

TALL FESCUE AND PHALARIS PASTURE FOR STEERS

AGRICULTURAL EXPERIMENT STATION
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FIRST PRINTING 4M, JULY 1979

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TALL FESCUE and PHALARIS PASTURE for STEERS

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TALL FESCUE (*Festuca arundinacea*) pasture is generally satisfactory for maintenance of beef cows with calves. However, average daily gain (ADG) of growing steers over the grazing season on tall fescue without legumes has generally been low even though stocking rate and gain per acre are satisfactory (2). In the Tennessee Valley of Alabama, the ADG of steers averaged only 1.1 pounds over the season for 8 years (3). Autumn gains in this study were lower than spring gains. In northern areas of the United States where tall fescue continues growth in summer, gains are generally poorest during the summer months. The poor ADG of steers on tall fescue has previously been attributed to alkaloids (2) and more recently to mycotoxins produced by fungi such as *Epichloe typhina* (1). Considerably higher steer gains, 1.7 pounds ADG over 3 years, were obtained on irrigated tall fescue in Washington State (4). The soil pH of 7.5 in this Washington experiment was considerably higher than in most eastern United States experiments.

Phalaris (*Phalaris aquatica*) is a cool season perennial grass that has potential in central Alabama. The high digestibility and winter forage production of certain phalaris introductions from the Mediterranean area were incorporated into an ex-

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perimental variety, AP-2, developed at Auburn University (5, 6). This report presents the first animal grazing data on this experimental variety.

EXPERIMENTAL PROCEDURE

This report summarizes the results of steer performance over 3 years at the Black Belt Substation, Marion Junction, Alabama, on two pasture grasses: (1) Kentucky 31 tall fescue and (2) AP-2 phalaris.

Pasture Management

Pastures were established on an area predominantly of two calcareous soils (pH 7.5), Sumter clay and Houston clay. Three paddocks, each 3 acres in area, were planted on prepared land in October 1974, to Kentucky 31 tall fescue and AP-2 phalaris. Grazing for record was begun in autumn 1975.

Grass residue was mowed and removed from paddocks each September. Nitrogen at 100 pounds per acre was applied in September and again in February on both tall fescue and phalaris. Phosphorus and potassium were applied according to soil test recommendations. Estimates on botanical composition were made at monthly intervals during the grazing season. Forage was sampled monthly during the third grazing season for *in vitro* dry matter digestibility (IVDMD), calcium, magnesium, and potassium. Pastures were sampled in May 1978 for the fungus *Epichloe typhina*.

Management of Grazing Animals

Crossbred steers weighing approximately 500 pounds were purchased each September. These steers were pre-conditioned on dallisgrass or tall fescue pasture supplemented with grain before placing them on the experimental paddocks. During January and February when sufficient grazing was not available, steers were removed from the paddocks and fed hay and a protein-mineral-vitamin supplement. Animals were weighed at 28-day intervals. Additional animals were added during peak periods of pasture growth.

RESULTS AND DISCUSSION

Pastures

Phalaris was more summer dormant than tall fescue, resulting in less forage available by early October and a lower

TABLE 1. ESTIMATED AVERAGE BOTANICAL COMPOSITION OF TALL FESCUE AND PHALARIS PASTURES DURING GRAZING SEASON OVER THREE YEARS

Grass species	Date	Fescue or phalaris	Dallis- grass	Grass weeds	Broad- leaf weeds
KY 31 tall fescue	1975-76	88	1	3	8
	1976-77	95	0	0	5
	1977-78	95	0	5	0
AP-2 phalaris	1975-76	80	3	7	10
	1976-77	79	6	5	10
	1977-78	67	10	23	0

stocking rate. Although greater winter production has been obtained with phalaris as compared to tall fescue in small plot trials on sandy loam soils (5), this was not evident in the grazing trial. The clay soils at this location are wet and cold in winter and may be responsible for the lack of phalaris winter growth.

Botanical composition of forage over the grazing season differed for the grass species, table 1. Tall fescue paddocks contained about 12 percent other species the first season but were nearly weed free by the third year. Phalaris paddocks contained more weeds than tall fescue paddocks, especially the third year. The major weeds in phalaris were common bermudagrass (*Cynodon dactylon*); little barley (*Hordeum pusillum*), and dallisgrass (*Paspalum dilatatum*). The increase in dallisgrass and bermudagrass under grazing suggests that phalaris is less competitive with warm season grasses than is tall fescue.

Digestibility of both tall fescue and phalaris was relatively low in autumn, high in late winter-early spring, and declined sharply in May and June, figure 1. There was no difference in digestibility between phalaris or tall fescue at any season of the year.

Mineral content of the grasses was unaffected by season of the year. Calcium content of tall fescue was higher than that of phalaris, averaging 0.72 and 0.58 percent, respectively. The magnesium content of both grasses was low, averaging 0.14 percent. The low magnesium content in grasses is common on calcareous soils such as Sumter and Houston clays. The phosphorus and potassium levels were adequate for cattle nutrition and similar in both grasses, averaging 0.25 and 2.10 percent, respectively.

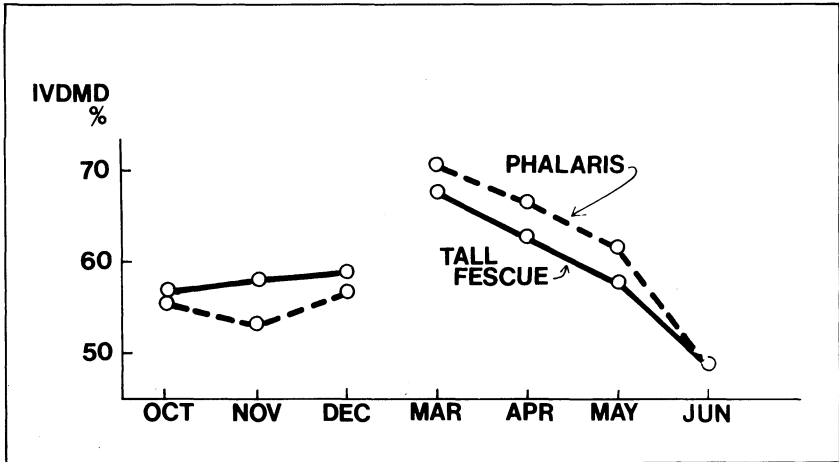


FIG. 1. Forage digestibility of Ky 31 tall fescue and AP-2 phalaris over the 1977-78 grazing season.

Cattle Performance

The average grazing periods on both phalaris and tall fescue for the 3-year period was from October 17, to December 26, and March 7, to June 19. Long, cold winters in 1975-76 and 1976-77 resulted in less winter grazing than expected. A severe spring drought in 1977 reduced animal performance and steers had to be removed from the pastures in early June rather than the latter part of the month.

Animal days per acre for the two grass species appeared to be similar over the 3 years, table 2. However, the relative rank of the two different grass swards in respect to animal days per acre was not the same each year. The first and second years tall fescue exceeded that of phalaris but during the third year they were similar. The greater carrying capacity on tall fescue than

TABLE 2. PERFORMANCE OF STEERS ON TALL FESCUE AND PHALARIS PASTURES AT BLACK BELT SUBSTATION, 3-YEAR AVERAGE

Grass species	Calendar days grazing	Carrying capacity steers/acre	Animal days/acre	Beef gain per acre	Average daily gain
KY 31 tall fescue	182	1.40 a*	246 a	Lb. 434 a	Lb. 1.78 a
AP-2 phalaris	173	1.26	202 a	347 b	1.73 a

*Values within a column marked with the same letter are not significantly different at 5 percent level.



FIG. 2. Excellent appearance of steers on tall fescue pastures at end of grazing season, June 1978.

on phalaris resulted in 87 pounds more beef gain per acre annually on tall fescue compared to phalaris over the 3-year period.

The ADG of steers was high for cool season perennial grasses and similar on both tall fescue and phalaris, table 2. Most importantly, the ADG of steers was nearly double that generally obtained on tall fescue pasture (2). The favorable ADG of steers in this experiment was generally maintained throughout the grazing season except for some decline in December. The high ADG obtained on both tall fescue or phalaris is similar to that obtained in high quality small grain pastures.

Steers on both tall fescue and phalaris had excellent appearance from the standpoint of hair coat and degree of finish at the end of each grazing season, figures 2 and 3. No problems were encountered with fescue toxicity during any of the 3 years.

These results show that good ADG can be obtained with AP-2 phalaris pasture but similar performance was obtained on tall fescue together with higher carrying capacity, better stand persistence, and less encroachment by other species.



FIG. 3. Excellent appearance of steers on phalaris pasture at end of grazing season, June 1978.

Results of this experiment did not indicate any advantage of phalaris over tall fescue for growing steers.

The reasons for the good performance on tall fescue are not known. The high ADG obtained on tall fescue in this experiment is similar to that obtained on irrigated tall fescue in Washington State (4). One similarity in these two grazing trials is that both were on calcareous soil having a pH of 7.5. At the Black Belt Substation in another tall fescue grazing trial on an acid clay soil 0.7 mile from the trial on calcareous soil, ADG of steers during the last 2 years was poor and serious fescue toxicity symptoms were observed in May and June, 1978.

The differences in animal performance with tall fescue on the two soils may be related to the calcareous nature of the one soil. Mineral content may affect development of fungi having the potential to produce mycotoxins. One such fungus, *Epichloe typhina*, was abundant in grass on the acid soil but absent in grass on the calcareous soil where excellent animal performance was obtained. If this fungus is an important factor in poor animal performance on tall fescue, this presents oppor-

tunities for research to solve this problem and enable better utilization of tall fescue in stocker programs. Results of this experiment suggest that tall fescue has the potential for better animal performance than is now being realized in most pastures.

SUMMARY

1. A grazing study with yearling steers was conducted for 3 years at the Black Belt Substation on: (a) Kentucky 31 tall fescue and (b) AP-2 phalaris.

2. Average daily gain (ADG) of steers on both tall fescue and phalaris pasture was good, 1.78 and 1.73 pounds respectively.

3. Beef gain per acre was greater on tall fescue, 434 pounds per acre, as compared to 347 pounds on phalaris.

4. Carrying capacity was higher, 1.40 steers per acre, on tall fescue as compared to 1.26 on phalaris.

5. Steers on both tall fescue and phalaris had excellent appearance of hair coat and finish at the end of each grazing season.

6. The results indicate that under some conditions, tall fescue has the potential for better animal performance than is now generally realized.

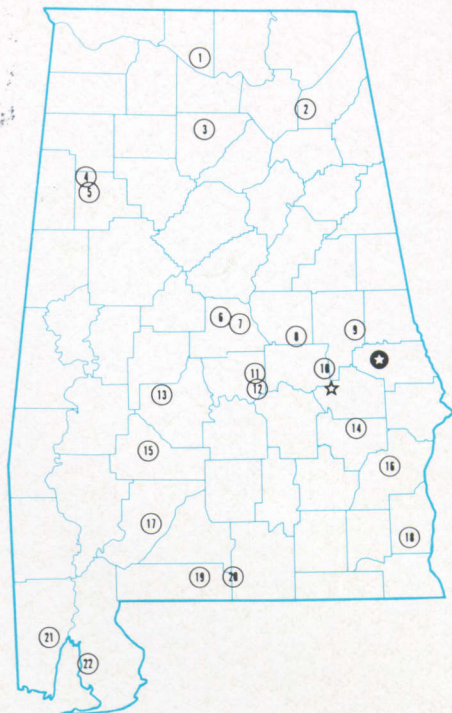
7. Phalaris furnished relatively high ADG but had a lower carrying capacity and was less persistent under grazing than tall fescue.

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1. Tennessee Valley Substation, Belle Mina.
2. Sand Mountain Substation, Crossville.
3. North Alabama Horticulture Substation, Cullman.
4. Upper Coastal Plain Substation, Winfield.
5. Forestry Unit, Fayette County.
6. Foundation Seed Stocks Farm, Thorsby.
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9. Piedmont Substation, Camp Hill.
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11. Forestry Unit, Autauga County.
12. Prattville Experiment Field, Prattville.
13. Black Belt Substation, Marion Junction.
14. The Turnipseed-Ikenberry Place, Union Springs.
15. Lower Coastal Plain Substation, Camden.
16. Forestry Unit, Barbour County.
17. Monroeville Experiment Field, Monroeville.
18. Wiregrass Substation, Headland.
19. Brewton Experiment Field, Brewton.
20. Solon Dixon Forestry Education Center,
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21. Ornamental Horticulture Field Station, Spring Hill.
22. Gulf Coast Substation, Fairhope.