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Development of Yearling Horses on Pasture and Supplemental Feed

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Summary

Six Quarter horse yearlings, three colts, and three fillies, which averaged about 650 lb and 53 inches in height at the shoulder, were assigned to each of two pasture treatments: (1) pasture (PO), and (2) pasture + 8.3 lb supplemental feed/head/day (PF). Bermudagrass pastures were sod-seeded with Elbon rye, Gulf ryegrass, and Yuchi arrowleaf clover in mid-October and grazing was initiated in mid-March on the winter annual forages. From late May to October 2, all horses grazed bermudagrass exclusively. During the winter pasture phase (March 15 to May 29), horses on PF had average daily gains (ADG) twice that of horses on PO (1.87 lb versus 0.97 lb). The ADG for the 201-day trial was 1.46 for PF and 1.12 for PO. Stocking rates of slightly more than three horses per acre resulted in seasonal gains of 706 lb/A for PO and 937 lb/A for the PF treatment. The horses grew less than 2 inches in height during the treatment period. Horses on the PF treatment had higher condition scores and more rib fat at termination of the trial. Rump fat thickness, however, was the same for horses on both treatments.

Introduction

The development of yearling horses is often costly as well as time consuming. Ration selection becomes critically important in meeting the nutritional requirements for growth and gain. Forages such as alfalfa and other temperate forages have long held traditional roles in supplying a portion of the daily nutritional needs of the horse. With the combination of winter and summer pastures in the southeastern United States, high quality forages are available and may be suitable for the development of certain kinds of yearling horses. The primary objective of this trial was to determine the biological feasibility of developing yearling Quarter horses on an exclusive forage diet.

Procedure

The six Quarter horse yearlings were allotted to each of two pasture treatment groups based on sex, weight, height, and body condition. The two pasture treatments were as follows: (1) (Pasture Feed, PF) pasture plus 8.3 lb/head/day of a 14 percent protein supplemental feed; and (2) Pasture Only (PO) until August 28, and 8.3 lb/head/day of 14 percent supplement from August 28 to October 2. Horses were group-fed (50 lb/group) once a day during the trial. Bermudagrass [*Cynodon dactylon* (L.) Pers.] was sod seeded with 'Elbon' rye (*Secale cereale* L.), 'Gulf' ryegrass (*Lolium multiflorum* Lam.), and 'Yuchi'

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arrowleaf clover (*Trifolium vesiculosum* Savi.) in mid-October. Full-time, continuous grazing of the cool-season annual forages was initiated on March 15. By mid- to late May, the cool-season forages constituted less than 25 percent of the diet, and from June to October, all horses grazed bermudagrass exclusively. Although the stocking rates were held relatively uniform among pastures at approximately 3.0 horse-equivalents/A (700 lb = 1 horse equivalent), forage available to ground level was measured at monthly intervals. Liveweight and height at withers measurements were taken approximately 30-day intervals throughout the 201-day trial. At termination of the trial, all horses were conditioned scored and fat thickness estimates made over the rump and rib by an electronic scanner.

Results and Discussion

Pastures used in this trial were stocked at 3.0 horse-equivalents/A for the PO treatment and 3.2 horse-equivalents/A for the PF treatment with each horse unit being equivalent to 700 lb. As evidenced by the forage data, forage availability was in adequate supply at all times, with the exception of July, so as not to restrict *ad libitum* intake (Table 1). Nutritive value of forage samples as estimates of diet selection was similar between groups (Table 2). Relative to stocking rate trials with beef cattle on adjacent pastures, grazing pressures which allowed for more than 100 lb dry matter forage per 100 lb body weight were designated as light stocking rates and resulted in maximum individual animal performance (Rouquette et al., 1984). The magnitude of the grazing pressures expressed as pounds of dry matter forage per 100 lb body weight, along with visual observations, suggested that sufficient forage was available to allow for selective grazing within each pasture. However, with the advance in chronological and physiological maturity of the bermudagrass, there was an increased incidence of selective or spot-grazing behavior in both the PO and PF pastures. Although not quantitatively measured in this trial, horses in the PO pastures grazed for longer periods of time than did horses in the PF pastures because the PF group tended to anticipate feeding.

Table 3 shows a summary of the growth data taken during the grazing period. There were no differences in height growth between the two treatments as both sets of horses gained nearly 2 inches during the 201-day trial. Respective height gains for colts and fillies were 2.0 and 1.8 inches for PO and 2.2 and 1.2 inches for PF. The relatively small average daily change in height at the withers may be due to the age of the horses when the trial was initiated. Certainly the most rapid stages of skeletal growth occurred prior to the yearling stage.

Horses assigned to the PF treatment gained more weight than did horses on the PO treatment ($P<0.01$)

TABLE 1. PERIODIC FORAGE AVAILABILITIES AND GRAZING PRESSURES

	Treatments			
	Pasture Only		Pasture + Feed	
Date	lb DM/A[1]	lb DM/100 lb BW[2]	lb DM/A	lb DM/100 lb BW
Mar. 15	2,550	192	2,300	181
Apr. 27	3,996	275	5,854	396
May 29	2,719	184	2,868	185
July 3	1,142	58	742	40
Aug. 28	5,227	270	6,224	309
Oct. 2	3,110	154	4,675	222

[1]Pound of dry matter forage/A.
[2]Pound of dry matter forage/100 lb body weight.

TABLE 2. PERCENT PROTEIN AND IN VITRO DRY MATTER DIGESTIBILITY (IVDMD) OF FORAGE IN PASTURE TREATMENTS

	Treatments			
	Pasture Only		Pasture + Feed	
Date	Protein	IVDMD	Protein	IVDMD
	Percent		Percent	
April 4	19.0	76.2	18.8	75.2
May 10	17.5	73.0	20.0	76.7
May 24	9.9	61.7	11.7	65.8
June 11	10.6	55.7	10.9	53.0
June 29	10.2	49.5	11.4	55.0
July 18	16.4	61.3	16.7	59.0
Aug. 1	16.3	58.6	15.1	60.0
Aug. 15	13.8	58.4	14.2	58.4
Sept. 6	11.1	48.0	11.3	50.4
Oct. 2	10.8	49.5	11.0	50.2

TABLE 3. SUMMARY OF GROWTH DATA DURING GRAZING PERIOD

	Treatments	
Item	Pasture Only	Pasture + Feed
Number of animals	6	6
Height at withers, inches		
Initial	54.1	52.8
Gain	1.9	1.7[3]
Avg. Daily	0.0095[3]	0.0085[3]
Weight, lb		
Initial	665	637
Gain[1]		
Period 1	72.5[3]	140.5[4]
Period 2	118[3]	112[3]
Period 3	35.5[3]	40.5[3]
Total	226	293[4]
Avg. Daily		
Period 1	0.97[3]	1.87[4]
Period 2	1.30[3]	1.23[3]
Period 3	1.01[3]	1.16[3]
Total	1.12[3]	1.46[4]
Stocking rate[2], Avg. horse-equiv./A	3.1	3.2
Gain/A[2], Total	706[3]	937[4]
Condition Score, Final	4.2[3]	5.9[4]
Rump Fat, Final	0.76[3]	0.90[3]
Rib Fat, Final	0.89[3]	1.30[4]

[1]Period 1, Mar. 15 to May 29 (75-days); Period 2, May 29 to Aug. 28 (91-days); Period 3, Aug. 28 to Oct. 2 (35-days); Total, Mar. 15 to Oct. 2 (201-days).
[2]Gain per animal x stocking rate = gain/A (1 horse equivalent = 700 lb).
[3],[4]Means within rows with different superscripts differ ($P < 0.01$).

(Table 3). However, a closer examination of the weight gain data showed that the weight gain advantage of horses on PF over horses on PO occurred during the winter pasture period. During the winter pasture period (period 1) the average daily gain (ADG) of horses on PF was 1.87 lb; whereas, the ADG of horses on PO was 0.97 lb. Thus, the ADG from PF horses was twice that from PO horses ($P<0.01$). Similar trends between fed and non-fed animals grazing winter pasture have been observed with cattle during the first 60 to 75 days of the grazing period (Rouquette et al., 1982). However, it is not clear as to whether the gain advantage of PF over PO horses was a result of supplemental energy, dry matter, or a combination of both these and other digestive factors.

There were no differences in ADG of horses on either PF or PO during the exclusive bermudagrass grazing period (June to October). The horse ADG from May 29 to August 28 was slightly less than 1.3 lb; whereas, the ADG of horses from August 28 to October 2 when both groups of horses were receiving supplemental feed was approximately 1.0 lb/head/day. Although there were no differences in ADG between the two groups of horses, those horses on PF gained 1.16 lb/day; whereas, those on PO gained 1.01 lb/day. It was anticipated that the PO horses would make some compensatory gains during this 35-day period. However, the feed did not have an additive nor a compensating effect which may have been due partially to a change in grazing behavior. The horses on the PO treatment tended to behave more like the horses on the PF treatment in that they anticipated a feeding period rather than conducting their previous foraging habits. The overall ADG during the trial was different among treatments, 1.12 for PO and 1.46 for PF, ($P<0.01$) and were similar in magnitude to gains of thoroughbred horses which received similar levels of supplemental feed during the growing phase (Wooden et al., 1984.)

Estimates of body condition were made by condition scoring and electronic scanning of subcutaneous rib and rump fat (Table 3). At the end of the trial, horses on the PF treatment had higher ($P<0.01$) body condition scores, 5.9, than horses on the PO treatment 4.2. There were no differences in rump fat of horses between treatments as the rump fat thickness was estimated at approximately 0.8 inches. Differences in rib fat ($P<0.01$) of horses did occur between treatment with those on PO with 0.89 inches and those on PF with 1.30 inches fat thickness.

In summary, yearling horses which started the 201-day trial receiving 8.3 lb/head/day of a 14 percent protein supplement gained more and were fatter than horses which received pasture only. However, the weight gain advantage was attributable to the winter pasture period and not the bermudagrass period. Additionally, these kinds of improved pastures in the southeastern United States are capable of stocking rates in excess of 3.0 horses/A (700-lb equivalent) and can produce more than 900 lb/A gain during the development period. The use of exclusive forage rations for yearling horses was determined to be a biologically feasible method of development, however, the activity and training schedules of the yearlings should be considered.

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