of Agriculture, the Georgia Coastal Plain Experiment Station, and the Georgia Experiment Station.

2 Geneticist, U. S. Department of Agriculture, Tifton, Georgia.
grown by a number of experiment stations and farmers under the name of Tifton selection number 35, has now been named Coastal Bermuda.

It soon became apparent that it was impossible to choose the best individual from this nursery of 5,000 plants. Therefore, in the spring of 1939, 4-inch plugs of sod from 147 of the most promising individuals were placed in the center of cultivated plots measuring 4 x 24 feet. Three plots of each selection were planted. Several of the best selections (Coastal Bermuda, No. 35, was one of them) spread as much as 18 feet in three months, and most of the plots were completely sodded by fall.

The rate of spread, disease resistance, sod density, cold tolerance, earliness of growth, seed and forage yielding ability, etc., of these strains have been studied and recorded. Their reaction when grown in association with crimson clover has been observed. Those strains rating highest in these tests have been increased and their palatability, chemical composition, and fertilizer requirements are being studied. In these comparisons, Coastal Bermuda grass has ranked high and has been enough better than common or Tift Bermuda to warrant its general distribution at this time.

**DESCRIPTION**

When compared with common Bermuda (see figures 1 and 2) the stems, stolons, and rhizomes of Coastal Bermuda are found to be
larger and to have much longer internodes. Its leaves have a characteristic light green color, are much longer, and form a more acute angle with the stem than the leaves of common Bermuda. At Tifton, Georgia, common Bermuda produces seed heads containing viable seed from April until October. Coastal Bermuda produces very few seed heads and those that are produced rarely contain viable seed. It is one of the most nearly seedless strains that has been produced at the Coastal Plain Experiment Station and ranks well above Tift Bermuda in this respect. It is more resistant than common Bermuda to the Helminthosporium leaf spot that causes the leaves of Bermuda grass to turn dark and die. Coastal Bermuda has in several instances tolerated several degrees more frost than common Bermuda, indicating that it is more frost resistant. Although its maximum cold tolerance has not been determined, preliminary observations indicate that it will survive the winter wherever common Bermuda grows.

Coastal Bermuda may be readily distinguished from Tift Bermuda by the following characteristics. It is larger and much more erect in growth habit and its leaves are lighter green, are more flexible, and droop more than the leaves of the Tift strain.

**SOIL REQUIREMENTS**

Coastal Bermuda will grow on any well drained soil in which common Bermuda will thrive. Although it will tolerate flooding for
rather long periods, it makes little if any growth on water logged soil. Like common Bermuda it may survive on soils low in fertility but will produce little feed. Few grasses respond so readily to fertilizer, particularly nitrogen. The striking influence of fertilizers upon the yield and chemical composition of Coastal Bermuda hay is shown in table 2. It is affected little if any by soil reaction and at Tifton, Georgia, has made good growth on both acid and “over-limed” alkaline soils. On this “over-limed” soil having a pH well above 8, the common cultivated crops have not made satisfactory growth.

**PLANTING METHODS**

Since Coastal Bermuda is practically seedless, it must be propagated by planting stolons or rhizomes. Many methods of planting Bermuda stolons and rhizomes have been used with varying degrees of success, depending largely upon the moisture conditions at the time of planting.

In the sandy soils of the Southeast the stolons should be planted 4 to 6 inches deep in rows or uniformly spaced hills in well prepared land. Deep planting can hardly be overemphasized, especially if the stolons will not be watered when set. Under such circumstances deep planted stolons have a much better chance to survive than those only covered an inch or two with loose soil. Various machines such as modified tobacco planters have been devised to reduce the labor required for this job, but many of them fail to plant the grass deep enough. In the spring, if the soil is moist, the stolons need not be watered when planted. The soil should be rolled after planting, however, to bring the stolons in intimate contact with the soil particles and thus help to keep them from drying out and dying. In the summer this procedure frequently results in poor stands if dry weather follows the planting date.

In the summer of 1941, L. L. Patten of Lakeland, Georgia, obtained some stolons of Coastal Bermuda grass from the Georgia Coastal Plain Experiment Station and planted a nursery block on some newly cleared land. He planted 27 acres of Coastal Bermuda from this nursery during the summer of 1942 and gave planting material to a number of friends. He followed the practice of watering each hill that was planted regardless of the soil moisture present and is convinced that it paid. The perfect stands that he obtained in this manner demonstrate the value of a small amount of water supplied to each hill at planting time.

The U. S. engineers in sodding airfields in 1942 soon learned the importance of planting Bermuda grass stolons and rhizomes as quickly as possible after they were dug. They found that the old common Bermuda that has been so hard to kill in cultivated fields dies very easily when allowed to dry out as it is moved from field to field. This demonstrates the importance of planting Coastal Bermuda as soon as possible after it is dug. Those who have established a small nursery of Coastal Bermuda on their own farms will have the advantage of having fresh planting material available whenever they care to make increased plantings.
Coastal Bermuda, once established in rows or hills, will spread and cover the ground faster than common or Tift Bermuda without cultivation. Observations at Tifton indicate, however, that it will cover over twice as fast if given one or two cultivations between the rows and will produce enough hay the first season to pay the cultivation cost.

Grazing also retards the rate of spread of Coastal Bermuda grass. Best results may be obtained, therefore, by allowing the grass to cover the ground well before it is grazed. It is very important that these cultivation and delayed grazing practices be observed whenever Coastal Bermuda is planted in soil infested with common Bermuda grass. Spring and early summer plantings, if cultivated and not grazed during the summer, should be well enough sodded by fall to furnish excellent fall and early winter grazing.

Side dressings of fertilizer, particularly nitrogen carriers, applied to the rows once they are established, will greatly hasten the spread of the grass. Some preliminary observations indicate, however, that fertilization without cultivation on land heavily infested with annual weeds is of no value. In these instances the annual weeds have drawn upon the fertilizer sufficiently to outgrow the Bermuda grass and have furnished so much competition that it has covered no better with fertilizer than without.

The plot of Coastal Bermuda grass shown on the cover was planted 3 x 3 feet March 24, 1941, on a Tifton sandy loam at the Georgia Coastal Plain Experiment Station. Fertilizer (4-8-4) at the rate of 500 pounds per acre had been incorporated in the soil before the grass was planted and 1 level tablespoonful of nitrate of soda was scattered around each hill on June 4. Nitrate of soda at the rate of 240 pounds per acre was broadcast over the plot on July 8. The hills were cross cultivated twice with a Georgia single stock and scrape. The photograph on the cover, showing the soil completely covered, was taken July 26, 1941, four months after the grass was planted. This plot was cut September 8, 1941, and yielded at the rate of 4,734 pounds of air-dry hay per acre.

Coastal Bermuda could probably be planted in any month of the year if care was taken to keep the stolons from drying due to desiccation or cold injury. When no special care, such as watering, is given, early spring plantings are most likely to give the best stands.

**COASTAL BERMUDA FOR HAY**

Coastal Bermuda is an excellent hay plant. In numerous small plot comparisons at Tifton, it has consistently produced several times more hay per unit area than common Bermuda. Its erect growth habit and greater lodge resistance make it more suitable for hay production than Tift Bermuda. In four cuttings of duplicate tenth-acre plots in 1942, Coastal Bermuda produced approximately 75 per cent more hay than the Tift strain. These data are presented in table 1. Plots of Coastal Bermuda receiving 500 pounds of 4-8-4 fertilizer and 480 pounds
of nitrate of soda per acre as top dressings, produced nearly six tons of air-dry hay in four cuttings in 1942. The chemical composition of this hay shown in table 2 compares favorably with the chemical composition of Timothy hay.

If cut when 15 to 18 inches high, Coastal Bermuda gives good yields of nutritious, palatable hay that is easily cured. As the grass grows taller the percentage of stem increases and the quality and palatability of the hay decreases.

Preliminary observations indicate that crimson clover grows well with Coastal Bermuda. The first cutting of hay made May 7, 1942, contained approximately 2/3 crimson clover and 1/3 Bermuda grass, making an excellent quality hay. The crimson clover made no growth thereafter, but its decaying roots supplied the grass with considerable nitrogen, thereby increasing the growth and nutritive value of the grass.

TABLE 1
THE 1942 YIELDS OF AIR-DRY HAY OBTAINED FROM DUPLICATE TENTH-ACRE PLOTS OF TIFT AND COASTAL BERMUDA PLANTED IN A TIFTON SANDY LOAM IN MARCH, 1941.

<table>
<thead>
<tr>
<th>CUTTING DATE</th>
<th>POUNDS OF AIR-DRY HAY PER ACRE OBTAINED FROM</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Tift Bermuda</td>
</tr>
<tr>
<td>May 20, 1942</td>
<td>602</td>
</tr>
<tr>
<td>July 11, 1942</td>
<td>1345</td>
</tr>
<tr>
<td>August 18, 1942</td>
<td>1408</td>
</tr>
<tr>
<td>October 5, 1942</td>
<td>943</td>
</tr>
<tr>
<td>Total</td>
<td>4298</td>
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</table>

Note: Common Bermuda was not included in this test. In other comparisons Tift has yielded two to three times as much hay as common Bermuda.

COASTAL BERMUDA FOR PASTURE

Most of the Bermuda grass planted in the Southeast will be used for pasture. Therefore, in order to get an early estimate of the value of Coastal Bermuda as a pasture plant the following tests were made. Since palatability is an important characteristic of pasture plants, several Bermuda strains including common and Coastal Bermuda were grazed by the dairy herd at the Coastal Plain Experiment Station in 1942. The behavior of these cows, which were given a choice of any strain, indicated that Coastal Bermuda is as palatable as the common type. The chemical analyses of samples taken from these plots are presented in table 3 and suggest that Coastal Bermuda is as nutritious as common Bermuda when grazed. Therefore, since Coastal Bermuda has out-yielded common Bermuda in clipping tests, it should also outyield it in pounds of livestock products when pastured.

Coastal Bermuda tolerates more frost, grows more in the fall, and remains green much later than common Bermuda. In the fall of 1941
a plot of Coastal Bermuda that had been cut for hay on September 8, made considerable growth, survived several light freezes in the upper twenties and was still quite green the second week in January. A fourteen-degree freeze at that time killed all of the above-ground growth. These characteristics of Coastal Bermuda should enable it to furnish much more late fall and early winter grazing than the common types.

It is recognized, of course, that the only true measure of the value of any plant for pasture purposes is the pounds of animal products that it will produce per acre when grazed. Under normal conditions new strains would not be released until such information were available. The present need for improved varieties of plants which will increase the per-acre production of food in the United States has made it seem desirable to distribute promising strains before they have been thoroughly tested. The many requests which Georgia farmers have made for planting material of Coastal Bermuda and their expressed desire to assist in its evaluation have supplied equally important reasons for releasing it at this time.

In Alabama, Johnson grass, that has been allowed to grow without grazing and has been left standing in the field after frost, has supplied an excellent source of roughage for wintering cattle. It has been suggested by several who are familiar with this practice that Coastal Bermuda might be utilized in this manner to good advantage. Although several tons of dry matter per acre could be accumulated in one season, the palatability and nutritive value of Coastal Bermuda after frost must be determined before its value for this purpose will be known.

CONTROL MEASURES

The manure of animals eating common Bermuda, either in pastures or hay, contains many viable seeds of Bermuda grass. This manure is usually spread on cultivated fields and has undoubtedly been an important source of new Bermuda grass plants in fields that have been freed of Bermuda stolons and rhizomes by careful cultural practices. Since Coastal Bermuda seeds little, if any, it should be easier to keep out of cultivated fields than common Bermuda. Once established in a cultivated field, however, it may become a more serious pest than common Bermuda and will require the same control measures.

SOURCE OF PLANTING MATERIAL

The Georgia Coastal Plain Experiment Station has made an increase planting of Coastal Bermuda and hopes to be able to give at least one bag of stolons to each farmer requesting them. It is advising those farmers who are interested to plant these stolons in a nursery block that is free of common Bermuda. Newly cleared land is particularly suitable for such a nursery. Because the stolons should be planted as soon as possible after they are dug, the soil in the nursery should be well prepared in advance. The planting suggestions presented under
the heading "Planting Methods," if followed, will greatly facilitate the establishment of this nursery.

In the past most farmers have driven to Tifton for planting material. The present travel restrictions will no doubt make it necessary for many people to request that the grass be shipped to them. Air-tight, burlap, nitrate of soda bags have been found to be both satisfactory and practical containers for shipping Bermuda grass stolons. Due to the present shortage of bags, those people requesting that the grass be shipped to them should send a good, clean nitrate of soda bag with their request to the Georgia Coastal Plain Experiment Station, Tifton, Georgia. They should also indicate the approximate date that they will be ready to plant the stolons so that they may be shipped (via express) to reach them at that time.
<table>
<thead>
<tr>
<th>Strain and Treatment</th>
<th>Yield of dry hay in pounds per acre 8-18-42</th>
<th>Total Dry matter 8-18-42</th>
<th>Crude Protein</th>
<th>Fat</th>
<th>Crude Fiber</th>
<th>Cellulose</th>
<th>Lignin</th>
<th>Undigested Residue</th>
<th>Ash</th>
<th>Calcium</th>
<th>Phosphorus</th>
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<tbody>
<tr>
<td>Coastal Bermuda</td>
<td></td>
<td></td>
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<td></td>
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<td>%</td>
<td>%</td>
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<td>%</td>
<td>%</td>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Tift Bermuda</td>
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<td>%</td>
<td>%</td>
<td>%</td>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
</tbody>
</table>

Note: The chemical analyses above were made by T. S. Boggess, Chemist at the Georgia Coastal Plain Experiment Station.

* These fertilized plots received 4-8-4 at the rate of 500 pounds per acre following the first hay cutting May 20, 1942, and 240 pounds of nitrate of soda following the second hay cutting made July 11, 1942.

1 Official A. O. A. C. Methods.
### Table 3

**The Comparative Chemical Composition of Common and Coastal Bermuda Grasses When Grazed.**

<table>
<thead>
<tr>
<th>STRAIN OF BERMUDA</th>
<th>Total Dry Matter</th>
<th>Per Cent Leaves (dry basis)</th>
<th>CHEMICAL COMPOSITION OF OVEN-DRY SAMPLES¹</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>Crude Protein %</td>
</tr>
<tr>
<td>Common Bermuda</td>
<td>42.9</td>
<td>52.6</td>
<td>11.31</td>
</tr>
<tr>
<td>Coastal Bermuda</td>
<td>40.4</td>
<td>57.1</td>
<td>11.56</td>
</tr>
</tbody>
</table>

The chemical analyses were made by T. S. Boggess, chemist at the Georgia Coastal Plain Experiment Station.

*Samples for these analyses were obtained by hand clipping (to simulate grazing) duplicate plots of common and Coastal Bermuda grasses that were being grazed by the Experiment Station dairy herd.

¹ Official A. O. A. C. Methods.