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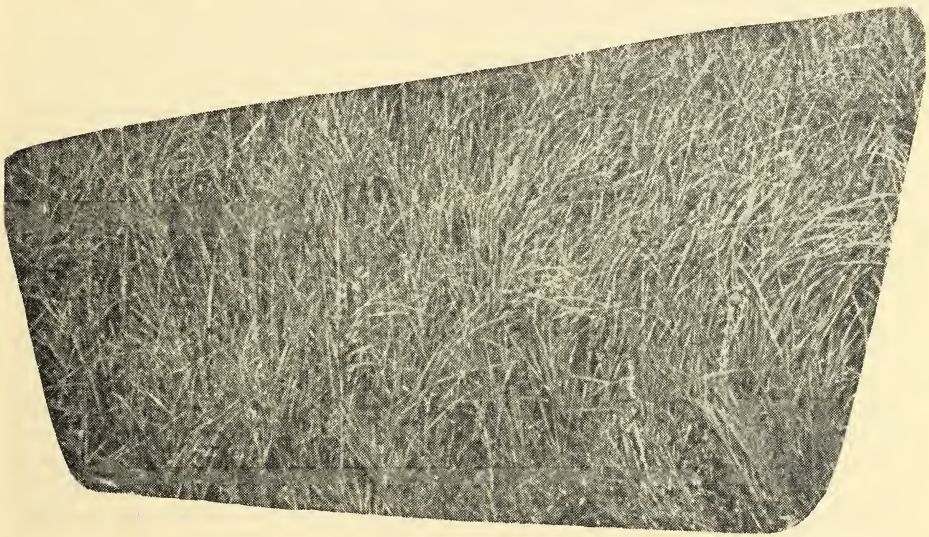


In Mississippi

MISSISSIPPI STATE COLLEGE
AGRICULTURAL EXPERIMENT STATION
CLAY LYLE, Director
STATE COLLEGE MISSISSIPPI

Recommendations

If Coastal Bermuda grass is to be sprigged on a large area several things should be considered.

1. A small area of one-half acre or more should be established for a nursery so that live sprigs for future plantings can be dug and planted immediately.

Home grown sprigs are the cheapest source of planting material and are more likely to survive.

2. The sprigs should be planted in moist soil that has been well prepared as for row crops.

3. The sprigs used should be freshly dug. If possible they should be planted the same day they are dug.

4. A small portion of the sprig should be left above the soil surface.

5. Moist soil should be pressed around each sprig.

6. The Coastal Bermuda should be fertilized as soon as it begins to grow.

7. Weeds and grass should be controlled to prevent crowding out before the Coastal becomes established.

8. Plenty of sprigs should be planted so stolons that did not survive would leave only small skips.

The best time to plant bermuda is in the early spring after all danger of frost has gone, however, most any time during the spring or summer is satisfactory provided the soil is wet for several days after planting. There are many ways of planting bermuda stolons. They can be planted by hand in much the same way as sweet potatoes. Other hand plantings include various methods of making openings in the soil with plows and hand dropping in the furrow. Various mechanical devices such as tree planters, tobacco planters and some vegetable planters may be successfully used. Some commercial companies have a bermuda grass planting machine that does a satisfactory job, however, the machine is very expensive and unless an unusually large acreage is to be planted the cost of this machine would not be justified.

Regardless of the method of planting a minimum of 5,000 sprigs per acre should be used. The more sprigs used per acre the quicker the pasture can be put to use.

Care of Coastal Bermuda pasture will take better management practices than are often given Common Bermuda. It is possible to kill or severely damage the stand by prolonged periods of over grazing or renovation. It is equally hazardous to the stand to allow dense growth of weeds and annual grasses to grow unchecked on the area. If the expense of establishing a Coastal Bermuda pasture is incurred, care should be taken to prolong the productive life of the pasture or meadow. With proper care a good Coastal Bermuda grass pasture will last indefinitely.

COASTAL BERMUDA GRASS IN MISSISSIPPI

By ROBERT E. COATS

Coastal Bermuda grass has been widely publicized in the South during the past few years as a superior pasture grass to Common Bermuda, Dallis grass, and to most other permanent pasture grasses. Phenomenal forage yields have been accredited to this wonder grass. Several hay cuttings per season have been harvested from well managed meadows. Reports have been made that livestock prefer Coastal to Common Bermuda grass. In many cases Coastal Bermuda pastures have produced greater beef and milk yields per acre than other permanent pasture grasses.

Coastal Bermuda grass is a hybrid. It was developed in Georgia by crossing Tift Bermuda (a selection of Common Bermuda discovered near Tifton, Georgia) and a tall growing strain from South Africa. Its many outstanding characteristics have caused some research workers and livestock producers to become interested in this relatively new grass as a possible major pasture and hay crop.

In the spring of 1953 an investigation was begun at the Brown Loam Branch Experiment Station to evaluate Coastal Bermuda grass. Objectives were: (1) to compare the characteristics of Coastal and Common Bermuda; (2) to study the compatibility of legumes with these grasses and their subsequent effect; (3) to study the effect of sod seeding on bermuda grass varieties; (4) to study the effects of dates and levels of nitrogen application on yield and seasonal distribution of production; and (5) to compare the production of Dallis grass, Common Bermuda, and Coastal Bermuda with and without nitrogen.

Management practices during the year of establishment included fertilizing all plots of each experiment with equal amounts of complete fertilizer. Weeds and rapid growing annual grasses were mowed so that establishment would not be delayed by shading or excessive crowding.

Nitrogen in April

Test I: An experiment with low rates of nitrogen applied in the spring was studied. The treatments were as follows: (1) check (no nitrogen applied); (2) 30 pounds of N per acre from ammonium nitrate applied in April; and (3) 60 pounds of N per acre from ammonium nitrate in April. The test was established on an upland soil (Calloway silt loam) and arranged in a Randomized Complete Block design with five replications. The Coastal Bermuda was ordered from Tifton, Georgia, and the Common Bermuda sprigs were dug from the Station pastures. Both the Coastal and Common Bermuda grasses were sprigged by hand on well prepared land on the same day. A uniform application of 60 pounds of phosphate and 25 of potash per acre was applied each spring to all plots. The plots were harvested with a small tractor and mower. Green forage weights were taken and dry weight determinations computed.

Results: The summer of 1953 was dry and a ground cover was not obtained until 1954. The Common Bermuda being slower in growth could not be harvested during 1954.

The Coastal plots were in production a full year before Common Bermuda was well enough established for forage yields. The Coastal plots could be distinctly identified at a distance by their lighter green color, larger and more erect growth, and larger leaves and stems.

Coastal Bermuda grass produced more forage than Common Bermuda at all nitrogen levels, Table I. Over a three-year period Coastal Bermuda produced 197 percent more dry forage than Common Bermuda without nitrogen. Thirty pounds of nitrogen applied in April resulted in 130 percent more Coastal Bermuda for-

age than a comparable treatment to Common Bermuda grass. Fertilizing both grasses with 60 units of nitrogen increased forage yields of Coastal Bermuda 106 percent more than Common Bermuda.

In comparing two years results (1955 and 1956) in Table I the results show Coastal Bermuda to be a much higher forage producing grass than Common after an extra year was allowed for Common Bermuda growth. The two-year average forage yields for 0, 30, and 60 pounds of nitrogen per acre applied in the spring were 128, 99, and 74 percent more respectively for Coastal Bermuda than for Common. Results indicate that as the nitrogen rates are increased the differences in forage yields for the two grasses are decreased.

For the two years 1955 and 1956 forage production of Coastal Bermuda was increased 1938 pounds per acre with 30 pounds of nitrogen and 3998 pounds per acre where 60 units of nitrogen were added. The response of Common Bermuda to nitrogen was also very good. Thirty units of nitrogen increased the yields from 1095 to 2281 pounds per acre or 1186 pounds of dry forage per acre more than plots without nitrogen. Sixty units of nitrogen applied in April increased the yields of Common Bermuda 2657 pounds per acre more than plots that were not nitrated.

Nitrogen in April and July

Test II: Test two was planted at the same time and in the same way as Test I. The nitrogen treatments were: (1) Check (no nitrogen); (2) 30 pounds nitrogen per acre applied in April and 30 pounds nitrogen per acre applied in July; and (3) 60 pounds of nitrogen per acre applied in April and 60 pounds nitrogen per acre applied in July. The test was located on Calloway silt loam and the treatments were replicated four times. The phosphate and potash were applied each spring at the rates of 60 and 25 units of P_2O_5 and K_2O respectively.

Results: The results followed the same general pattern as in Test I. The Coastal Bermuda, because of its more rapid growth, secured a ground cover more quickly and could be harvested one year before the Common Bermuda was well enough established to warrant a harvest.

Splitting the nitrogen into two applications, one in April and one in July, gave a much better distribution of green thrifty forage than in Test I where only one application was made. The yields were good from spring until mid-fall. Production from Coastal Bermuda was approximately double that of Common Bermuda on all treatments.

Over a two-year period (1955 and 1956) without the addition of nitrogen Coastal Bermuda produced an average of 2780 pounds of dry forage per acre compared to 1270 pounds per acre for Common Bermuda, Table II. Thirty units of nitrogen per acre applied in April and again in July increased the dry forage yield of Coastal Bermuda from 2780 to 6715 pounds per acre or an increase of 3935 pounds. The same treatment on Common

Table 1. Forage production of Common and Coastal Bermuda grass with low nitrogen rates.

Treatment	Yield of dry forage 1954	1955	1956	Three-year average	2-year av. for 1955 & 1956
		Pounds per acre			
Coastal					
1 Check (no nitrogen)	1395	2894	2109	2133	2501
2 30 pounds N April	1912	4937	3941	3597	4439
3 60 pounds N April	2508	7018	5980	5169	6499
Common					
1 Check (no nitrogen)	.....	1296	894	717	1095
2 30 pounds N April	.....	2332	2230	1521	2281
3 60 pounds N April	.....	3544	3961	2501	3752

Common Bermuda on the left and Coastal Bermuda on the right. Both varieties were nitrated with 60 pounds of nitrogen in April and 60 pounds in July.

Table II. Rates and dates of applying nitrogen to Common and Coastal Bermuda grass for forage production.

Treatment	Yield of dry forage 1954	1955	1956	Three-year average	2-year av. for 1955 & 1956
			Pounds per acre		
Coastal					
1 Check (no nitrogen)	1652	3419	'2141	2404	2780
2 30 lbs. N April and 30 lbs. N July	2781	7132	6298	5404	6715
3 60 lbs. N April and 60 lbs. N July	4145	10,407	11,181	8578	10,794
Common					
1 Check (no nitrogen)	*	1585	955	847	1270
2 30 lbs. N April and 30 lbs. N July	*	3778	'3289	2356	3534
3 60 lbs. N April and 60 lbs. N July	*	4526	6157	3561	5342

*Common Bermuda was not large enough to be clipped in 1954.

Bermuda increased the dry forage yield from 1270 to 3534 pounds per acre or an increase of 2264 pounds. Coastal Bermuda with two applications of 30 units of nitrogen produced 90 percent more forage than Common Bermuda with the same fertilizer treatment.

Sixty pounds of nitrogen per acre applied in April and 60 pounds per acre in July increased the yield of Coastal Bermuda forage 8014 pounds per acre more than plots without nitrogen. The same treatment with Common Bermuda produced 3772 pounds of dry forage per acre more than Common Bermuda without nitrogen. Coastal Bermuda grass produced 102 percent more forage than Common Bermuda where both were fertilized in April and in July with 60 units of nitrogen at each application.

High Rates of Nitrogen

Test III: This test included three rates of nitrogen 0, 150 and 200 pounds of nitrogen per acre. The test was treated and managed in the same way as in Test I and II except the nitrogen treatments were made in one application in April.

Results: The high rates of nitrogen produced very high yields of forage from both Coastal and Common Bermuda grass. The difference in yields of Coastal and Common Bermuda, expressed as percentage, was not as great at the higher rates of nitrogen as it was at the low rates. Without nitrogen Coastal Bermuda produced 105 percent more forage than

Common Bermuda, Table III. When 150 pounds of nitrogen per acre was applied, Coastal Bermuda was only 57 percent more productive than Common. Coastal produced 76 percent more dry forage than Common Bermuda when 200 units of nitrogen per acre were applied.

Fertilizing Coastal Bermuda grass with 150 pounds of nitrogen per acre increased the dry forage yield from 3221 to 11,864 pounds per acre, a difference of 8625 pounds. The same treatment applied to Common Bermuda increased the yields from 1570 to 7535 pounds of dry forage per acre, an increase of 5965 pounds. Two hundred pounds of nitrogen per acre produced 13,480 pounds of dry Coastal Bermuda forage and 7650 pounds of Common Bermuda forage per acre. This was an increase of 10,259 pounds of Coastal Bermuda forage and 6080 pounds of Common Bermuda forage per acre more than was produced from Coastal Bermuda and Common Bermuda plots that were not nitrated.

Applying high rates of nitrogen to a permanent pasture grass is not a general practice in Mississippi, however, these exceptionally good forage yields indicate the productive potential of a well managed permanent pasture is far more than is generally realized.

Influence of Legumes

Test IV: In Test IV Wild Winter Peas and White Clover were drilled into a Coastal and Common Bermuda grass sod with a sod seeding machine. This test was conducted to determine the influence of a legume on (1) the length of the productive period, (2) the effect on the grass after the legume was removed or dead, and (3) the difference in yields of Common and Coastal Bermuda grass. The legumes were planted in October and fertilized with 60 units of phosphate and 25 units of potash per acre. No nitrogen was applied to any part of the test. The plots were 10 by 15 feet in size and the treatments were replicated six times.

Results: The Wild Winter Peas came

Table III. High rates of nitrogen for the production of Coastal and Common Bermuda grass forage.

Treatment	Yield of dry forage 1954	1955	1956	Three-year average	2-yr. av. for 1955 & 1956
	Pounds per acre				
Coastal					
Check (no nitrogen)	701	4027	2414	2381	3221
150 lbs. N per acre	3480	12,000	11,727	'9069	11,864
200 lbs. N per acre	4021	14,301	12,658	10,327	13,480
Common					
Check (no nitrogen)	——*	1742	1403	1048	1570
150 lbs. N per acre	——*	7827	7242	5023	7535
200 lbs. N per acre	——*	'7403	7897	5100	7650

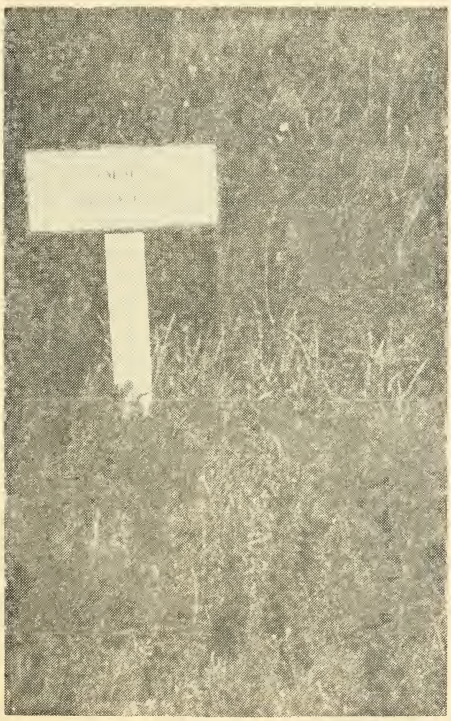
*Common Bermuda not large enough to clip.

Table IV. Common and Coastal Bermuda grass grown without a legume and sod seeded with wild winter peas and white clover.

Treatment	Yield of dry forage 1954	1955	1956	Three-year average	2-year av. for 1955 & 1956
	Pounds per acre				
Costal					
Check (no nitrogen)	1726	3055	2240	2340	2648
Coastal + wild winter peas	2413	7040	7079	5511	7060
Coastal + white clover	1785	3432	2497	2571	2965
Common					
Check (no nitrogen)	——	1131	984	705	1058
Common + wild winter peas	——	5325	5190	3505	5258
Common + white clover	——	1676	1259	978	1468

up to a good stand each year and made satisfactory growth. The White Clover was erratic in stand each season and caused very little increase in forage yields from either Common or Coastal Bermuda. Sod seeding Wild Winter Peas in either Common or Coastal Bermuda increased the production and the productive period of the plots. Over a two-year period Coastal Bermuda without a legume averaged 2648 pounds of dry forage per acre, Table IV. Wild Winter Peas sod seeded in Coastal Bermuda produced 7060 pounds of dry forage per acre. This was an increase of 4412 pounds of dry forage per acre. Sod seeding Wild Winter Peas in Common Bermuda increased the forage production from 1058 to 5258 pounds per acre.

The length of productive period was extended by two to two and one-half months by seeding Wild Winter Peas in either a Common or Coastal Bermuda sod. This extended productive period makes it possible for a bermuda pasture to be grazed for approximately nine months.



Common Bermuda grass without nitrogen severely infested with weeds.

Bermuda grass, both Common and Coastal, was much greener and more productive after the peas were gone than the plots without a legume, indicating the peas had left a considerable quantity of nitrogen in the soil.

Without a legume Coastal Bermuda produced 150 percent more dry forage than Common Bermuda. The Common Bermuda averaged 1058 pounds of dry forage per acre without a legume. The hybrid (Coastal) bermuda produced 2648 pounds of dry forage per acre. The measurable difference between the two grasses was greatly reduced where Wild Winter Peas were interplanted with the grasses. Coastal Bermuda with peas interplanted produced only 34 percent more dry forage than Common Bermuda sod seeded with Wild Winter Peas. This was because the production of peas from the Common and Coastal plots were practically the same. The Coastal Bermuda produced considerably more forage than the Common Bermuda after the Wild Winter Pea forage was harvested.

Dallis Grass and Bermuda

Test V: This test includes Dallis grass, Common Bermuda grass and Coastal Bermuda grass with and without nitrogen. The test was planted in eight by 20-foot plots and each treatment replicated four times. The Common and Coastal Bermuda were sprigged while the Dallis grass was seeded. All entries were planted in the spring of 1954. In order to give all entries ample time to secure a good ground cover and become well established, the test was kept two years before the nitrogen treatments were added. The two years delay was caused by the extremely dry summers of 1954 and 1955. In the spring of 1956 the nitrogen treatment was added to the test. Each of these grasses received one

application of 60 pounds of nitrogen per acre in April and again in July. This was compared with similar plots that were not nitrated. Sixty pounds of phosphate and 25 of potash per acre were applied in the spring.

Results: Since there was no rain for eight weeks the crops did not produce maximum yields of forage. Coastal Bermuda with or without nitrogen was superior in forage production to comparable treatment with Dallis grass or Common Bermuda grass, Table V. Without the addition of nitrogen to either grass, Coastal Bermuda produced 1701 pounds more oven dry forage per acre than Common Bermuda and 1630 pounds more oven dry forage per acre than Dallis grass. This increase for Coastal Bermuda was 126 percent more than Common Bermuda and 115 percent more than Dallis grass.

The differences in forage yields where nitrogen was applied were also outstanding. Sixty pounds of nitrogen per acre in April and 60 in July applied to all three grasses produced 6194 pounds more Coastal forage than was produced from the same treatment on Common Bermuda grass. The yields of Coastal Bermuda with nitrogen were 7874 pounds more dry forage than similar treatments on Dallis grass. Coastal Bermuda grass with nitrogen produced 91 percent more dry forage than Common Bermuda and 154 percent more dry forage than Dallis grass.

Even though 1956 was an exceptionally dry year, the response of each grass to nitrogen was very good. Sixty pounds of nitrogen per acre applied in April plus an additional 60 in July increased the production from Coastal Bermuda by 9936 pounds of dry forage per acre. This was a 326 percent increase in Coastal Bermuda forage yields for the addition of nitrogen. Applying nitrogen to Common Bermuda increased forage yield 404 percent. The yield of Common Bermuda was 5443 pounds more dry forage per acre where nitrogen was applied than on comparable plots without nitrogen. Nitrated Dallis grass produced 3692 pounds more dry forage than Dallis grass without nitrogen. The yields from nitrated Dallis grass were 361 percent more than similar plots that were not nitrated.

The nitrated Dallis grass produced most of its forage in the spring and early summer. By June 28 the Dallis grass that was nitrated had produced 229 percent more than was produced from these plots the remainder of the season. The extremely dry summer partially accounted for the small amount of Dallis grass growth after June 28. The yields of Coastal Bermuda were practically the same between June 28 and August 15 as they were up to June 28. The yield of dry forage before June 28 was 6632 pounds per acre. The production between June 28 and August 15 was 6351 pounds per acre which was only a 4 percent difference for Coastal Bermuda.

The Common Bermuda grass forage

Table V. Comparative yields of Coastal Bermuda, Common Bermuda, and Dallis grass with and without nitrogen.

Treatment	Yield of dry forage 1st clipping	2nd clipping	Yield for season	Dry forage per acre Tons
		Pounds per acre		
Coastal with nitrogen*	6632	6351	12,983	6.49
Coastal without nitrogen	1364	1683	'3047	1.52
Common with nitrogen*	2784	4005	6789	3.39
Common without nitrogen	662	684	1346	0.67
Dallisgrass with nitrogen*	3917	1192	5109	2.55
Dallisgrass without nitrogen	784	633	1417	0.71

*Sixty units of nitrogen was applied in April and 60 units added in July.

Note the difference between nitrated Coastal Bermuda on the left and Coastal Bermuda without nitrogen on the right.

produced before June 28 was 30 percent less than was produced between June 28 and August 15. Without nitrogen Coastal Bermuda produced 23 percent more forage after June 28 than was produced before that date. Common Bermuda without nitrogen produced practically the same amount after June 28 as it did before June 28. The yields of Dallis grass with no nitrogen were 24 percent less after June 28 than were produced before that date.

These results indicate that Coastal Bermuda and Common Bermuda are more productive and more dependable pasture crops than Dallis grass during extremely dry periods. Even though the summer of 1956 was extremely dry the growth from the two varieties of bermuda grass was more uniformly distributed throughout the spring and summer growing season.

Discussion

Coastal Bermuda has proven to be superior in many ways to all presently adapted permanent pasture grasses in the Brown Loam Area of Mississippi. Some of the superior characteristics of Coastal Bermuda over Common Bermuda are as follows:

1. It is more erect in growth which lends itself to hay making as well as grazing.

2. The internodes are longer and the leaves, stems, stolons, and rhizomes are larger than Common Bermuda.

3. Coastal is more tolerant to light frost and remains green and in a more thrifty condition later in the fall.

4. The root penetration of Coastal is much deeper than that of Common which insures good growth for Coastal Bermuda during dry weather.

5. It is more disease resistant. Coastal Bermuda is resistant to Helminthosporium leaf spot that often causes the leaves of Common Bermuda to die. It is also resistant to root knot nematode which makes it possible to grow some legumes that are not susceptable to root knot organisms.

6. It will grow and spread faster, and secure a ground cover quicker than Common Bermuda when both are sprigged.

7. The dry weight content is often higher than most other grasses.

8. It is a dependable perennial pasture crop.

9. The forage yields are much higher than Common Bermuda or Dallis grass.

10. The yields appear to be better distributed over a longer portion of the season.

Coastal Bermuda is relatively new in Mississippi forage crops. The hybrid grass has consistantly produced much better forage yields than either Common Bermuda or Dallis grass. It is possible that higher yields can be obtained from all species reported. The yields were produced during three of the driest years on record.

The greatest differences between Common and Coastal Bermuda seem to be where no fertilizer is applied and under low fertility levels. The difference between Common and Coastal Bermuda narrowed as the rate of nitrogen was increased. This is a definite advantage for Coastal Bermuda since most improved pastures are fertilized with only small quantities of fertilizer materials.

Coastal Bermuda is not without fault. Some of the disadvantages are listed as follows:

1. Coastal Bermuda must be propogated vegetatively on a prepared seedbed either by hand or mechanically since it makes practically no seed.

2. Generally, during drouthy years, the first year's grazing on the area is lost or delayed unless irrigation is available. During seasons of ample rainfall a ground cover may be completed the first year.

3. Weeds and annual grasses should be controlled.

Common Bermuda can be seeded and a good ground cover secured the first year. This advantage for Common Bermuda as well as its perennial persistance and presence in practically every pasture and field in the Brown Loam Area cannot be discounted. Greater yields can be realized from presently established Common Bermuda pastures by applying better management practices. It is an expensive operation to completely renovate a pasture that is well covered with a practically adapted perennial grass. However, Coastal Bermuda is a perennial grass that has the same general region of adaptation as Common Bermuda and if properly managed is a good dependable pasture or hay crop.