



CIRCULAR 196
MARCH 1972

PASTURES FOR BEEF CATTLE IN THE PIEDMONT

Serala Sericea
Dallisgrass-Regal Ladino Clover
Coastal Bermuda-Yuchi Arrowleaf Clover

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E. V. Smith, Director Auburn, Alabama



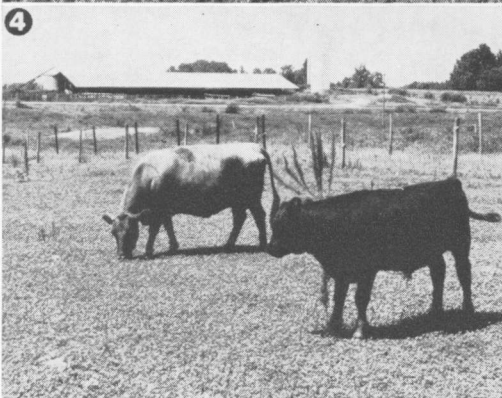
FIG. 1. Yuchi arrowleaf clover with little barley in Coastal bermuda sod on June 8.

FIG. 2. Yuchi arrowleaf clover in Coastal bermudagrass sod on July 1.

FIG. 3. Sericea grazing on July 16, showing good utilization of the forage.

FIG. 4. Cattle grazing Regal ladino clover. Photograph made in August 1971.

FIG. 5. This mid-July photograph shows the excellent condition of calves as they continued to graze Yuchi arrowleaf clover along with Coastal bermudagrass.



FIRST PRINTING 4M, MARCH 1972
 SECOND PRINTING 4M, SEPTEMBER 1974

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Pastures for Beef Cattle in the Piedmont

C. S. HOVELAND, W. B. ANTHONY, E. L. MAYTON, and H. E. BURGESS¹

PASTURES FOR BEEF COWS and calves should provide low-cost grazing of sufficient quality to support a high level of production. However, many pasture crops do not provide the needed productivity and quality, particularly in the Piedmont area of Alabama. For example, in research at the Piedmont Substation, calf gains were low on both Coastal bermudagrass and *Serala sericea*, averaging 180 pounds per acre annually (1). Calf daily gains declined sharply on both species in July and August. Highest daily gain on Coastal pastures was made on little barley and other weedy grasses.

Winter legumes such as clover and vetch improve beef calf gains on warm-season perennial grass pastures (2,6). Yuchi arrowleaf, an annual winter clover, has shown promise in Alabama trials by remaining productive and high in nutritive quality 2 months longer in spring than crimson clover (3). Productivity of Yuchi was superior to crimson clover on bermuda and bahia-grass sods in Alabama (4). White clover has not persisted nor been highly productive on upland soils of the Piedmont (2). However, Regal ladino clover persists as a perennial in pastures longer than other white clover varieties (5).

The research reported herein was conducted at the Piedmont Substation near Camp Hill, Alabama, to compare several grass-clover pastures with *Serala sericea* for beef cows and calves.

¹Professor, Department of Agronomy and Soils; Professor, Department of Animal and Dairy Sciences; Superintendent and Assistant Superintendent, Piedmont Substation, respectively.

EXPERIMENTAL PROCEDURE

Performance of beef cows and calves was compared on three pasture swards from 1969 through 1971: (1) *Serala sericea* (*Lespedeza cuneata*), (2) dallisgrass (*Paspalum dilatatum*)-Regal ladino clover (*Trifolium repens*), and (3) Coastal bermudagrass (*Cynodon dactylon*), with 100 pounds of N per acre, overseeded annually with Yuchi arrowleaf clover (*Trifolium vesiculosum*).

Pasture Management

Each paddock was $1\frac{3}{4}$ acres. There were three replications of each forage species, making a total of nine paddocks. Soils in the hilly pasture area were mostly Lloyd clay loam with lesser areas of Louisa clay loam and Cecil sandy loam.

The Coastal bermuda was established in 1964 and had been grazed prior to starting this experiment in 1969. Each October beginning in 1968, a disc harrow was used to scarify the closely grazed bermuda sod before seeding with 8 pounds per acre Yuchi arrowleaf clover. After seeding, $\frac{1}{2}$ pound per acre active diazinon was applied for cricket control. Nitrogen at the rate of 50 pounds per acre was applied in early June and again in late July.

Dallisgrass was seeded at 20 pounds per acre in March 1969, followed in October with 5 pounds per acre of Regal ladino clover seed.

Serala sericea was broadcast at 20 pounds per acre in March 1969, using 4 pounds per acre vernolate herbicide to control weeds.

Lime and mineral fertilizer were applied to all forage species according to soil test recommendations.

Management of Grazing Animals

Grade Hereford cows bred to Angus bulls were used. Calves, born from October through December, remained with the cows until weaned in late August or early September.

Each $1\frac{3}{4}$ -acre paddock was stocked with a cow-calf unit whenever grazing was available. Additional cow-calf units were added during peak periods of pasture growth and after early-weaned calves were removed in August. Weighing was done at 28-day intervals. During the grazing season, additional animals for the

test were maintained on Coastal bermuda pastures when not on experimental pastures. After calves were weaned in August or September, cows continued to graze pastures until October. An attempt was made to maintain at least one cow-calf unit per paddock throughout the growing season.

No supplements were fed to animals while on pasture. Water, salt, and shade were provided in the paddocks. During late fall and winter, when no grazing was available, animals were removed from the paddocks and fed Coastal hay or sorghum silage and a protein-mineral-vitamin supplement.

RESULTS AND DISCUSSION

Pastures

Yuchi arrowleaf clover made possible earlier grazing on Coastal bermuda swards. Clover stands were fair to good in 1969 and generally good the next 2 years. Little barley was an abundant weed and furnished grazing in April prior to heading. Clover provided most of the grazing in May and into June, Figure 1 (page 2). Coastal bermuda makes little growth when night temperatures are below 60°F. At the Camp Hill location, night temperatures averaged 50 to 56°F in May, accounting for the lack of Coastal bermuda growth, Table 1. Yuchi arrowleaf clover furnished grazing through June and into July, Figure 2 (page 2). Cattle continued to graze the stemmy mature clover in July even though ample grass was available.

Serala sericea stands were good initially and cattle grazed this pasture well, Figure 3 (page 2). After two grazing seasons, sericea stands were reduced and Coastal bermudagrass made up 20 to 30 per cent of the sward. In this experiment, grass encroached

TABLE 1. RAINFALL AND MONTHLY TEMPERATURES DURING SPRING AND SUMMER, PIEDMONT SUBSTATION, 1969-71

Month	Rainfall, inches			Mean temperatures, degree F					
	1969	1970	1971	Maximum			Minimum		
				1969	1970	1971	1969	1970	1971
March.....	5.0	9.0	12.8	59	64	61	32	40	35
April.....	6.2	4.1	5.5	76	76	75	49	51	44
May.....	5.6	3.6	4.1	81	84	78	56	55	50
June.....	2.6	6.4	2.6	90	85	89	64	63	64
July.....	2.1	7.1	9.8	92	90	86	68	66	66
August.....	3.7	7.6	3.2	87	88	87	64	68	66
September	6.3	1.5	4.6	82	89	85	58	64	64

on sericea from adjacent Coastal bermuda paddocks. Under farm conditions, this would not likely be a problem.

Dallisgrass stands were generally poor. One paddock consisted of 90 per cent or more Regal ladino clover with the remainder being weeds, Figure 4 (page 2). The other two paddocks contained about 30 per cent dallisgrass and only 10 to 30 per cent clover. Better clover growth in 1971 was probably the result of a combination of cooler temperatures and better rainfall distribution than in 1970. (May and July maximum temperatures were 4 to 6°F lower in 1971, Table 1.) Dallisgrass-ladino clover on this type soil is likely to suffer more from drought than bermudagrass or sericea, resulting in greater year-to-year fluctuation in forage production.

Cattle Performance

Only the Coastal bermuda-Yuchi arrowleaf clover paddocks were grazed in 1969 while the other species were being established. Grazing began April 9 and continued until October 3 (178 days), although calves were weaned August 28. Calf gain was excellent, averaging 314 pounds per acre total and average daily gain of 1.71 pounds, Table 2. On pastures containing considerable Yuchi arrowleaf clover, April to July calf gains were over 2.5 pounds per day. Daily gains dropped to 1.1 pounds during July and August.

Calves that grazed until weaned on August 28 gained an average of 240 pounds each. Therefore, not only did the sward pro-

TABLE 2. PERFORMANCE OF BEEF COWS AND CALVES GRAZING COASTAL BERMUDAGRASS OVERSEEDED WITH YUCHI ARROWLEAF CLOVER AT PIEDMONT SUBSTATION, 1969

Performance measure	1969 result
Cow-calf days/acre ¹	170
Cow gain/acre, pounds.....	219
Cow average daily gain, pounds ²	1.18
Calf gain/acre, pounds.....	314
Calf average daily gain, pounds ²	1.71
Calf average daily gain/period, pounds	
April 9-May 6 (Yuchi arrowleaf and little barley).....	2.68
May 7-July 2 (Yuchi arrowleaf and Coastal bermuda).....	2.36
July 2-August 28 (Coastal bermuda only).....	1.10

¹ Cows were grazed additionally from August 29 to October 3, but they were not weighed after August 28.

² Average of animals that remained on pastures throughout the season. (See Table 5 for number of days.)

TABLE 3. PERFORMANCE OF BEEF COWS AND CALVES GRAZING PERENNIAL PASTURES AT PIEDMONT SUBSTATION, 1970

Performance measure	Coastal bermuda-Yuchi arrowleaf clover	Serala sericea	Dallisgrass-Regal ladino clover
Days grazed during season			
Cows and calves.....	160	160	160
Cows only.....	194	177	177
Cow-calf days/acre ¹	223	126	119
Cow gain/acre, lb.....	316	143	213
Cow average daily gain, lb. ²	1.56	0.66	1.38
Calf gain/acre, lb. ³	336	250	225
Calf average daily gain, lb. ²	2.17	1.92	2.40
Calf average daily gain/period, lb.			
April 1-April 28.....	2.47	-----	-----
April 28-May 28.....	2.22	2.34	2.28
May 28-June 23.....	2.69	1.41	2.69
June 23-July 21.....	1.85	1.97	2.26
July 21-August 11.....	1.67	1.19	1.91
August 11-September 8.....	2.09	2.92	3.09

¹ Cows were grazed additionally from September 8 to October 12 on Coastal bermuda; September 8 to 25 on the other two species.

² Average daily gains of animals that remained on pastures throughout the season. (See Table 5 for number of days.)

³ Calf gain per acre on Coastal bermuda-Yuchi arrowleaf was significantly ($P < .05$) higher than on Serala sericea or dallisgrass-Regal ladino clover.

duce a high gain per acre, but individual calves made excellent daily gains.

All three pasture swards were grazed in 1970. Cows grazed the Coastal bermuda-Yuchi arrowleaf from April 1 to October 12 (194 days). Sericea and dallis-Regal ladino could not be stocked until April 22 because of limited forage. This is nearly 2 weeks later than obtained in a previous experiment on Serala sericea (1). Cows were continued on sericea and dallis-ladino clover from September 8 to 25.

Coastal bermuda-Yuchi arrowleaf clover was the most productive sward in 1970, Table 3. Calf gain per acre was 336 pounds and cow gain averaged 316 pounds per acre, much better than on the other two swards. Calf average daily gain of 2.52 pounds from April to late June reflected the good clover growth. Considerable green clover, maturing and quite stemmy, furnished grazing into July, probably accounting for continued satisfactory gains and condition of calves, Figure 5 (page 2).

Calf daily gains remained high throughout the season on dallis-Regal ladino but stocking rate was lower than on the other two swards, Table 3. Cow-calf days per acre were highest on Coastal bermuda-Yuchi arrowleaf. Cow gains on Serala sericea were only

TABLE 4. PERFORMANCE OF BEEF COWS AND CALVES GRAZING PERENNIAL PASTURES AT PIEDMONT SUBSTATION, 1971

Performance measure	Coastal bermuda-Yuchi arrowleaf clover	Serala sericea	Dallisgrass-Regal ladino clover
Days grazed during season			
Cows and calves.....	159	131	159
Cows only.....	201	173	201
Cow-calf days/acre ¹	221	161	172
Cow gain/acre, lb.....	204	133	273
Cow average daily gain, lb. ²	1.09	0.90	1.76
Calf gain/acre, lb. ³	280	208	301
Calf average daily gain, lb. ²	1.98	1.59	2.32
Calf average daily gain/period, lb.			
April 1-April 29.....	2.62	2.38
April 29-May 28.....	2.50	2.45	2.86
May 28-June 23.....	1.80	1.41	2.21
June 23-July 21.....	2.09	1.79	1.73
July 21-August 11.....	0.40	0.19	1.39
August 11-September 8.....	0.74	1.49	1.96

¹ Cows were grazed additionally from September 8 to October 20.

² Average daily gains of animals that remained on pastures throughout the season. (See Table 5 for number of days.)

³ Calf gain per acre on Coastal bermuda-Yuchi arrowleaf and Regal ladino was significantly ($P < .05$) higher than on Serala sericea.

143 pounds per acre, less than half that on the Coastal-Yuchi arrowleaf clover. High daily calf gains made on all swards in late summer are probably a result of restocking pastures with younger animals when older calves were weaned.

Length of 1971 grazing season for cows on both clover swards was from April 1 to October 20 (201 days), Table 4. Calf gain per acre was similar on dallis-Regal ladino and Coastal bermuda-Yuchi arrowleaf, but cow gains per acre were highest on dallis-Regal ladino. Highest average calf gain in 1971 was made on dallis-Regal ladino, 2.32 pounds per day, Table 4. Calves on Coastal bermuda-Yuchi arrowleaf averaged 1.98 pounds gain per day, as compared with 1.59 pounds on Serala sericea. Daily gains of calves remained high all season on dallis-Regal ladino. Some Regal clover was available for grazing even in late summer, Figure 5 (page 2). Poor daily gains were made by calves on Coastal bermuda alone from late July to September. The value of clover for continued calf gains in late spring and summer is apparent from these results.

Yuchi arrowleaf clover was a valuable addition to the Coastal bermuda sward. The combination produced a 3-year average of 310 pounds calf gain per acre. In contrast, calves on Coastal bermuda alone fertilized with 100 pounds per acre nitrogen —

at the same location — averaged only 180 pounds gain per acre over 4 years (1).

Total live weight gain for calves and their dams for each sward in each year is summarized in Table 5. Calves on Coastal bermuda-Yuchi arrowleaf and dallis-Regal ladino swards made comparable gains. Dams nursing these calves gained approximately 200 pounds during the grazing season. Therefore, both swards proved to be nutritionally adequate for beef cows nursing calves. The 200 pounds cow gain would normally provide adequate body reserves to withstand mild winter stress. In contrast, cows on *Serala sericea* gained an average of only 64 pounds per head and their calves 189 pounds each. It appears that *Serala sericea* forage was generally inferior to the other swards for supporting either the beef cow or her calf.

TABLE 5. TOTAL ANNUAL LIVE WEIGHT GAIN PER CALF AND FOR DAM OF THE CALF GRAZING PERENNIAL PASTURES AT PIEDMONT SUBSTATION¹

Item and year	Coastal bermuda-Yuchi arrowleaf clover		<i>Serala sericea</i>		Dallisgrass-Regal ladino clover	
	Gain, pounds	Days grazed	Gain, pounds	Days grazed	Gain, pounds	Days grazed
1969						
Cow.....	165	-----	-----	-----	-----	-----
Calf.....	240	140	-----	-----	-----	-----
1970						
Cow.....	207	-----	73	-----	153	-----
Calf.....	287	132	213	111	267	111
1971						
Cow.....	173	-----	54	-----	240	-----
Calf.....	260	131	164	103	303	131

¹Data and means for calves grazed continuously and weaned about 4 to 6 weeks before end of grazing season.

²Number of days grazed continuously.

SUMMARY

A grazing study with beef cows and calves was conducted at the Piedmont Substation on dallisgrass-Regal ladino clover and *Serala sericea* over a 2-year period and Coastal bermudagrass-Yuchi arrowleaf clover with 100 pounds of nitrogen per acre over a 3-year period. Results are summarized as follows:

(1) Calf gain for the 2-year period 1970-71 was highest on Coastal bermuda-Yuchi arrowleaf clover, averaging 308 pounds per acre annually. Dallisgrass-Regal ladino clover averaged 263 pounds and *Serala sericea* 229 pounds. Coastal bermuda-Yuchi arrowleaf clover for the 3-year period averaged 310 pounds of calf gain per acre.

(2) Coastal bermuda-Yuchi arrowleaf clover furnished 222 cow-calf grazing days per year, as compared with 145 days for dallis-Regal ladino and 144 days for Serala sericea.

(3) Average daily gain of calves was 2.36 pounds on dallis-Regal ladino clover, 2.08 pounds on Coastal bermuda-Yuchi arrowleaf, and 1.75 pounds on Serala sericea.

(4) The value of clover in the sward was demonstrated. Calf gains ranged from about 2.5 pounds per day with clover in the sward to 1 pound or less when clover was absent.

(5) Regal ladino clover was outstanding when adequate rainfall permitted good growth. However, it will probably be difficult to build a dependable grazing program with this clover on droughty upland soils of the Piedmont.

(6) Yuchi arrowleaf clover resulted in excellent calf gains from early April until July. This clover is compatible with Coastal bermuda and can be expected to lengthen the grazing season by 1 to 2 months and improve the calf gain per acre over that of grass alone fertilized with nitrogen. Short grass stubble and insecticide for cricket control in autumn are essential for clover establishment.

(7) Total 2-year average live weight gain per calf for dallis-grass-Regal ladino clover, Coastal bermuda-Yuchi arrowleaf clover, and Serala sericea was 285, 274, and 189 pounds, respectively.

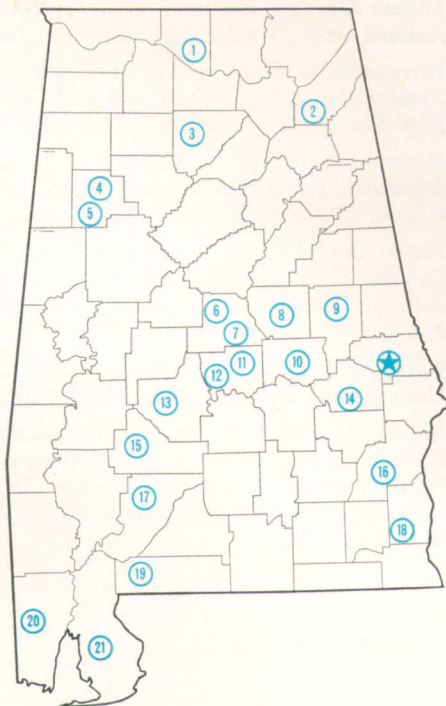
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