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BAHIAGRASS for FORAGE in ALABAMA

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E. V. Smith, Director Auburn, Alabama

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BAHIAGRASS for FORAGE in ALABAMA

C. S. HOVELAND, *Associate Agronomist*

BAHIAGRASS, a native of South America, had its origin in southern Brazil, Paraguay, Uruguay, and northern Argentina. Common Bahia was first introduced into the United States in 1913 by the Florida Agricultural Experiment Station *(13)*.

Bahiagrass (*Paspalum notatum* Flugge) is a deep rooted warm season perennial having short thick scaly J-shaped rhizomes. The seed heads consist of 2 to 3 panicles on stalks 1 to 3 feet tall. Acreage of this grass has increased rapidly in Alabama. In 1960 there were over 400,000 acres in the State.

DESCRIPTION of VARIETIES

Common, the original type of Bahia, is found in the Gulf Coast area of Alabama. The plants are small with broad leaves and seed heads growing 8 to 18 inches tall. The oval-shaped seed have a tight waxy glume covering, making germination very low unless scarified. Common Bahia is not cold tolerant; the plants are often killed by temperatures lower than 20° F.

Pensacola was first found growing on vacant lots in Pensacola, Florida, by County Agent E. H. Finlayson in 1935 *(7)*. It has long narrow leaves, large stems, and 2 or 3 fingered seed heads on seedstalks 24 to 36 inches tall. Pensacola is immune to ergot *(14)*. The long oval seed are smaller and germinate more readily than common Bahia. There are about 160,000 seed per pound *(1)*. Pensacola tolerates frost better than common Bahiagrass and withstands winter temperatures down to nearly 0° F. It is the most widely planted variety in Alabama.

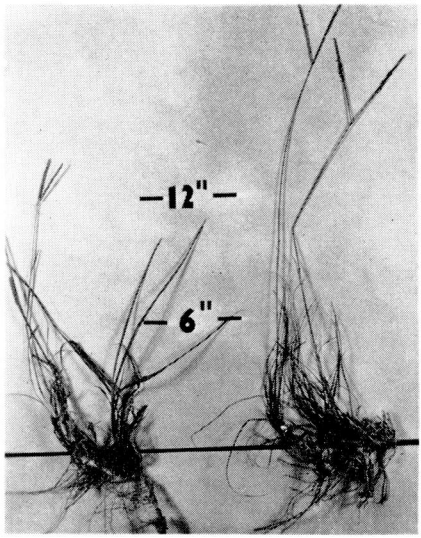

FIG. 1. Plant characteristics of Argentine (left) and Pensacola Bahiagrass are shown in the photograph.

Argentine was introduced into Florida from Argentina in 1945 *(11)*. It has leaves somewhat narrower than common, but much wider than Pensacola, Figure 1. The seed are very susceptible to ergot. There are about 135,000 seed per pound *(1)*. This variety starts growth later in the spring and is less cold hardy than Pensacola.

Paraguay is a coarse, short, narrow-leafed variety less productive than Pensacola.

Wilmington is a cold hardy variety but less productive than Pensacola.

Tifhi-1 a new hybrid, developed at the Georgia Coastal Plain Experiment Station by Dr. G. W. Burton, is somewhat leafier, more shatter-resistant, and higher yielding than Pensacola. This hybrid has given more beef gain per acre than Pensacola *(1)*.

DISEASES and INSECTS

Disease and insect pests have not presented a serious problem with Pensacola Bahiagrass. Argentine Bahia is sometimes seriously affected with ergot (*Claviceps paspali*) *(11)*. This disease, present on the seed heads, is poisonous to cattle. The largest amount of ergot appears in late summer; therefore, the danger can be avoided by mowing seed heads at that season.

Leaves of most Bahiagrasses are slightly damaged by a fungus disease, *Helminthosporium micropus* Drechs *(1)*. Helminthosporium damage on Bahia has been widely observed in Alabama by plant pathologists of this Station. Recently a severe foliar disease of Bahia, apparently caused by Helminthosporium, was observed in Mississippi *(10)*. Different types of Bahia were found to vary in their reaction to the fungus.

ADAPTATION

Adaptation trials with common Bahia were carried on in southern Alabama from 1932 to 1936. Dry forage yields during this period averaged 5,724 pounds per acre at Monroeville and 4,259 pounds at Brewton. Yields were lower than those of carpetgrass; as a result, there was little encouragement for use of common Bahia as a desirable pasture species.

Data from clipping trials at 10 locations in Alabama show that high yields of forage can be obtained from Pensacola Bahia. As given in Table 1, Pensacola has generally produced yields comparable to those of Coastal Bermuda at locations in southern and central Alabama. At Alexandria and Belle Mina in northern Alabama, Coastal Bermuda has outyielded Pensacola Bahia. Pensacola Bahia has been sufficiently cold hardy to withstand winter conditions in that section of Alabama. This has been true even on clay soils subject to considerable heaving. However, Pensacola Bahia has not been as productive as Dallisgrass or Coastal Bermuda on Sumter clay, a heavy gray lime soil.

TABLE 1. DRY FORAGE YIELDS OF COASTAL BERMUDA AND PENSACOLA BAHIA AT NINE LOCATIONS IN ALABAMA

Location and years of test	Soil	Nitrogen applied per year	Dry forage yield per acre	
			Coastal Bermuda	Pensacola Bahia
		Lb.	*Lb.*	*Lb.*
Tennessee Valley Substation, Belle Mina, 1956-59	Humphries sil	200	9,097	8,054
Alexandria Experiment Field, Alexandria, 1957-59	Decatur sicl	150	10,720	6,832
Foundation Seedstocks Farm, Thorsby, 1956-59	Greenville fsl	150	8,582	7,668
Piedmont Substation, Camp Hill, 1956-58	Louisa cl	150	5,373	6,107
Dairy Research Unit, Auburn, 1956-59	Cecil sl	200	8,438	8,445
Plant Breeding Unit, Tallassee, 1958-59	Cahaba fsl	200	17,420	9,441
Prattville Experiment Field, Prattville, 1955-59	Greenville sl	150	10,278	10,266
Tuskegee Experiment Field, Tuskegee, 1955-59	Boswell sl	150	7,304	8,478
Black Belt Substation, Marion Junction, 1957-60	Sumter c	150	6,690	4,192
Wiregrass Substation, Headland, 1953-59	Norfolk sl	160	7,670	7,165
Brewton Experiment Field, Brewton, 1954-57	Kalmia sl	200	5,584	6,386

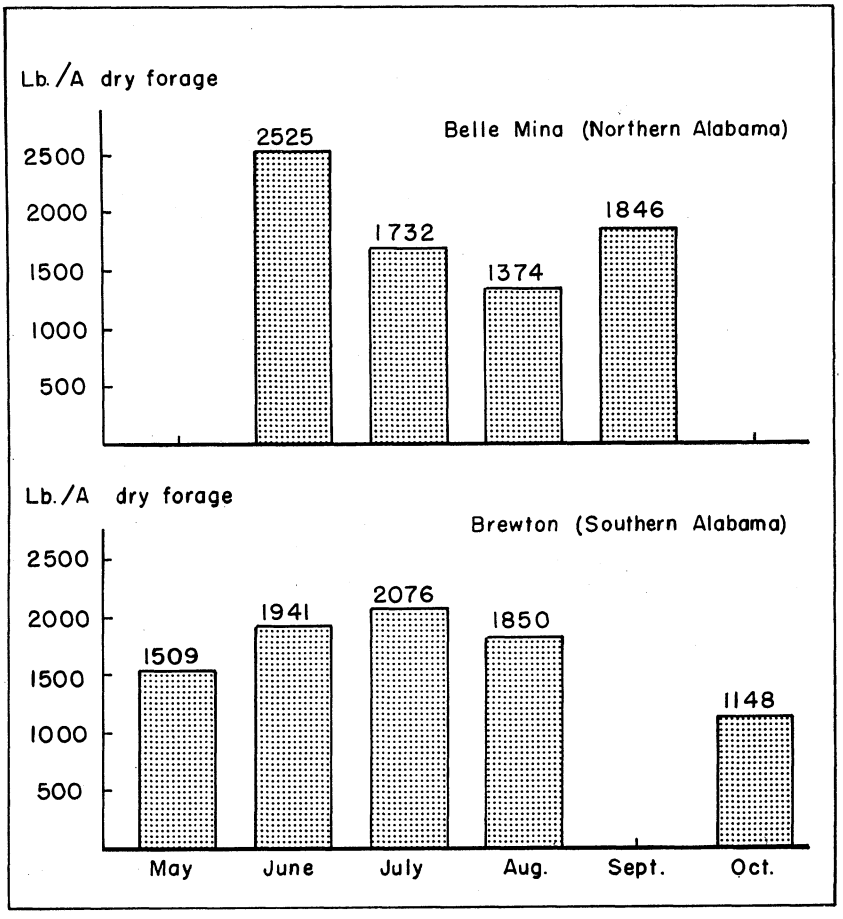

FIG. 2. Seasonal forage production of Pensacola Bahia at Belle Mina and Brewton 1957 is shown above. Drought during late August and early September was responsible for no September harvest at Brewton.

Although annual yields of Pensacola Bahia in northern Alabama tests have been equal to or higher than those at Brewton and Headland in southern Alabama, the productive season has been much shorter. The seasonal distribution of forage shown in Figure 2 is typical of the much earlier spring and later fall production in southern Alabama. Generally, Pensacola Bahia has furnished some forage in late April at Brewton, whereas little growth has been obtained before June at Belle Mina. If moisture is available in the fall, considerable forage can be obtained during

late September and October at Brewton, but little growth occurs during that period at Belle Mina. Nitrogen fertilization has increased the total production of Pensacola Bahia, but it has not influenced the seasonal distribution of forage *(2,6)*.

Pensacola Bahia can survive drought conditions in Alabama, but it makes less forage growth during periods of dry weather than Coastal Bermuda. Consequently, Pensacola Bahia is less suited to droughty upland soils than Coastal Bermuda. In Georgia *(3)*, Coastal Bermuda was found to be more drought tolerant, more efficient in water use, and more dependable from year to year than Pensacola Bahia. Results of research at Thorsby, Alabama *(5)* have shown that the less efficient use of water by Bahia cannot be attributed to shallow rooting. However, Bahia has roots considerably larger in diameter than Coastal Bermuda, possibly giving less thorough distribution of roots in the soil profile.

Under poor drainage conditions in the spring, as experienced in the test at Tuskegee on Boswell fine sandy loam (Table 1), Pensacola Bahia has performed better than Coastal Bermuda. At this location Pensacola Bahia has consistently given more early growth under wet conditions than Coastal Bermuda or Dallisgrass. Pensacola Bahia has also performed better than Coastal in tests at Brewton, an area of the State that generally receives more and better distribution of rainfall than most areas. On wetter soils in southern Alabama, Bahia is well adapted and is a good forage producer.

The adaptation of Pensacola Bahia to conditions of low fertility is illustrated in Table 2. In an experiment on Cecil sandy

TABLE 2. DRY FORAGE YIELDS OF PENSACOLA BAHIA AND COASTAL BERMUDA AS AFFECTED BY IRRIGATION AND NITROGEN AT AUBURN, 4-YEAR PERIOD

Grass	Irrigation treatment[1]	Nitrogen applied per acre annually	Dry forage yield per acre				
			1956	1957	1958	1959	Av.
		Lb.	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*
Pensacola Bahia	None	0	3,886	4,787	2,965	2,403	3,510
Pensacola Bahia	None	200	4,983	9,074	9,747	9,975	8,445
Pensacola Bahia	Irrigated	0	6,588	5,194	4,001	3,193	4,744
Pensacola Bahia	Irrigated	200	6,332	8,573	8,980	10,814	8,675
Coastal Bermuda	None	0	3,565	1,935	2,059	1,503	2,265
Coastal Bermuda	None	200	8,288	8,139	7,950	9,375	8,438
Coastal Bermuda	Irrigated	0	3,642	2,409	3,802	2,681	3,133
Coastal Bermuda	Irrigated	200	8,323	9,129	7,532	10,504	8,872

[1] Irrigation water applied per year: 1956—9 inches; 1957—15 inches; 1958—12 inches; 1959—8 inches.

TABLE 3. DRY FORAGE YIELDS FROM PENSACOLA AND ARGENTINE BAHIA AT SIX LOCATIONS IN ALABAMA, 7-YEAR PERIOD

Location	Variety	Dry forage yield per acre							
		1954	1955	1956	1957	1958	1959	1960	Av.
		Lb.	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*
Alexandria	Pensacola	----	----	----	4,598	6,594	9,303	----	6,832
	Argentine[1]	----	----	----	1,399	0	0	0	----
Tallassee	Pensacola	----	----	----	----	7,211	11,671	----	9,441
	Argentine	----	----	----	----	5,699	10,123	----	7,911
Tuskegee	Pensacola	----	4,888	5,794	11,221	11,019	9,469	----	8,478
	Argentine	----	4,853	4,752	10,860	9,447	9,765	----	7,935
Prattville	Pensacola	----	7,070	8,238	11,495	14,264	10,636	----	10,266
	Argentine	----	4,344	7,152	11,352	12,628	8,930	----	8,869
Marion Junction	Pensacola	----	----	----	787	5,526	5,532	4,922	4,192
	Argentine	----	----	----	726	5,350	6,548	5,610	4,558
Brewton	Pensacola	2,962	6,647	7,417	8,520	----	----	----	6,386
	Argentine	2,478	5,349	6,523	8,190	----	----	----	5,635

[1] Argentine Bahia winter killed after the first year.

loam near Auburn, Pensacola Bahia and Coastal Bermuda, established in April of 1955 were clipped at monthly intervals. When yields of the two grasses are compared where no nitrogen or irrigation water was applied, Pensacola Bahia outyielded Coastal Bermuda. When additional water but no nitrogen was applied, the difference in favor of Pensacola Bahia was even greater. With application of 200 pounds per acre of nitrogen fertilizer, there was little difference in the total production of the two grasses. This suggests that Pensacola Bahia is better adapted than Coastal Bermuda where soil moisture is good and little or no nitrogen fertilizer is used. Results from other irrigation studies in Alabama showed that Bahia was more responsive to irrigation than Coastal Bermuda *(6)*. Data indicate that it is best to plant high dry sites to a more drought tolerant plant, such as Coastal Bermuda. Similar results were obtained in Mississippi where Pensacola Bahia outyielded Dallis when no nitrogen was used. When nitrogen was applied the yields of the two grasses were the same *(4)*.

Argentine Bahia has been compared with Pensacola Bahia at six locations in Alabama. Results of these tests (Table 3) show that Argentine in general has not yielded as much forage as Pen-

FIG. 3. Argentine Bahia stand, right, was lost during winter of 1957-58, as shown by photograph made in August, 1958 at Alexandria. Pensacola, left, was not damaged.

sacola. At Alexandria in northern Alabama, Argentine failed to survive the winter, Figure 3. Therefore, this variety should not be planted in the northern half of the State. Little or no winter killing has been experienced in experimental plantings of Argentine made in the central and southern parts of the State.

Although Argentine has yielded less total production than Pensacola, there is a greater difference in performance of these two grasses. Argentine remains dormant later in the spring and gives less early forage than Pensacola. Data in Table 4 show the earlier production of Pensacola at Brewton in a 3-year period. Although these yield differences are not great, even a small amount of additional forage can be important to a cattleman at this time of the year.

Argentine, making less spring growth, produces more forage than Pensacola during the midsummer period. This larger quantity of midsummer growth, together with its leafiness and wider leaf, makes Argentine better suited for haymaking than Pensacola.

Observations on a pasture containing both Pensacola and Argentine Bahia at Tuskegee Experiment Field, indicated that the cattle showed a distinct preference for Argentine after frost.

Pensacola Bahia is an excellent plant for soil conservation. It is widely used for protecting highway shoulders in Alabama. Bahia forms a tight sod with a deep, extensive root system that will hold soil in place once it becomes established. Results of recent studies in Alabama *(5)* show that Bahiagrass roots weigh almost twice as much as roots of common or Coastal Bermudagrass. This suggests that Bahiagrass may be useful in rotations with cultivated crops. Tomato yields in Georgia have been much better when planted on land where a Bahiagrass sod was turned *(1)*. Results of this study also show a reduction in the incidence of root-knot and meadow nematodes and southern root rot (*Sclerotium rolfsii*) following Bahia sod. Corn yields, however, were no better following sod than on continuously cultivated land.

TABLE 4. SPRING PRODUCTION OF PENSACOLA AND ARGENTINE BAHIAGRASS AT BREWTON EXPERIMENT FIELD, 3-YEAR PERIOD

Variety	Dry forage yields per acre by mid-May				Dry forage yields per acre from mid-May to mid-June			
	1955	1956	1957	Av.	1955	1956	1957	Av.
	Lb.	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*
Pensacola	1,605	1,187	1,509	1,434	1,258	2,311	1,941	1,837
Argentine	1,157	570	1,309	1,012	754	1,690	1,597	1,347

ESTABLISHMENT

An important advantage of Bahiagrass over Coastal and Suwanee Bermudagrass is its ease of establishment from seed. However, germination of newly harvested Bahiagrass seed is low and the seed germinate over a long period after planting. This is because the seed are enclosed by a tough, waxy coat that does not permit water to enter readily for germination. This waxy seal can be broken by mechanical or sulfuric acid scarification to accelerate germination. Under most conditions it is not necessary to scarify seed of Pensacola and Argentine Bahia. Two-year-old seed germinate faster than one-year seed; stored unscarified seed will usually remain viable for 3 years *(14)*. Germination is generally low in seed that have been stored 4 years or more.

The best time for planting is after the average date of the last spring killing frost. Moisture conditions at this time of year are generally good for germination. Bahia can also be planted in July when rains are expected, but crabgrass and other weed competition will be severe. Late fall seeding is risky and should be done only in southern Alabama. When late planting is done, seed sometimes germinate during warm winter weather and are killed by freezes.

Before planting it is recommended that lime and fertilizer be applied according to soil test recommendations from the Auburn University Agricultural Experiment Station Soil Testing Laboratory. The land should be prepared several weeks in advance by breaking, disking, and harrowing to obtain a good seedbed.

A cultipacker-seeder or grain drill is ideal for planting Bahia seed. The soil should be firmed around the seed to encourage quick germination and rooting. Too often, Bahia seed are left uncovered and in poor contact with the soil, resulting in poor stands of grass. The best planting depth for Bahiagrass seed is one-fourth to one-half inch. When using a grain drill with grass seeder attachment care must be taken to prevent seed being covered too deeply by the disks.

A seeding rate of 15 pounds per acre is recommended for Pensacola and Argentine Bahia. A lower seeding rate may result in a thin stand, encouraging weed competition. A heavier seeding rate generally gives a good sod in a shorter period of time.

Bahiagrass seedlings are very small and weak competitors with weeds. Thus, for quick establishment of a good productive Bahia sod, it is necessary that weeds be controlled. Avoid grazing cat-

tle on a new planting, since trampling destroys many small seedlings. A good well-fertilized sod of Bahia will remain almost completely free of weeds. Under good moisture conditions and low nitrogen fertility, Bahia will suppress the growth of Bermudagrass.

The advantage of easy establishment from seed can also make Bahiagrass a pest in areas where it is not wanted. Cattle eating the mature seed may transport the undigested seed in manure to other areas. Bahiagrass can be controlled by turning the sod and growing clean cultivated crops.

FERTILIZATION

Bahiagrass requires fertilization for satisfactory establishment and production, preferably according to soil test recommendations. In the absence of a soil test, an application of 16 pounds of nitrogen and 48 pounds per acre each of P_2O_5 and K_2O is recommended. It may be necessary to apply lime at the rate of 1 ton per acre on sandy soils and 2 tons per acre on loam soils.

As soon as the stand is established, a topdressing of 45 pounds of nitrogen is needed. In succeeding years, a spring application of 56 pounds per acre each of P_2O_5 and K_2O is recommended. In the absence of legumes and if the grass is to be used for grazing only, an application of 30 pounds per acre of nitrogen is needed in April and again in June. For production of grazing and hay, 40 to 50 pounds per acre of nitrogen is needed several times during the season up to a total of 200 pounds.

An application of 56 pounds per acre each of P_2O_5 and K_2O is necessary before planting where winter legumes are grown on the grass sod. When legume stands are good, the spring topdressing of nitrogen can be omitted. For high summer grass production, however, the pasture should be topdressed in June.

HAY PRODUCTION

The Bahiagrasses are primarily pasture-type plants and not as well suited for hay production as some other warm season perennial grasses. Because of the low-growing dense growth, the usual farm mower rides over much of the forage, often giving a lower hay yield than Coastal Bermuda. Argentine Bahia is somewhat better than Pensacola in this respect since it makes more growth during a shorter period of time in mid- and late-summer.

Bahiagrass properly fertilized and cut at an early stage of growth, makes good quality hay. Unfortunately much Bahiagrass

TABLE 5. DRY MATTER COMPOSITION OF PENSACOLA BAHIA PLANT PARTS AT MONTHLY INTERVALS AT AUBURN, 1959

Plant part	June 22	July 20	Aug. 17	Sept. 16	Oct. 23
	Pct.	*Pct.*	*Pct.*	*Pct.*	*Pct.*
Stems	4.1	8.7	4.0	2.3	1.9
Leaves	87.5	69.0	88.0	94.5	98.1
Seedstalks	8.4	22.3	8.0	3.2	0

hay harvested on farms is of low quality because it is cut at a late stage of maturity and exposed to rain and sun after mowing. One common practice on farms is to combine Bahia seed from a field and then cut the residue for hay. This material is of low quality and is not much better than straw.

High quality Bahia hay is leafy and has a low content of stems and seed heads. Seed heads do not develop at the same rate throughout the summer. In an experiment at Auburn, separations of Pensacola Bahia forage into leaves, stems, and seedstalks were made at each clipping. The results in Table 5 show that seed head production was greatest during late June and early July, becoming progressively less later in the season.

SEED PRODUCTION

Bahiagrass produces good yields of seed. With good fertilization and combining methods, 200 to 300 pounds of cleaned seed per acre can be obtained. When little grazing is done, several seed crops can be harvested each year.

Unfortunately, all seed do not mature at the same time but ripen throughout the summer. Close examination of fields before harvesting will help prevent shattering loss. Seed color does not denote maturity since green colored seed may be fully ripe. Readiness for harvest may be checked by pulling a seed head through partially closed fingers. Ripe seed will strip off, leaving immature seed on the head. Each stem may bear up to as many as 50 seeds.

Bahiagrass can be easily combined, since seed heads extend above the leaves and can be cut without including much forage. Both green and ripe seed are harvested by the combine. Thus, it is necessary to prevent heating of the newly harvested seed. Seed are spread a few inches deep on a dry floor and thoroughly stirred once or twice a day. Heating of seed will seriously reduce germination. Forced air drying is essential if large acreages of seed are to be harvested. If heated air is used, the temperature should not be allowed to rise above 110° F or germination will be impaired.

PASTURE

Beef Cattle. Results of grazing studies in Alabama show that Pensacola Bahia pastures will produce high per-acre beef gains if stocked to capacity with steers. However, as with Coastal Bermuda, daily gains of yearling steers have been low. Average seasonal daily gain per animal in Alabama tests range from less than 0.8 pound at Camp Hill to about 1.25 pounds at Headland. Daily gain per steer did not increase as larger quantities of nitrogen were applied.

Steer grazing data obtained on Pensacola Bahia over a 5-year period, in cooperation with the Animal Husbandry and Nutrition Department and the Wiregrass Substation, show the value of nitrogen in increasing forage yields and steer gain per acre (Table 6). Nitrogen fertilization increased the crude protein content of the herbage. In this experiment, pastures were stocked with enough yearling steers to utilize the forage at each season of the year. Average annual length of the grazing season was 168 days. In this study, Pensacola Bahia was superior to common Bermuda, but was less productive than Coastal Bermuda at all levels of nitrogen *(8)*. Pensacola Bahia was less responsive to high rates of nitrogen than Coastal Bermuda.

Slaughter finish of yearling animals grazing Pensacola Bahia, Coastal Bermuda, and common Bermuda has not been satisfactory. In the experiments at the Wiregrass Substation, the cattle were predominantly utility grade when removed from these pastures at the end of the summer.

TABLE 6. FORAGE YIELD, STEER GAIN, AND STOCKING RATE ON PENSACOLA BAHIA AT THREE NITROGEN LEVELS, WIREGRASS SUBSTATION, HEADLAND, 1953-57 AVERAGES

Nitrogen applied per acre	Oven dry forage yield per acre	Steer gain per acre	Average daily stocking rate steers/acre
Lb.	*Lb.*	*Lb.*	*No.*
0	3,205	221	1.25
80	5,482	291	1.79
160	6,473	353	2.02

Dairy Cattle. Pensacola Bahia pasture has not been satisfactory as the sole source of roughage for high producing dairy cows, based on studies in cooperation with the Department of Dairy Husbandry over a 3-year period *(12)*. Cows on Pensacola Bahia, Coastal Bermuda, and Dallisgrass fertilized with 200 to 300

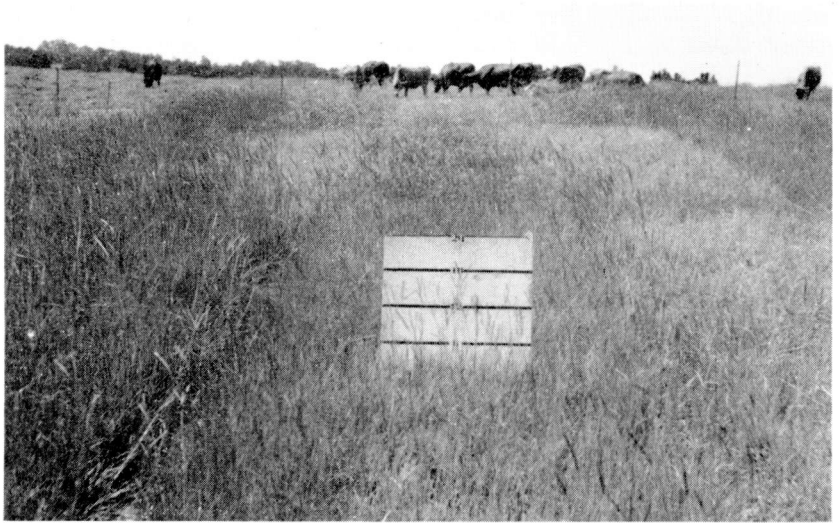

FIG. 4. Twenty-eight day growth of Pensacola Bahiagrass grown at the Station's Dairy Unit without either legume or commercial nitrogen is shown above. Photograph was made on August 4.

FIG. 5. Twenty-eight day growth of Pensacola Bahiagrass is shown above that was grown at the Station's Dairy Unit after vetch but without commercial nitrogen. Photograph was made on August 4.

pounds of nitrogen per acre showed similar lactation response. All of these species failed to support high milk production and were inferior to alfalfa hay. Cows in these experiments received a concentrate mixture of 1 pound per 4 pounds of 4 per cent fat milk.

Irrigation of Pensacola Bahia gave a small increase in forage yield, but it did not change the downward trend in lactation. Likewise, rotational grazing of 3 paddocks for 1 week periods offered no advantage from the standpoint of milk production. The crude protein content of herbage in these pastures declined from over 15 per cent in early May to slightly over 10 per cent in October.

LEGUMES and PENSACOLA BAHIA

It is difficult to get good stands of legumes in the dense, tough sod of Bahiagrass. Winter annual clovers, such as crimson, have not reseeded successfully in Bahia sod. Likewise, white clover stands are often difficult to obtain.

Where annual clovers have been seeded each fall on Pensacola Bahia sod scarified with a disk, results have been much better. Annual legumes greatly increased the total forage production in clipping tests at three locations in the State, Table 7. Legumes grown with Bahia generally doubled the total yield of forage when no nitrogen fertilizer was applied, Figures 4 and 5. The value of legumes was demonstrated even when nitrogen was applied. An added advantage of the winter legumes was the extension of the grazing season by several months and furnishing good quality forage when the Bahia was dormant.

Ball clover, seeded on Bahia sod at Headland, was somewhat less productive than crimson. However, ball had the advantage of being able to reseed when the sod was scarified.

TABLE 7. EFFECT OF LEGUMES AND NITROGEN FERTILIZATION ON ANNUAL DRY MATTER PRODUCTION OF PENSACOLA BAHIAGRASS-LEGUME HERBAGE AT THREE LOCATIONS

Mixture	Yield of dry matter per acre					
	Camp Hill, 1956-58		Auburn, 1956-59		Headland, 1957-59	
	No N	150 lb. N	No N	200 lb. N	No N	160 lb. N
	Lb.	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*
Pensacola Bahia	2,348	6,107	3,879	7,935	1,720	6,129
Pensacola Bahia-crimson clover	5,028	7,917	7,902	9,994	3,140	7,964
Pensacola Bahia-vetch	----	----	7,330	8,231	4,482	7,559
Pensacola Bahia-ball clover	----	----	----	----	2,852	7,173

Vetch has been the most dependable winter legume seeded on Pensacola Bahia sod. It is generally easier to obtain a stand of vetch than smaller seeded legumes because the larger seed and more vigorous seedlings permit deeper planting to take advantage of soil moisture. Best results have been obtained from using a conventional sod-seeder. Grain drills have not given satisfactory stands on sod. This was probably caused by poor penetration of the sod and shallow placement of seed.

Results of grazing studies indicate the value of vetch in Pensacola Bahia. In the fall of 1957 grazing paddocks at Headland, previously referred to in Table 6, were seeded to vetch on grass sod. During 1958, beef gains per acre were higher than in any of the previous 5 years. Gains per animal were also higher. Pensacola Bahia-vetch with no nitrogen fertilizer produced a total beef gain per acre of 335 pounds with an average daily stocking rate of 1.65 steers per acre.

In an experiment at Camp Hill in 1959, a combination of Pensacola Bahia-woollypod vetch and a little crimson clover gave 341 pounds of calf gain per acre *(9)*. This was somewhat below gains on Coastal Bermuda planted with these legumes.

SUMMARY

Bahiagrass, a vigorous, warm season, perennial grass is a native of South America. Common Bahia, a low yielding grass, is not cold hardy enough for Alabama.

Argentine Bahia is not cold hardy enough for northern Alabama. This variety, which is severely affected by ergot, starts growth later in the spring and is generally less productive than Pensacola even in southern Alabama.

An important advantage of Bahiagrass is that it can be established from seed. The seed should be planted on a well prepared seedbed at the rate of 15 pounds per acre. Seed yields of 200 to 300 pounds per acre are possible from well managed plantings.

In southern and central Alabama, Pensacola Bahia has given a forage yield comparable to Coastal Bermuda, but on wet soils it has been more productive. In northern Alabama it has been cold hardy and has given high annual yields but a much shorter productive season than in southern Alabama. Pensacola Bahia has been more successful than Coastal Bermuda under very low fertility. It is less suited to droughty soils than Coastal Bermuda.

Steer gains per acre on Pensacola Bahia have been higher than those obtained on common Bermuda, but lower than those on

Coastal Bermuda. However, daily gains per animal have not been good. Satisfactory results have been obtained with brood cows and calves on Pensacola Bahia and clover or vetch. Growing a winter legume on Pensacola Bahia sod has extended the grazing season, increased forage yield, and improved animal performance. Much difficulty has been encountered in getting stands of winter legumes on the dense tough sod of Bahiagrass. Vetch, sod-seeded each fall, has been the most dependable legume.

Pensacola Bahia has failed to maintain a high level of lactation when used as the sole source of roughage for high-producing dairy cows.

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