The objective of this study was to examine whether castration method would alter daily feed and water intake, calf performance and residual feed intake. Brangus (n = 45) and Angus (n = 30) male calves weighing 498 lb (200 days of age) were placed in a GrowSafe feed intake facility 7 days postweaning. Body weight gain and dry matter intake were recorded over an 84-day period. Calves were offered a mixed diet (TDN = 67.3% and CP = 12.2%, DM = 89%) ad libitum. Shrunk body weight was recorded on days 0, 14 and 84; full body weight was recorded on days 7, 28, 42, 56 and 70. On day 0, calves were assigned to one of 5 treatments (n = 15/treatment): 1) control steers were castrated surgically before weaning at an average age of 52 days; 2) intact bulls; 3) bulls castrated surgically; 4) bulls castrated by the Callicrate Bander; and 5) bulls castrated using the Henderson castration tool.

- During the first 14 days post castration, bulls castrated by the Callicrate Bander gained body weight slower than control steers (0.22 vs. 1.50 lb/day) and tended to gain body weight slower than intact bull calves (0.26 vs. 1.05 lb/day).
- Additionally, control steers gained more body weight than bulls castrated using the Henderson castration tool and bulls castrated surgically, 1.50, 0.53 and 0.49 lb/day, respectively.
- Dry matter intake was similar among castration methods 14 days post castration.
- Bulls castrated by the Callicrate Bander had decreased average daily water intake compared with intact bulls, control steers and bulls castrated surgically (7.5 vs.10.3, 12.0 and 10.4 gallons/day, respectively) and tended to drink less than bulls castrated using the Henderson castration tool (7.5 vs. 9.8 gallons/day).
- During the experiment, all treatments had similar average daily gain and residual feed intake.

Our results suggest that method of castration did not have a long-term impact on performance or efficiency of weaned calves.

Effect of Preconditioning Average Daily Gain on Feedlot Performance and Carcass Characteristics of Beef Cattle

A study was conducted to evaluate the effect of preconditioning average daily gain on feedlot performance and subsequent carcass characteristics in beef cattle. Steers (n = 1,100, body weight = 560 lb) and heifers (n = 421, body weight = 531 lb) from a single ranch were shipped 230 miles to be preconditioned in north central Florida. Calves were preconditioned on 18 acres of bermudagrass pastures and acclimated to a high-energy
Heritability and Genetic Correlations of Residual Feed Intake Between Angus and Simmental Bulls and Resulting Steer Relatives

(Rutherford et al., Auburn University)

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Objectives of this research are to observe breed differences for feed intake and trait differences of low-, medium- and high-residual feed intake bulls and steers, estimate \( h^2 \) in central-tested bulls and steers and compare residual feed intake in bulls and steers. Individual feed intake was measured on 1,433 Angus, Simmental and composite Simmental-Angus bulls at the Auburn University Beef Evaluation Center from 1977 to 2007. Bulls were measured for weight and height biweekly or monthly, depending on year. Scrotal circumference and ultrasound measurements for carcass traits were taken at yearling age (330 to 400 days). Feed intake and carcass trait data from 760 Angus and Simmental-composite steers were acquired courtesy of the American Simmental Association Carcass Merit Project. Residual feed intake was determined by regressing metabolic mid-weight and average daily gain on intake by year of test for bulls and by contemporary group for steers.

- High percentage Angus bulls consumed more dry matter per day, had higher feed conversion ratio and residual feed intake than purebred Angus, 50% Angus:50% Simmental (50:50), high percentage Simmental and Simmental bulls.
- Angus steers consumed more dry matter per day and had higher feed conversion ratio and residual feed intake than high-percentage Angus and 50:50 steers.
- Genetic correlations between steer and bull residual feed intake ranged from -0.18 to 0.33, depending on covariate.
- Bulls and steers classified as low-residual feed intake consumed less dry matter per day and had more favorable feed conversion ratio than medium- and high-residual feed intake animals.

Results indicate residual feed intake is a moderately heritable trait, and improvements for feed intake and feed conversion ratio should be achievable when selection is made using residual feed intake. However, selection of bulls based on their residual feed intake in an attempt to sire more efficient steers may not be practical, as the genetic relationships between steer residual feed intake and bull residual feed intake were variable and moderate.

Effect of Dietary Energy on Ovarian Development and Fertility in Postpubertal Beef Heifers

(Echternkamp, et al., USDA, ARS, U.S. Meat Animal Research Center, Clay Center, Northeast)

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Beef producers are advised to develop replacement heifers to 65% of mature body weight, but reports indicate this body weight could be reduced to lower input costs. To determine whether lower dietary intake impedes ovarian development and fertility in purebred or crossbred heifers, Angus \( (n = 60) \) and MARC II (one-fourth Angus, one-fourth Hereford, one-fourth Gelbvieh and one-fourth Simmental; \( n = 60 \) ) heifers
were fed either a high- or low-energy diet for 180 days postweaning to achieve 65 vs. 53% of mature body weight at first breeding. At 14 months of age, heifers were housed with fertile bulls for 47 days. Estrus was monitored for 21 days, and 12 hours after estrus, ovaries were viewed by ultrasound in one-half of the heifers to measure ovarian length and height, preovulatory follicle diameter and total number of antral follicles. Corpus luteum diameter and blood progesterone were measured 7 to 14 days after estrus.

- Initial body weight (624 lb) did not differ, but at breeding, high-energy-diet heifers were heavier (947 vs. 760 lb) and fatter (6.9 vs. 5.0 ± 0.1 body condition score) than low-energy-diet heifers; experimental average daily gain was 1.79 vs. 0.77 lb/day.
- Puberty occurred in 93.3% of heifers prebreeding.

Effect of Shade Area on Performance and Welfare of Short-Fed Feedlot Cattle
(Sullivan et al., The University of Queensland, Australia, and University of Nebraska–Lincoln)

One hundred twenty-six Black Angus yearling heifers were used in a 119-day study to assess the effect of shade allocation (0, 2.4, 4.0 or 5.6 yard² per animal) on the performance and welfare of feedlot cattle. Shade treatments were replicated four times, and the no-shade treatment was replicated twice. Shade was provided by a 70% solar block shade cloth attached to a 13 feet-high frame with a north-south orientation. Performance was assessed using dry matter intake, gain:feed, average daily gain, hot carcass weight, dressing percentage and rump fat depth. Climatic data (ambient and black globe temperature, solar radiation, wind speed, relative humidity and rainfall) were recorded.

From these data, the heat load index was calculated. When the daily maximum heat index was <86, individual panting score (0 = no panting; 4 = open mouth, tongue extended), animal location (eating, drinking, under shade) and animal posture (standing or lying) were collected at 0600, 1200 and 1800 hour. When daily maximum heat index was ≥86, these data were collected every two hours between 0600 and 1800 hour.

- When daily maximum heat load index was ≥86, mean panting score was greatest (1.02) for unshaded cattle compared with cattle in the shade treatments, which were similar (0.82).
- During heat waves, the mean panting score of unshaded cattle was greater (2.66) than that for shaded cattle.

- The mean panting score of cattle in the 2.4 yard²/animal treatment (2.43) was greater than that of cattle in the 4.0 (2.11) and 4.7 yard²/animal (2.03) treatments. The mean panting score of cattle in the 4.0 and 5.6 yard²/animal treatments were similar.

- Number standing was similar between unshaded and shaded at 2.4 yard²/animal treatment with 4.75 and 4.76 animals/pen, respectively. Fewer were standing in the 4.0 (4.19 animals/pen) and 5.6 yard²/animal (4.06 animals/pen) treatments.

- Fewer cattle were under the shade at 2.4 yard²/animal (47.1%) compared with the number under the shade at 4.0 (53.7%) and 5.6 yard²/animal (53.6%).

- Unshaded cattle had the smallest (0.085) gain:feed ratio, followed by cattle shaded at 5.6 yard²/animal (0.104). There was no difference between the 2.4 and 4.0 yard²/animal treatments.

- There were no differences for final body weight, hot carcass weight, dressing percentage and rump fat depth.

Cattle with access to shade had smaller panting scores, which suggests improved welfare, and had better feed efficiency. Shade reduced the intensity of the heat load but did not fully remove the effect of heat.

- Size of preovulatory follicle, ovary length and height, corpus luteum and total number of antral follicles did not differ between high-energy-diet and low-energy-diet heifers, but follicle diameter (0.56 vs. 0.51 inch) and ovarian length (1.0 vs. 0.91 inch) were greater for MARC II vs. Angus heifers.
- Ovarian size was correlated with the total number of antral follicles. Plasma progesterone was greater for high-energy vs. low-energy heifers (5.3 vs. 4.3 ng/mL), but corpus luteum diameter was not affected by diet or line.

- Pregnancy rate did not differ between diets but tended to be greater for MARC II vs. Angus (80 vs. 65%).

Developing yearling beef heifers to 53% of mature body weight did not impede ovarian development or heifer pregnancy rate.
Birth and Weaning Traits in Crossbred Cattle From Hereford, Angus, Brahman, Boran, Tuli and Belgian Blue Sires

(Casas et al., U.S. Meat Animal Research Center, USDA, ARS, Clay Center, Northeast)


The objective of this study was to characterize breeds representing diverse biological types for birth and weaning traits in crossbred cattle. Gestation length, calving difficulty, percentage of unassisted calving, percentage of perinatal survival, percentage of survival from birth to weaning, birth weight, body weight at 200 days and average daily gain were measured in 2,500 calves born and 2,395 calves weaned. Calves were obtained by mating Hereford, Angus and MARC III (one-fourth Hereford, one-fourth Angus, one-fourth Pinzgauer and one-fourth Red Poll) mature cows to Hereford or Angus (British breed), Brahman, Tuli, Boran and Belgian Blue sires. Calves were born during the spring seasons of 1992, 1993 and 1994.

- Offspring from British breeds and the Belgian Blue breed had the shortest gestation length (285 days) when compared with progeny from other sire breeds (average of 291 days).
- Calving difficulty was greater in offspring from Brahman sires, whereas the offspring of Tuli sires had the least amount of calving difficulty.
- Offspring from all sire breeds had similar perinatal survival and survival from birth to weaning (average of 97.2 and 96.2%, respectively), with the exception of offspring from Brahman sires, which had less (92.8 and 90.4%, respectively).
- Progeny of Brahman sires were heaviest at birth (101 lb), followed by offspring from British breeds, Boran and Belgian Blue sires (average of 93 lb).
- The lightest offspring at birth were from Tuli sires (85 lb).
- Progeny derived from Brahman sires were the heaviest at 200 days (542 lb), and they grew faster (2.2 lb/day) than offspring from any other group.
- The progeny of British breeds and the Belgian Blue breed had an intermediate body weight at 200 days (525 lb) and an intermediate average daily gain (average of 2.16 lb/day).
- The progeny of Boran and Tuli sires were the lightest at 200 days (501 lb) and had the least average daily gain (2.1 lb/day).
- Male calves had a longer gestation length, had a greater incidence of calving difficulty, had greater mortality to weaning, were heavier and grew faster than female calves.

Sire breed effects can be optimized by selection and use of appropriate crossbreeding systems.

Relationship of Ruminal Temperature With Parturition and Estrus of Beef Cows

(Cooper-Prado et al., Oklahoma State University)


Spring-calving Angus cows (n = 30) were used to evaluate changes in ruminal temperature related to parturition and estrus. Cows were synchronized and artificially inseminated with semen from a single sire. Temperature boluses were placed in the rumen at 7.0 months of gestation. Boluses were programmed to transmit ruminal temperature every 15 minutes. Cows (body weight = 1,374 lb, body condition score = 4.9) calved during 3 weeks, and estrus was synchronized at 77 days after calving with PGF2α. Cows were observed every 12 hours to detect estrus. Daily average ambient temperatures ranged from 36 to 72°F during parturition (February to March) and 63 to 77°F during estrus (May to June).

- Day did not influence ruminal temperature from day −2 to −7 before parturition (102.1°F).
- Ruminal temperature decreased from day −2 to d −1 before parturition (102 to 101°F, respectively).
- Ruminal temperature was not influenced by day from one day before to three days after parturition (101.3°F).
- Ruminal temperature at 0 to 8 hours after detection of estrus (101.2°F) was greater compared with ruminal temperature at the same daily hour of the day before (101.0°F) or the day after estrus (100.9°F).
- Ambient temperature did not influence ruminal temperature at parturition or estrus.

Ruminal temperature decreased the day before parturition and increased at estrus in spring-calving beef cows and has potential use as a predictor of parturition and estrus.
U.S. Consumers’ Valuation of Quality Attributes in Beef Products

(Abidoye, et al., Iowa State University)

A sample of U.S. consumers were surveyed in a choice-based experiment in the fall of 2005 and spring of 2006 to elicit consumers’ preferences for quality attributes in beef products. The survey was 58% female, 86% White/Caucasian and 22%, 23%, 29% and 26% in the age groups under 35, 35 to 44, 45 to 54 and over 54 years of age, respectively. Listed below are a few of the results.

- Consumers prefer Choice steak over Select.
- Consumers are relatively homogenous in their preference for the majority of the production attributes such as grass-fed beef and traceability and yet heterogeneous in others such as Choice versus Select, growth-hormone-free beef and U.S. origin. The observed heterogeneity reflects the diverse attitudes of consumers in the U.S. towards these attributes.
- Consumers preference for growth-hormone-free beef, for example, largely depends on the educational level and knowledge of the consumer.
- Attributes such as specifically traceability, source of information and feeding method are a potential source of differentiation.
- Consumers’ awareness for the credence attributes, particularly traceability, has been increasing.
- Consumers are willing to pay a premium of about 34% for grass-fed beef but not a premium for other production attributes such as raised on small farms.
- 24% feel that grain-fed steak is healthier to eat, while 48% feel that there is no health difference between grass-fed and grain-fed steak.
- 20% feel that grain-fed cattle might contain chemicals that are harmful in contrast to 10% for grass-fed.
- 11% think that steak from grain-fed cattle may contain harmful chemicals and that grass-fed is healthier to eat.
- 63% of those who think grain-fed steak is healthier to eat are older than 40.

This survey confirms that consumers are moving away from commodity beef and are willing to pay a premium for select credence attributes.

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