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Differences in Lifetime Productivity of Beef Heifers That Conceived to First-Service Artificial Insemination (AI) or a Clean-Up Bull Via Natural Service (NS) as a Yearling and Among Females That Were Offspring of an AI or NS Mating

(French, J.T., et al., Colorado State University, Fort Collins)
The Professional Animal Scientist 29 (2013): 57-63

The objectives of this study were to compare lifetime productivity between heifers that conceived to AI or a clean-up bull via natural service as yearlings and among females that were offspring of an AI or natural service mating. Records (n = 6,693) on 1,173 females subjected to estrus synchronization and AI, with natural service beginning approximately 10 days later, at one location from 1991 to 2010 were used.

For the first objective, females were classified as conceiving to AI or natural service as yearlings based on a 290-day gestation length added to the AI date. For the second objective, females were grouped into 1 of 4 dam classifications if they were the offspring of: 1) primiparous heifer that conceived to AI, 2) primiparous heifer that conceived to natural service, 3) multiparous cow that conceived to AI or 4) multiparous cow that conceived to natural service.

 Lifetime revenue was calculated using price and weaning weight data for each calf produced. Actual and average market prices, as well as synthetic price regimens representing extreme weight-price interactions, were used.

- As yearlings, females that conceived to AI had greater lifetime weight weaned, calves weaned and revenue under all price scenarios and greater calf weaning weight than did females that conceived to natural service.
- Dam classifications did not differ for any variables.

In conclusion, when estrus synchronization and AI are used before natural service, yearling heifers conceiving earlier to AI can achieve greater lifetime productivity than can heifers conceiving later to NS.

Effects of Year-Round Stocking Rate and Stocking Method Systems on Cow-Calf Production in the Gulf Coast Region of the United States: Costs, Returns and Labor Considerations


The present research examines the effect of stocking method, i.e., continuous and rotational, and set (fixed) stocking rate on labor requirements, costs and profits in cow-calf beef production. Two replicates of four adjacent pastures each, containing a mixed warm-season, perennial grass sod (common bermudagrass), were overseeded to ‘Marshall’ annual ryegrass in the autumn of two consecutive years. Within each replicate of
four pastures, one of the following grazing treatments was randomly assigned each pasture: rotationally stocked (eight paddocks) at a low, medium or high stocking rate and continuously stocked at a moderate stocking rate. Labor activities, expenditures, sales and equipment usages were recorded throughout the study.

- On a per-cow basis, total labor usage declined in response to increases in stocking rate.
- However, on a per acre basis, total labor usage only tended to increase as stocking rate increased.
- In both bases, total labor usage was greater for rotationally stocked at a medium stocking rate compared with continuously stocked at a moderate stocking rate.
- On a per acre basis, increases in stocking rate tended to result in increased specified expenses, increased total sales revenue and increased return over total expenses.
- Net returns between rotational and continuous stocking methods, at a moderate stocking rate, did not differ and would not justify the additional labor associated with rotational grazing management.

Effects of Year-Round Stocking Rate and Stocking Method Systems on Performance of Cow-Calf Pairs in the Gulf Coast Region of the United States

(Wyatt, W. E., et al., Louisiana State University Agricultural Center and USDA-ARS, El Reno, OK)
The Professional Animal Scientist 29 (2013): 10-15

The present research is the second phase (2 year) of a multi-year cow-calf project examining the effect of stocking method, i.e., continuous and rotational, and fixed stocking rate on beef-cattle production. Two sets of four adjacent pastures, each containing a mixed warm-season, perennial grass sod (common bermudagrass), were overseeded to ‘Marshall’ annual ryegrass in the autumn of two consecutive years. Within each set of four pastures, one of the following grazing treatments was randomly assigned each pasture: rotationally stocked (eight paddocks) at a low, medium or high stocking rate and continuously stocked at a moderate stocking rate.

- Mean cow body weight was greater for rotationally stocked at low stocking rate compared with rotationally stocked at medium stocking rate (1,254 vs. 1,162 lb) but did not differ for the rotationally stocked at medium stocking rate versus rotationally stocked at high stocking rate (1,151 vs. 1,254 lb) comparisons.
- Calf-adjusted 205-day body weight was similar for all treatment contrasts.
- Pasture weaning body weight differed between the rotationally stocked at low stocking rate versus rotationally stocked at medium stocking rate (232 vs. 385 lb/acre) and the rotationally stocked at medium stocking rate versus rotationally stocked at high stocking rate (385 vs. 569 lb/acre) treatment contrasts but was similar for rotationally stocked at medium stocking rate and continuously stocked at a moderate stocking rate (385 vs. 427 lb/acre).

Stocking rate influenced both cow and calf production, but stocking method had little or no effect in the current study.

Effects of Stocker-Phase Grazing System and Implantation on Performance and Carcass Characteristics of Fall-Born Steers

(McMurphy, C. P., et al., Oklahoma State University, and South Dakota State University)
The Professional Animal Scientist 29 (2013): 27-32

Fall-born Angus and Angus × Hereford steers (n = 113; body weight = 498 lb) were used in a 2-year study evaluating the effects of growth-promoting implants and grazing system during the stocker phase on performance and carcass traits. Steers were assigned to one of four treatment combinations arranged in a 2 × 2 factorial design. Grazing treatments included 1) late-season grazing of tallgrass native range with protein supplementation from June to December and 2) late-season grazing followed by wheat-pasture grazing from December to March. Implant treatments included 1) stocker-phase implant of Component TE-G (Elanco Animal Health) administered at weaning and 2) no stocker-phase implant (control).

- Compared with late-season grazing of tallgrass native range with protein supplementation, wheat-pasture grazing from December to March increased final body weight, finishing-phase average daily gain, hot carcass weight and rib-eye area.
- Grazing-phase implantation increased average daily gain and final grazing body weight during both the fall grazing and wheat pasture periods.
• However, grazing system did not influence marbling score or Yield Grade.
• Carcass weight, dressing percentage, fat thickness and Yield Grade were not influenced by grazing-phase implant, although the percentage of cattle grading in the upper two-thirds of the Choice Quality Grade was reduced.

Factors Affecting Body Weight Loss During Commercial Long-Haul Transport of Cattle in North America

(González, L. A., et al., University of Manitoba, Department of Animal Science, Winnipeg, Canada)

The objective of the present study was to identify and quantify several factors affecting shrink in cattle during commercial long-haul transport (≥ 248 miles; n = 6,152 journeys). Surveys were designed and delivered to transport carriers to collect relevant information regarding the characteristics of animals, time of loading, origin and destination and loaded weight before and after transport.

• In contrast to fat cattle, feeder cattle exhibited greater shrink (4.9 vs. 7.9% of body weight, respectively) and experienced longer total transport durations (12.4 vs. 14.9 hours, respectively) due to border crossing protocols which require mandatory animal inspection.
• Shrink was greater for feeder cattle loaded at ranches/farms and feed yards compared with those loaded at auction markets.
• Cattle loaded during the afternoon and evening shrank more than those loaded during the night and morning.
• Shrinkage was less in cattle transported by truck drivers having six or more years of experience hauling livestock compared with those with five years or less.
• Temperature and time on the truck had a multiplicative effect on each other because shrink increased most rapidly in cattle transported for both longer durations and at higher ambient temperatures.
• The rate of shrink over time (% of body weight/hour) was greatest in cull cattle, intermediate in calves and feeder cattle and slowest in fat cattle, but such differences disappeared when the effects of place of origin, loading time and experience of truck drivers were included in the model.

Cull cattle, calves and feeder cattle appear to be more affected by transport compared with fat cattle going to slaughter because of greater shrink. Several factors should be considered when developing guidelines to reduce cattle transport stress and shrink including type of cattle, ambient temperature, transport duration, driving quality and time and origin of loading.

Effect of Castration and Dehorning Singularly or Combined on the Behavior and Physiology of Holstein Calves

(Sutherland, M. A., et al., Texas Tech University)

The objectives of this study were to determine 1) the effect of castration, dehorning or both on the physiology and behavior of 3-month-old Holstein calves and 2) the effectiveness of pain relief to alleviate the pain caused by castration and/or dehorning. Holstein calves (n = 80) were assigned randomly to one of eight treatments (10 calves/treatment): 1) control handling, 2) surgical castration, 3) dehorning, 4) surgical castration and dehorning, 5) control handling plus pain relief, 6) surgical castration plus pain relief, 7) dehorning plus pain relief or 8) surgical castration and dehorning plus pain relief. Pain relief consisted of administering local anesthetic and a nonsteroidal anti-inflammatory drug immediately before castration, dehorning or both. Sequential blood samples were collected to measure leukocyte counts and cortisol concentrations. Behavior was recorded using five-minute scan samples during the first three hours after application of the treatments. Calves were weighed before and 24 hours after treatment application.

• Calves dehorned spent more time head shaking and ear flicking, and surgical castrated and dehorned calves spent more time ear flicking and foot stamping than controlled-handled calves.
• Calves castrated, dehorned or both spent less time eating compared with sham handled calves.
• Giving calves pain relief before castration and/or dehorning increased the time spent eating compared
Behavioral and physiological changes caused by castration, dehorning or both are indicative of calves experiencing pain for at least four hours after application of these procedures, and these responses were additive when performed together. Therefore, providing calves with pain relief, in the form of local anesthetic and a nonsteroidal anti-inflammatory drug, can markedly reduce both the behavioral and physiological response to these procedures.

The Relationships Among Performance, Residual Feed Intake and Temperament Assessed in Growing Beef Heifers and Subsequently as Three-Year-Old Lactating Beef Cows

(Black, T. E., et al., North Florida Research and Education Center, University of Florida, USDA, ARS, SubTropical Agricultural Research Station (STARS), Brooksville, FL)


Seventy-four beef heifers were used to evaluate the relationships among performance, residual feed intake and temperament measured as growing heifers (Phase 1) and subsequently as three-year-old lactating beef cows (Phase 2) in the same cohort. In both phases, females were housed in a covered facility and fed similar forage-based diets while individual feed intakes, body weight, body condition scores, chute scores, exit velocities and pen scores (subjective measurement of the behavioral response to isolation in the pen with a handler present) were collected throughout the 70-day feeding trials. In Phase 2, cows were milked on trial day 14 (lactation day 28 ± 3.5) and trial day 70 (lactation day 84 ± 3.5) to determine energy-corrected milk production. Ultrasonic backfat thickness and ribeye area were evaluated on day 0 and day 70 of the trial in Phase 2. Heifers were ranked by residual feed intake and placed into Low, Medium and High residual feed intake groups.

- Body weight, body condition scores and average daily gain were similar among all residual feed intake groups; however, daily dry matter intake differed for all groups and was greater (23.7 lb/day) for High, intermediate (21.8 lb/day) for Medium and lesser (18.8 lb/day) for Low residual feed intake heifers.

- When cow performance was analyzed based on residual feed intake rank as heifers, body weight, body condition score, average daily gain, residual feed intake, day 14 and day 70 energy-corrected milk, backfat thickness and ribeye area were similar among residual feed intake groups; however, cows which were most efficient as heifers (Low) had decreased daily dry matter intake values (22.7 lb/day) than cows that ranked Medium (25.6 lb/day) or High (25.4 lb/day) as heifers.

- The Pearson rank correlation between Phase 1 and 2 feed intake rank was r = 0.13, and Pearson rank correlations showed no relationship between feed intake rank and temperament.

- Phase 1 chute scores was negatively associated with average daily gain in Phase 1 (r = -0.28) and 2 (r = -0.32) and positively associated with day 14 (r = 0.24) and day 70 (r = 0.25) energy-corrected milk.

- Phase 2 chute scores were negatively associated with Phase 2 average daily gain (r = -0.29) and positively associated with day 14 (r = 0.46) and day 70 (r = 0.33) energy-corrected milk.

- Phase 2 pen scores also tended to be negatively associated with dry matter intake in Phase 1 (r = 0.20) and 2 (r = -0.20).

In this study, heifers that were most feed efficient subsequently consumed less feed as lactating cows while maintaining similar performance. Feed efficiency was not associated with differences in temperament; however, more excitable females had poorer gains and tended to have reduced feed intakes but produced more energy-corrected milk.