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INFLUENCE OF SEASON OF BIRTH AND POST-WEANING PASTURE GAIN ON FEEDLOT PERFORMANCE OF BRAHMAN STEERS

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SUMMARY

Fall-born and spring-born Brahman steers were used to ascertain the effect of season of birth and stocker pasture system on subsequent feedlot performance and carcass characteristics. Daily gains of spring-born steers grazing the winter pasture stocker phase (2.18 lbs) were nearly double that of the fall-born steers on the summer pasture stocker phase (1.17 lbs). The spring-born steers, which were fed during the summer-fall period, had the best daily gain at 2.82 vs 1.85 lbs/day and the best feed:gain conversion at 5.8:1 vs 8.3:1 compared to the fall-born steers which were in the feedlot during winter-spring. Compensatory gain was not evident during the feedlot phase due primarily to the severity of environmental conditions during the winter. On the average, steers were slaughtered after 160 days on feed and graded USDA Select. Except for hot carcass weight and ribeye area, all carcass traits were similar for both groups of purebred Brahman steers.

INTRODUCTION

Most of the Brahman cattle in the U.S. are grown in the southern states that have relatively mild winter conditions. And, the majority of the Brahman cattle calve during the spring-early summer months. Stocker conditions, therefore, are predominant during the winter months. This study was initiated using both fall- and spring-born Brahman calves to determine the influence of season of birth on stocker and feeder performance.

PROCEDURES

Fall-born Steers

Fourteen purebred Brahman steers, born in September, grazed bermudagrass pastures and were fed *ad libitum* hay with their dams until mid-February. From mid-February until mid-June, Brahman cow-calf pairs grazed 'Yuchi' arrowleaf clover-'Marshall' ryegrass-bermudagrass pastures and were weighed monthly. On June 24, calves were weaned in drylot, and grazed on bermudagrass pastures from July 6 until September 29. Steers were then transported to feedlot facilities at the Research and Extension Center at Amarillo and fed a high energy ration (Table 1)

via Pinpointers to quantify individual intake. Steers were weighed monthly and slaughtered in a commercial packing facility as they reached visual estimates of one-half inch backfat. Various carcass traits were collected at the time of slaughter.

Spring-born Steers

Twenty-seven purebred Brahman steers, born in April and May, grazed bermudagrass pastures until time of weaning in late December. Calves were weaned in drylot and offered *ad libitum* hay and winter pasture until mid-February. Steers then grazed winter pasture of 'Elbon' rye + 'Marshall' ryegrass from late February to early June. On June 6, all steers were transported to feedlot facilities at the Research and Extension Center at Amarillo. The same high energy ration (Table 1) fed to the fall-born calves was used with this group of steers. As calves reached visual estimates of one-half inch backfat, they were slaughtered at a commercial facility, and carcass data were recorded. Carcass data for both the fall-born and spring-born steers included the following: hot carcass weight, fat thickness, ribeye area, KPH fat, USDA Yield grade, USDA Quality grade, marbling score, and maturity.

RESULTS AND DISCUSSION

The birth to weaning performance of both fall-born and spring-born Brahman steers is presented in Table 2. Fall-born calves were lighter at birth, but had higher average daily gains (ADG) and weaning weights than spring-born steers. Differences in age at weaning were due primarily to forage-pasture systems available for the dry cow rather than treatment or design. With fall-born calves in the humid areas of Texas, forage-pasture conditions improve for the dry cow during the summer because of the productivity and nutritive value of the bermudagrass pastures. The dam of the fall-born, June-July weaned calf generally has an abundant supply of actively growing forage which has adequate quality to meet the nutritive demands for dry cows. On the other hand, cows which have calves weaned during late fall-early winter usually depend upon stored forages such as hay rather than a pasture of actively growing forage. Pasture conditionss during the fall-winter period, therefore, becomes a prime economic consideration for cows with spring-born calves. The post-weaning or stocker performance of the Brahman steers was typical of previous grazing studies with bermudagrass (1.17 lbs/day) or rye-ryegrass pastures (2.18 lbs/day) (Table 3). Length of the grazing period and quality of the winter pasture allowed the spring-born Brahman steers to exceed the off-test weight of the fall-born steers.

After a 21-day adjustment period to the feedlot ration, the on-test weights of both groups of steers were relatively similar at 648 and 612 pounds (Table 4). Both groups of calves were fed for approximately 160 days before a visual estimate of one-half inch backfat was evident. The climatic conditions (temperature) of the summer-fall feeding period for the spring-born calves was more conducive to economically acceptable ADG than the winter-spring feeding period for the fall-born steers. The fall-born steers consumed slightly more feed per day (16 vs 15 lbs), but gained nearly a pound per day less (1.85 vs 2.82 lbs) than the spring-born steers. Thus, a higher feed:gain ratio was recorded for fall-born steers (8.3:1) as compared to spring-born Brahman steers (5.8:1). The spring-born steers, therefore, had feed to gain conversions that were about 30% more efficient than the fall-born steers. Except for hot carcass weight and ribeye area, there were no other differences in carcass characteristics (Table 5). The dressing percent averaged about 63%, and the average USDA Quality grade after 160 days on feed was Select. The Yield grade scores indicated that the steers produced desirable lean beef carcasses. Although the original intent was to attain one-half-inch backfat, the actual backfat on both groups was similar at about one-quarter inch.

A relative gain code (Table 6) was established to evaluate compensatory gain by ranking the steers into three groups based on their previous stocker performance on pasture. For the spring-born steers, this code ranged from more than 2.3 lbs/day to those calves gaining less than 2 lbs/day. The arbitrary gains set for the fall-born steers ranged from more than 1.4 lbs to less than .9 lbs/day. Using both groups of steers (Table 7), the three relative gain codes were partitioned into groups that had ADG of 1.25, 1.65, and 2.09 lbs/day, respectively. These data indicated that those calves that gained well on pasture also gained well in feedlot, had higher daily feed consumption, and had better feed:gain conversions than those steers that had poor pasture performance. Those calves which grazed the high quality winter pastures gained 2.18 lbs/day and had the most favorable (temperature-wise) feedlot residence period (summer-fall) compared to the fall-born steers. A regression analysis was performed to quantify the influence of previous stocker gains on feedlot gains (Table 8). There were no significant relationships between pasture and feedlot performance with either the fall-born or spring-born steers as the previous pasture gains accounted for only 21% and 12%, respectively, of the feedlot performance. However, when both groups were combined, a significant relationship was revealed in which 61% of the feedlot gain was associated with previous pasture performance. This indicated that environment and climatic conditions during the

feeding period were the most important aspect affecting feedlot gain.

A preliminary economic assessment of cost of gain during the feedlot period is shown in Table 9. Using these assumptions, the total feedlot costs per animal were almost identical at approximately $235 each for both the fall-born and spring-born steers. However, the spring-born steers gained 156 pounds more than the fall-born calves for this same cost. The estimated feedlot cost per pound of gain, therefore, was nearly $.80 for fall-born, and about $.51 for the spring-born Brahman steers. These feedlot cost estimates, along with projected animal values entering the feedlot, allowed for the calculation of a projected cost of $1.21 and $1.03 per pound of carcass, respectively, for fall-born and spring-born calves. Theseprojected carcass costs certainly do not include all costs, potential discounts, shrink, nor death losses; however, on a relative basis, a good economic comparison may be made of these two seasons of birth for Brahman steers.

These preliminary data suggest that Brahman steers make acceptable stocker gains on either bermudagrass or winter pasture. However, the inclement conditions of the Texas High Plains area do not appear to be conducive to a winter feedlot period for Brahman cattle. Thus, the environmental conditions during the feedlot phase may be one of the most important aspects to consider in the commercial production of purebred Brahman steers for slaughter. Cow-calf producers, therefore, should consider the possibilities of continuous ownership at least through the post-weaning, winter pasture phase of production, so that the Brahman cattle are in feedlot residence during the summer-fall period. Many other alternatives that include feedlot residence in a more tropical environment during the winter months were not explored in this research, but may be viable economic options.

TABLE 1. FEEDLOT RATION FED IN PINPOINTERS TO BOTH FALL-BORN AND SPRING-BORN BRAHMAN STEERS

Ingredient	%
Rolled corn	86
Supplement*	5
Cane molasses	5
Cottonseed hulls	4
Formulated crude protein	12.5%
Formulated NEm	1.9 Mcal/kg
Formulated NEg	1.3 Mcal/kg

*Supplement contains protein, minerals, salt, and ionophore (30 gms/ton)

TABLE 2. BIRTH TO WEANING PERFORMANCE OF BRAHMAN STEERS

Season of birth	Fall	Spring
Birth weight, lbs	70	85
Weaning weight, lbs	504	392
Age in days	286	238
ADG to weaning, lbs/d	1.52	1.30
Weight/Day of Age, lbs	1.76	1.65

TABLE 3. STOCKER PERFORMANCE OF FALL-BORN AND SPRING-BORN BRAHMAN STEERS

Season of birth	Fall	Spring
Season of stockering	Summer	Winter
Forage	Bermudagrass	Rye-ryegrass
On-test weight, lbs	520	436
Off-test weight, lbs	620	656
Days on test	85	102
ADG on pasture, lbs/d	1.17[a]	2.18[b]

[a,b]Means within a row differ ($P < .001$).

TABLE 4. FEEDLOT GAIN AND FEED:GAIN RATIO OF FALL-BORN AND SPRING-BORN BRAHMAN STEERS

Season of birth	Fall	Spring
Season in feedlot	Winter-Spring	Summer-Fall
On-test weight, lbs	648	612
Off-test weight, lbs	948	1068
Total gain, lbs	300	456
Days on feed	162	159
ADG, lbs/day	1.85[a]	2.82[b]
Total feed consumption, lbs/h	2481	2455
Avg. daily feed consumption, lbs/d	16.1	15.0
Avg. feed consumption, % BW	2.02	1.79
Feed:gain ratio	8.3:1[a]	5.8:1[b]

[a,b]Means within a row differ ($P < .001$).

TABLE 5. CARCASS CHARACTERISTICS OF FALL-BORN AND SPRING-BORN BRAHMAN STEERS

Season of birth	Fall	Spring
Season in feedlot	Winter-Spring	Summer-Fall
Hot carcass weight, lbs	601[a]	671[b]
Ribeye area, in^2	10.50[a]	12.00[b]
Fat thickness, inches	.22	.28
Dressing %	63.40	62.80
USDA Yield grade[1]	2.40	2.27
Marbling score	3.65	3.59
USDA Quality grade[2]	3.65	3.28
Maturity	A	A

[1]Yield grade score of 1 = very lean and 5 = very fat.

[2]USDA QG 3 = Select, 4 = Choice

[a,b]Means within a row differ ($P < .01$).

TABLE 6. GAIN CODE RELATIVE TO ADG DURING THE POST-WEANING (STOCKER) PERIOD

Code	Spring-born Winter Stocker	Fall-born Summer Stocker
	ADG (lbs/d)	
1	≤ 2.0	≤ 0.9
2	2.0 - 2.3	0.9 - 1.4
3	> 2.3	>1.4

TABLE 7. COMPENSATORY GAIN ASSESSMENT OF BRAHMAN STEERS USING A RELATIVE GAIN CODING METHOD

	Relative Gain Code		
Item	1	2	3
Mean ADG on pasture as stockers, lbs/d	1.25[a]	1.65[b]	2.09[c]
Feedlot ADG, lbs/d	2.16[e]	2.27[ef]	2.55[f]
Avg. daily feed consumption, lbs/d	14.8[e]	15.4[ef]	16.3[f]
Feed:Gain ratio	7.2:1	7.2:1	6.6:1

[a,b,c]Means within a row differ ($P < .001$).

[e,f]Means within a row differ ($P < .05$).

TABLE 8. RELATIONSHIP OF FEEDLOT PERFORMANCE TO STOCKER-PASTURE PERFORMANCE OF BRAHMAN STEERS

Season of Birth	Relationship	r^2	Pr>F
Fall	FADG†=1.33+.44 PADG‡	.21	.10
Spring	FADG=1.91+.41 PADG	.12	.13
Combined	FADG=1.04+.78 PADG	.61	.0001

†FADG = Feedlot average daily gain.

‡PADG = Stocker pasture average daily gain.

TABLE 9. ESTIMATED FEEDLOT COSTS FOR BRAHMAN STEERS

Item	Fall-born	Spring-born
	----------$/hd----------	
No. days on feed	162	159
Avg. feed/an (lbs)	2481	2455
Feed cost ($125/T)	$155	$153
Yardage ($.22/h/d)	36	35
Processing	8	8
Medicine	8	8
Trucking	2	2
Beef Check Off	1	1
Interest (12% @ 6 mo)	29	27
TOTAL FEEDLOT COSTS/An	$239	$234
TOTAL GAIN, lbs	300	456
COST/LB GAIN	$.797	$.513