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Effects of castration, dehorning, frame size, and gut fill on the long-term performance of feeder calves

Abstract

In two experiments, calves purchased as steers gained substantially faster than calves purchased as bulls and then castrated, during both the starting period and the subsequent growing period. Large-framed calves gained .22 lb per day faster, and small-framed calves .21 lb per day slower, than medium-framed calves. Cattle appearing gaunt at the start of the trial gained 1.33 lb per day less than those with average gut fill.

Keywords

Cattlemen's Day, 1986; Kansas Agricultural Experiment Station contribution; no. 86-320-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 494; Beef; Castration; Dehorning; Frame size; Gut fill; Calves

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Effects of Castration, Dehorning,
Frame Size, and Gut Fill on the Long-term
Performance of Feeder Calves¹

Frank K. Brazle² and Robert R. Schalles

Summary

In two experiments, calves purchased as steers gained substantially faster than calves purchased as bulls and then castrated, during both the starting period and the subsequent growing period. Large-framed calves gained .22 lb per day faster, and small-framed calves .21 lb per day slower, than medium-framed calves. Cattle appearing gaunt at the start of the trial gained 1.33 lb per day less than those with average gut fill.

Introduction

Research shows that castrating 400 to 500 lb bull calves reduces their gain about .5 lb per day for the first 21 to 28 days. It has been assumed that after this initial period, bulls castrated at arrival performed as well as steers. However, research by Brazle and coworkers (Cattlemen's Day Report, 1985) showed that 525 lb castrated bulls gained 27 lb per head less during a 28-day starting period and 18 lb less during a subsequent 77-day growing period compared to calves purchased as steers. Recent California research also found that castrated bull calves gained .54 lb per day less than calves purchased as steers during the first 29 days and .25 lb per day less from 30 to 169 days in the finishing period.

The objective of this research was to further clarify the long-term effects of purchasing and castrating bull calves compared to steers. The effects of dehorning, frame size, and gut fill on performance were also evaluated.

Experimental Procedures

In Experiment 1, 155 steer and bull calves of mixed breeds were purchased and shipped to a backgrounding lot in southeast Kansas. The calves were vaccinated at arrival for infectious bovine rhinotracheitis (IBR), bovine virus diarrhea (BVD), parainfluenza₃ (PI₃), and blackleg (7-way), and dewormed with Tramisol®. In late December,³ 60 days after arrival, the cattle were individually weighed, horns were removed at the base of the head, and bulls were castrated with a knife. All calves were visually scored for condition, fill, frame, and breed at that time. Individual weights were recorded after 29 and 71 days on a corn silage-based growing ration.

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In Experiment II, 1000 bull and steer calves of mixed breeds were purchased over a 60-day period in the fall from local sale barns in southeast Kansas. The calves were processed within 4 h of arrival at the lot; they were vaccinated for IBR, BVD, PI₃, 7-way blackleg, and hemophilus somnus, given an injection of vitamin A, dewormed with Tramisol®, and treated with Tiguvon®. The horned calves were tipped back 3 to 4 in. and bulls were castrated with a knife. All calves were weighed individually and visually evaluated for condition and breed. The calves were started on a forage sorghum silage-based ration with 3 to 4 lb of long-stem prairie hay and 3 lb of a pelleted protein, mineral, vitamin, and Bovetc® supplement per head daily.

During the receiving period, calves were pulled and treated when they appeared sick. Treatment was continued until visual appearance improved or body temperature returned to normal. The choice of drugs was determined by the local veterinarian and producer.

Calves were weighed individually at the end of the 22-day receiving period and 285 head were placed on wheat pasture, while the rest remained on the silage-based growing ration. At the end of the 74-day growing period, the calves were reweighed. Least Squares Analysis of Variance was used to evaluate the data.

Results and Discussion

In Experiment I, calves purchased as steers gained .35 lb per day faster ($P < .05$) than castrated bulls during the 29-day starting period. The steers continued to gain .18 lb per day faster ($P < .10$) than castrated bulls during the 71-day growing period. Over the 100-day period, this resulted in a .21 lb per head per day advantage ($P < .05$) in favor of the calves purchased as steers.

In Experiment II, calves purchased as steers gained .64 lb per day faster ($P < .001$) than castrated bulls in the first 22 days. Of those fed silage for 74 days, steers gained .23 lb per day faster ($P < .001$) than castrated bulls. Of those placed on wheat pasture, steers out-gained ($P < .001$) castrated bulls by .59 lb per head daily. Over the entire 94-day period, and considering calves on both wheat pasture and silage, this resulted in calves purchased as steers gaining .35 lb per day more than bulls castrated on arrival (Table 21.2).

In Experiment II, steer calves required fewer treatments per animal (.65 vs. 1.66) and fewer became sick (15 vs. 36%) compared to castrated bulls (Table 21.3).

These trials suggest that 550 lb bull calves must be discounted enough to account for increased health problems and the reduced gains over an extended period after castration. The bull calves in Experiment II cost \$2.46/cwt less than steer calves. That discount did not cover the extra costs and poorer performance. Earlier findings by Brazle and coworkers (Cattlemen's Day, 1985) suggested that highly stressed, long hauled, 525 lb bulls needed to be discounted \$8.70/cwt below steers. Locally purchased bull calves could probably be discounted less.

In both experiments, calves that were dehorned or tipped tended to gain slower, but not significantly so ($P > .10$), as shown in Table 21.4.

In Experiment I, large-framed calves gained significantly faster ($P<.05$) and small-framed calves gained slower ($P<.05$) than medium-framed calves (Table 21.5).

The effect on performance of gut fill, evaluated at the start of Experiment I, is shown in Table 21.6. Calves that were gaunt gained the slowest ($P<.05$). Calves with average fill had the best ($P<.05$) gains during the first 29 days. Calves that were full or "tanked" gained poorer than those with average fill, but considerably better than the gaunt calves. The number of gaunt calves in the study was small, and apparently they were either not completely healthy or had poor appetites.

There were no significant effects of either starting body condition or breed type on daily gains in the two experiments.

Many factors affect the performance and, therefore, the value of stocker calves. The data summarized in this article can be used to calculate the discounts appropriate for several of these factors.

Table 21.1. Performance of Castrated Bull Calves Compared to Steers -- Experiment I

Item	Steers	Castrated Bulls
Starting Wt., lb	592	591
Average Daily Gain, lb:		
29-Day Starting Period	1.40 ^a	1.05 ^b
71-Day Growing Period	1.68 ^c	1.50 ^d
100-Day Combined Periods	1.58 ^a	1.37 ^b

^{ab} Means in the same row with different superscripts are significantly different ($P<.05$).

^{cd} Means in the same row with different superscripts are significantly different ($P<.10$).

Table 21.2. Performance of Calves Purchased as Steers, or Bulls and Castrated on Arrival — Experiment II

Item	Steers	Castrated Bulls
Starting Wt., lb	550	549
Average Daily Gain, lb:		
22-Day Starting Periods (all calves)	2.19 ^a	1.55 ^b
74-Day Silage Growing Period (811 head)	1.32 ^a	1.09 ^b
74-Day Wheat Grazing Period (285 head)	1.60 ^a	.81 ^b
96-Day Combined Periods (all calves)	1.43 ^a	1.08 ^b

^{ab} Means in the same row with different superscripts are significantly different (P<.001).

Table 21.3. Sickness and Mortality of Calves Purchased as Steers Compared to Bulls Castrated on Arrival — Experiment II

Item	Steers	Castrated Bulls
Treatments Required per Head	.65 ^a	1.66 ^b
Percent of Calves Treated	15 ^a	36 ^b
Percent Mortality	1.1	2.4

^{ab} Means in the same row with different superscripts are significantly different (P<.05).

Table 21.4. Effect of Dehorning Calves on Average Daily Gain

Average Daily Gain	No Horns	Dehorned
<u>Experiment I:</u>		
29-Day Starting Period	1.26	1.19
71-Day Growing Period	1.66	1.52
100-Day Combined Periods	1.53	1.41
<u>Experiment II:</u>		
22-Day Starting Period	1.98	1.75
74-Day Growing Period	1.20	1.21
96-Day Combined Periods	1.30	1.20

Table 21.5. Effect of Frame Size on Calf Gains — Experiment I

Average Daily Gain, lb	Large	Medium	Small
29-Day Starting Period	1.51 ^a	1.01 ^b	1.16 ^b
71-Day Growing Period	1.74 ^a	1.67 ^a	1.35 ^b
100-Day Combined Periods	1.69 ^a	1.47 ^b	1.26 ^c

^{abc} Means in the same row not sharing the same superscript are significantly different (P<.05).

Table 21.6. Effect of Visual Gut Fill at Start of Trial on Calf Gains — Experiment I

Average Daily Gain, lb	Gaunt	Average	Full	Tanked
29-Day Starting Period	.07 ^a	2.10 ^d	1.52 ^c	1.20 ^b
71-Day Growing Period	.90 ^e	1.79 ^f	1.79 ^f	1.85 ^f
100-Day Combined Periods	.60 ^e	1.93 ^f	1.79 ^f	1.66 ^f

^{abcd} Means in the same row not sharing the same superscript are significantly different (P<.05).

^{ef} Means in the same row not sharing the same superscript are significantly different (P<.10).