Effect of Sex Status and Breed-type on Performance of Highly Stressed Calves[1]

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Summary

Bull and steer calves of mixed breed type were shipped from Newport, Tennessee to Manhattan, Kansas. Bull calves were castrated on arrival at Manhattan. Calves were classified into four breed types as follows: (1) black, polled, medium-frame, number one muscling; (2) white-faced, feather-necked, medium-frame, number one muscling; (3) black or red with white face, medium-frame, number one muscling; and (4) large-frame, mixed-color calves. The calves were in transit for 24 hours. Calves purchased and transported as steers outgained those purchased as bulls and castrated upon feedlot arrival by 26 lbs during the receiving phase and by 13 lbs on pasture. Fewer steer calves died than castrated bulls (7.7% vs. 13.2%). Steer calves had higher BVD antibody titers than bulls. Medium-frame, number one muscled, white-faced calves had a higher mortality rate (18.4%) than the average of other breed types (7.4%). The large-frame, number one muscled, mixed-color calves had the highest total gain.

Introduction

Substantial numbers of calves moving into western feedlots originate in the Southeastern United States and many are purchased as bulls. Thus, the stresses of marketing, transporting, and adapting to the feedlot are compounded by the additional stress of castration. Bull calves castrated soon after arrival at the feedlot generally gain faster than when castration is delayed for one or two weeks, but calves purchased as steers gain faster than bulls handled in either manner.

Experimental Procedures

The previous paper (page 31) describes how these cattle were purchased, transported, and handled during arrival and feedlot adaptation. Calves were classified as follows: (1) medium-frame, number one muscling, black, polled calves; (2) medium-frame, number one muscling, white-faced, feather-necked calves; (3) medium-frame, number one muscling, black or red, white-faced calves without white on the neck; and (4) large-frame, number one muscling, crossbred calves of mixed color.

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Results and Discussion

Calves purchased and transported as steers gained 45.1 lbs ($P<.001$) more during the 105-day study than calves purchased and transported as bulls and castrated upon arrival (Table 13.1). However, bull calves shrank 8.5 lbs less ($P<.1$) during the transit period.

Steers gained more ($P<.05$) from purchase to feedlot day 28 than castrated bulls. Castrated bull calves had not regained purchase weight by the end of the 28-day receiving period, probably due to the excessive stress to which they were subjected. Steers gained 33 lbs more ($P<.1$) from purchase to the end of the pasture period than did the castrated bulls. If allowances were made for differences in mortality and chronic illness, the steers had 66 lbs more saleable weight at the end of the pasture period than calves purchased as bulls and castrated upon arrival.

Stress is difficult, if not impossible, to quantify. However, in this study, stress was extreme. It is possible that our results on castration upon arrival only apply to cattle under inordinate stress.

Black, polled, medium-frame, number one muscled calves shrank almost 5 lbs less ($P<.1$) than did calves of other breed types during transit (Table 13.2). Large-frame, number one muscling, mixed-color calves gained 21.5 lbs more ($P<.10$) than the average of the other breed types during the silage and pasture periods.

Mortality of the castrated bull calves was greater ($P<.10$) than that of steer calves (13.2% vs 7.6%). Moreover, the difference in mortality among calf types was surprising. Mortality ranged from 18.4% for white-faced, medium-framed, number one muscling calves down to 2.8% for the black, medium-framed, number one muscling calves. Death loss for the white-faced, medium-framed, number one muscling bull calves was 24.3%.

Steers had higher ($P<.1$) antibody titers for BVD both before shipment and after 28 days in the feedyard than did bulls, but BVD titer changes during the receiving period were similar. Thus, calves purchased as steers should have had more protection than the castrated bulls even though both groups were vaccinated against BVD. There was no difference between bulls and steers with respect to IBR titers after 28 days in the feedlot.

More ($P<.05$) treatments per animal were required for castrated bulls than steers (3.76 vs. 3.13) during the 28-day receiving period. More ($P<.05$) treatments per animal were required for white-faced, medium-frame, number one muscling calves than for the other groups, with the fewest ($P<.05$) treatments per animal required in the black, medium-frame, number one muscling group. All cattle were mass medicated on days 3 and 4. However, from feedlot day 7 to day 28, castrated bulls required 19.5% more treatments than did steers, and the white-faced, medium-frame, number one muscling calves required 30% more treatments than did calves of all other breed types. Steers had a greater ($P<.1$) change in serum lymphocyte blastogenesis from the order buyer's barn to feedlot day 28 than did bulls, indicating higher immune potential in the steers.

Bulls tended to have higher rectal temperatures than steers during the first 2 weeks. White-faced, medium-frame, number one muscling calves had higher (P<.1) rectal temperatures at the order buyer's barn and upon arrival at the feedlot than calves of other breed types. This may indicate that white-faced calves and bull calves are more susceptible to early stress.

Table 13.1. Effect of Sex Status on Calf Gain and Health

Item	Sex Status		
	Steers	Castrated Bulls	P
No. Animals	139	125	
	— Least Squares Means[a] —		
Purchase Wt., lb	519.4[f]	526.9[g]	<.10
Transit Shrink, lb	-52.8[d]	-44.0[e]	<.01
Receiving Period Gain (28 days), lb	70.6[f]	44.0[g]	<.10
Silage and Pasture Gain (77 days), lb	146.7[f]	128.2[g]	<.10
Gain, Purchase to End of Pasture Period, lb	164.1[b]	130.9[c]	<.05
Purchase to End Receiving Period, lb	17.6[f]	-5.1[g]	<.10
Mortality, %	7.7[f]	13.2[g]	<.10
No. Treatments/Animal (28 days)	3.13[f]	3.76[g]	<.10

[a] The Least-squares model accounted for Leavamisole, calf type, potassium level, feedlot diet, sex status, and feedlot diet by potassium, and calf type by sex status interactions.

Table 13.2. Effects of Breed Type on Calf Gains and Health

Item	Black, Medium-Frame	White-Faced, Medium-Frame	Black & Red Baldy Medium-Frame	Large-Frame, Mixed Color
No. Animals	77	68	65	34
	— Least Squares Means[a] —			
Purchase Wt., lb	522.7	524.9	522.0	526.5
Transit Shrink, lbs	-47.5	-53.2	-50.8	-52.6
Receiving Period Gain, lb (28 days)	53.7	59.0	57.9	57.9
Silage & Pasture Gains, lb (77 days), lb	134[d]	136.8[d]	130.9[d]	151.6[e]
Gain, Purchase to End of Pasture Period, lb	142.1[d]	148.9[d]	142.1[d]	156.6[e]
Mortality, %	2.8[f]	18.4[g]	12.9[g]	6.3[f]
No. Treatments/Animal (28 days)	3.22[f]	3.82[g]	3.40[f]	3.44[f]

[a] The Least-squares model accounted for Leavamisole, calf type, potassium level, feedlot diet, sex status, and feedlot diet by potassium, and calf type by sex status interactions.

[de] Means in same row with different superscripts are significantly different (P<.01).

[fg] Means in same row with different superscripts are significantly different (P<.1).