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Beef Steer Performance

on Cimarron Alfalfa and Serala and AU Lotan Sericea Lespedeza Pastures

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Beef Steer Performance on Cimarron Alfalfa and Serala and AU Lotan Sericea Lespedeza Pastures

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PASTURES OF SMALL GRAINS (*1,4*) and fungus-free tall fescue ((*Festuca arundinacea)* (*7*) have furnished high average daily gains (ADG) and gains per acre with stocker steers during the cool season in Alabama. In contrast, ADG of steers has been low on warm season perennial grasses such as Coastal bermudagrass (*Cynodon dactylon)* (*5*). There is a need for high quality pastures that can provide high ADG into the summer months when cool season forages are not available.

Serala, a fine-stemmed sericea *(Lespedeza cuneata)* variety, is a productive legume that grows well during the warm season (*2*). However, the high tannin content of this variety reduces animal gains. The development of the low-tannin sericea variety AU Lotan offers the prospect of improved animal gains (*3*). Steer grazing data on this variety are not available. Previous small-plot research has shown that frequent cutting of sericea may deplete stands and reduce productivity, whereas leaving a high stubble will improve stand persistence (*6*). Information is needed on sericea persistence and production under grazing.

Alfalfa (*Medicago sativa)* is a highly productive hay plant in Alabama. The high quality of this legume suggests that it should give excellent steer gains over a long season. No data on rotational grazing of alfalfa alone are available in the Southeastern United States.

This publication summarizes results of a 3-year grazing trial with beef steers on pastures of alfalfa, Serala sericea, and AU Lotan sericea at the Upper Coastal Plain Substation.

EXPERIMENTAL PROCEDURE

Pasture Management

Twelve 3-acre paddocks on a mixture of Ora and Greenville soil at the Upper Coastal Plain Substation in Winfield, Alabama, were used for four pasture treatments:

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1. Cimarron alfalfa, rotationally grazed;
2. Serala sericea, rotationally grazed;
3. AU Lotan sericea, rotationally grazed; and
4. AU Lotan sericea, continuously grazed.

Pastures were limed and fertilized according to soil test recommendations. In April 1980, three paddocks of Serala sericea and six paddocks of AU Lotan sericea were planted at 20 pounds per acre with a cultipacker seeder after applying 3 pounds per acre Eptam herbicide. In September 1980 alfalfa was seeded similarly at 20 pounds per acre, but only limited grazing was available in 1981 because of drought. Experimental grazing was conducted from 1982 through 1984.

Rotationally grazed paddocks were cross-fenced into three 1-acre sub-paddocks. A sub-paddock was grazed for 1 week before sequentially rotating steers to the next sub-paddock, resulting in a 2-week rest between grazing periods. To determine stands, shoot counts were made at the end of the third grazing period and each spring from ten 1-square-foot areas in each sub-paddock. Grab samples of forage were obtained from each paddock at each rotation for determination of in-vitro dry matter digestibility.

Management of Grazing Animals

Paddocks were stocked with 500-pound Angus x Hereford steers when grazing was available in the spring. Ralgro was ear-implanted in steers and salt, shade, and water were available. In addition, steers grazing alfalfa were provided poloxalene blocks for bloat control. As surplus forage became available, additional steers were added, using a put-and-take system. When off test, steers were maintained on Serala sericea and alfalfa holding pastures. Cattle were weighed at 28-day intervals. Average daily gains were calculated only on tester steers that remained on pastures throughout the season.

At the end of the grazing season, tester steers were penned by grazing treatment and group-fed a finishing diet. It was composed of (as-fed basis) 41.4 percent whole shelled corn; 52.2 percent corn silage; 4.1 percent soybean meal; 1.3 percent of a mineral premix containing calcium, phosphorus, trace minerals, vitamin A, D, and E plus Rumensin at 250 milligrams per head per day; 0.6 percent of a magnesium, potassium, sulfur supplement; and 0.3 percent limestone. All steers were slaughtered at a commercial packing plant when backfat thickness probed 0.45 to 0.55 inch. Carcass data were obtained by a USDA grader.

RESULTS AND DISCUSSION

Pastures

Stands were generally good except in one rotationally grazed AU Lotan paddock. Weeds were not a problem except during late summer in alfalfa. Serala sericea paddocks were almost weed-free as animals selected weeds in preference to the high-tannin sericea. Sericea stands remained good throughout the test on all treatments, table 1. Shoot numbers of sericea declined the second year but recovered by the end of the third grazing season except for the continuously grazed AU-Lotan. The generally good stand persistence of sericea under grazing is probably a result of keeping 4 to 6 inches of stubble in the pastures. Previous small plot clipping research showed that close and frequent cutting reduced stands, while leaving a high stubble allowed rapid new bud development and forage growth (*6*). Alfalfa shoot counts declined each season. This was probably a result of inadequate time for recovery and replenishment of root carbohydrate reserves. Grazing studies on alfalfa in New Zealand have shown that a 4-week rest period between grazing is required to maintain grazed alfalfa stands for longer than 3 years (*8*). However, even with the severe grazing system used, there were still six alfalfa plants per square foot at the end of the third year.

Digestibility of alfalfa was consistently higher than sericea throughout the season, table 2. Alfalfa maintained relatively high digestibility even during mid- to late summer. Although lower than alfalfa, rotationally grazed AU Lotan sericea had higher digestibility than Serala. Digestibility of continuously grazed AU Lotan did not differ from Serala. Digestibilities of all forages declined during the grazing season, averaging 3 percentage units per month.

TABLE 1. SHOOT NUMBERS OF ALFALFA AND SERICEA LESPEDEZA AS AFFECTED BY GRAZING

Legume species	Grazing system	Shoots per square foot		
		May 26, 1983	June 8, 1984	Sept. 6, 1984
Cimarron alfalfa	Rotational	44 c[1] (A)[2]	36 a (B)	27 d (C)
Serala sericea	Rotational	64 a (A)	39 a (C)	52 a (B)
AU-Lotan sericea	Rotational	48 bc (A)	38 a (B)	46 b (A)
AU-Lotan sericea	Continuous	52 b (A)	37 a (B)	40 c (B)

[1]Means within a column followed by the same lower case letter are not significantly different at the 5 percent level.

[2]Means within a line followed by the same capital letter are not significantly different at the 5 percent level.

TABLE 2. IN-VITRO DRY MATTER DIGESTIBILITY OF ALFALFA AND SERICEA SAMPLES COLLECTED WEEKLY FROM GRAZING PADDOCKS AND AVERAGED BY MONTH, 3-YEAR AVERAGE

Month	Cimarron alfalfa, rotationally grazed	Serala sericea, rotationally grazed	AU Lotan sericea, rotationally grazed	AU Lotan sericea, continuously grazed
	Pct.	*Pct.*	*Pct.*	*Pct.*
April	76	—	—	—
May	69	41	49	48
June	71	37	45	44
July	67	35	44	41
August	63	33	38	37
Average	69a[1]	36b	44c	42 bc

[1]Means with the same letter are not significantly different at the 5 percent level.

Cattle Performance

The grazing season over the 3-year period on alfalfa averaged from March 30 to September 8 (163 days) and from April 22 to September 8 (139 days) on the two sericea varieties, table 3. Carrying capacity was similar on all forage systems, except during the drought of 1983 when it was reduced more in alfalfa than either sericea variety.

Beef gain per acre on alfalfa was nearly double that on Serala sericea, table 3, averaging 475 pounds per acre. This high gain per acre is excellent for a warm season perennial during the spring and summer on a relatively droughty soil. AU Lotan sericea was superior to Serala, but rotational grazing gave no advantage over continuous grazing. Although the gain per acre was lower on AU Lotan sericea than alfalfa, it should be pointed out that sericea has the capacity to grow on acid, high-aluminum soils where alfalfa is not productive unless heavily limed. The potential for low-tannin sericea in furnishing low-cost grazing for steers may make it attractive in some situations.

The ADG of steers on alfalfa averaged 2.16 pounds, table 3, which is about double that obtained on Coastal bermuda-

TABLE 3. PERFORMANCE OF BEEF STEERS ON ALFALFA AND SERICEA PASTURES, 3-YEAR AVERAGE

Legume	Grazing system	Days of grazing	Carrying capacity steers/ acre	Tester average daily gain	Gain per acre	Final weight per steer
		No.	*No.*	*Lb.*	*Lb.*	*Lb.*
Cimarron alfalfa	Rotational	163 a[1]	1.3 a	2.16 a	475 a	878 a
Serala sericea	Rotational	139 b	1.3 a	1.39 bc	248 b	785 b
AU Lotan sericea	Rotational	139 b	1.2 a	1.65 b	276 b	840 a
AU Lotan sericea	Continuous	139 b	1.2 a	1.87 b	306 b	844 a

[1]Values within a column with the same letter are not significantly different at the 5 percent level.

grass (*5*). The high ADG obtained on alfalfa makes it attractive for stocker steers on soils where this crop can be grown. Although ADG of steers on AU Lotan sericea was lower than on alfalfa, it was 0.35 pound per day higher than on Serala sericea and similar to that obtained on small grains (*4*) and fungus-free tall fescue (7). Continuous grazing of AU Lotan sericea furnished ADG similar to that with rotational grazing. The ADG on all species was 19 percent lower during the drought year of 1983 compared to 1982 and 1984, probably a result of high temperatures and less selectivity in forage available to the steers.

At the end of the grazing season, steers on Serala sericea were lighter than those on alfalfa or AU Lotan sericea, table 3. Steers on AU Lotan sericea and alfalfa were in excellent condition at the end of the grazing season.

In the feedlot, steers that had grazed alfalfa had the lowest ADG, 2.2 pounds. The feedlot gain for steers that previously had grazed Serala sericea, AU Lotan rotationally, and AU Lotan continuously were 2.82, 2.82, and 2.69 pounds, respectively. All groups were finished for slaughter in 97 days with no differences in slaughter weights, 1,098 pounds, carcass grades (11.6 average; 11 = high Good, 12 = low Choice), or percent grading USDA Choice (69 percent average).

The excellent gains obtained with alfalfa and AU Lotan sericea indicate the potential of these perennial legumes for production of stocker steers during the warm season in Alabama. Since no nitrogen fertilizer is needed for these pastures, they offer the potential of lower cost of gain than on warm season grasses. These legumes can extend the season, thus furnishing feeder cattle to feedlots over a longer portion of the year than now provided by cool season pastures.

SUMMARY

A grazing study with yearling beef steers was conducted for 3 years at the Upper Coastal Plain Substation with four pasture treatments:

1. Cimarron alfalfa, rotationally grazed.
2. Serala sericea, rotationally grazed.
3. AU Lotan sericea, rotationally grazed.
4. AU Lotan sericea, continuously grazed.

Stand persistence of these legumes was good and was not affected by continuous or rotational grazing. Forage digestibility of alfalfa was higher than sericea (69 percent vs. 36 to

44 percent) and remained high throughout the grazing season. Although lower than alfalfa, forage of AU Lotan had consistently higher digestibility than Serala sericea (44 percent vs. 36 percent).

Alfalfa provided a longer grazing season, April through August, and higher carrying capacity (1.3 vs. 1.2 steers per acre) than either Serala or AU Lotan sericea.

Beef gain per acre on alfalfa was nearly double that on Serala sericea and averaged 475 pounds per acre. AU Lotan was superior to Serala, 276 vs. 248 pounds per acre. Rotational grazing of AU Lotan did not improve gain per acre.

The average daily gain of steers on alfalfa averaged 2.16 pounds, Serala sericea 1.39 pounds, and AU Lotan 1.75 pounds.

On well-drained, productive soils adapted to alfalfa, this legume offers excellent potential for grazing stocker steers through the summer months. Although carrying capacity and length of grazing season are lower for AU Lotan than alfalfa, the tolerance of sericea to drought and acid soils high in aluminum make it an attractive legume in many situations.

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