Evaluating Conventional and Sexed Semen in a Commercial Beef Heifer Development Program

(R. N. Funston and T. L. Meyer, University of Nebraska)
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The objective of this study was to evaluate the use of sexed semen in a commercial heifer development program. Heifers (n = 500) were fed 0.5 mg/day of melengestrol acetate per animal for 14 days and 19 days later administered PGF2α, and Estrotect heat detection patches were placed on their tail heads. Following PGF2α injection, heifers were detected for standing estrus and AI approximately 18 to 24 hours following detection of standing estrus. Heifers not detected in estrus by 72 hours after PGF2α injection were time inseminated and given a GnRH injection 77 to 78 hours post-PGF2α injection. Heifers were AI with one of two sires, either conventional or sexed semen, creating four possibilities for AI sire. At each AI session, heifers were divided evenly to receive either sexed or conventional semen from the same sires. Pregnancy was determined via ultrasonography 55 to 58 days after AI. Heifers were identified as pregnant by AI, cleanup bull or nonpregnant.

- Pregnancy rate was greater for heifers inseminated with conventional compared with sexed semen (58.4 vs. 41.0%).
- In addition, more heifers detected in estrus were pregnant (≥ 55.9%) than heifers time inseminated (24.0%).

Effects of Temperament and Acclimation to Handling on Reproductive Performance of Bos taurus Beef Females

(R. F. Cooke et al., Oregon State University)

Two experiments evaluated the effects of temperament and acclimation to handling on reproductive performance of Bos taurus beef females. In Exp. 1, 433 multiparous, lactating Angus × Hereford cows were sampled for blood and evaluated for temperament before the breeding season. Cow temperament was assessed by chute score and exit velocity. Chute score was assessed on a five-point scale according to behavioral responses during chute restraining. Exit score was calculated by dividing exit velocity into quintiles and assigning cows with a score from 1 to 5 (1 = slowest, 5 = fastest cows).

Temperament score was calculated by averaging chute and exit scores. Cows were classified for temperament type according to temperament score (≤ 3 = adequate, > 3 = aggressive).

- Plasma cortisol concentrations were greater in cows with aggressive vs. adequate temperament.
- Cows with aggressive temperament had reduced pregnancy (95% = adequate and 89% = aggressive) and calving rate (92% adequate and 85% aggressive) and tended to have reduced weaning rate compared with cows with adequate temperament.
- Hence, pound of calf born per cow was reduced and pound of calf weaned per cow (491 pounds = adequate and 455 pounds = aggressive) tended to be reduced in aggressive cows.

In Exp. 2, 88 Angus × Hereford heifers (initial age = 206 days) were weighed (day 0 and 10) and evaluated for temperament score (day 10). On day 11, heifers were ranked by these variables and assigned to receive or not (control) an acclimation treatment. Acclimated heifers were processed through a handling facility three times weekly for four weeks (Mondays, Wednesdays and Fridays), whereas control heifers remained undisturbed on pasture.
- Puberty was hastened in acclimated heifers (60%) compared with control (38%).

Results from this study indicate that *B. taurus* beef cows with aggressive temperament have impaired reproductive performance compared with cohorts with adequate temperament, whereas acclimation to human handling after weaning hastens reproductive development of replacement heifers.

**Effects of Selected Endophyte and Tall Fescue Cultivar Combinations on Steer Grazing Performance, Indicators of Fescue Toxicosis, Feedlot Performance and Carcass Traits**

(J.A. Parish et al., Mississippi State University and The Samuel Roberts Noble Foundation)  
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Five tall fescue pastures were compared for steer growth performance, toxicity, feedlot performance and carcass traits.

1) “Kentucky-31” with 78.0% of plants infected with ergot alkaloid-producing endophyte (*KY31 E*+)
2) “Jesup” AR542 endophyte-infected contaminated with 30.3% tall fescue containing ergot alkaloid producing-endophyte (*Jesup AR542 E*+)
3) “GA-186” AR584 endophyte-infected contaminated with 11.8% tall fescue containing ergot alkaloid-producing endophyte (*AGRFA 140* )
4) “PDF” AR584 endophyte-infected contaminated with 5.5% tall fescue containing ergot alkaloid-producing endophyte (*AGRFA 144* )
5) “KYFA’ 9301’ AR584 endophyte-infected contaminated with 10.0% tall fescue containing ergot alkaloid-producing endophyte (*AGRFA 150* )

Steers (body weight = 708 pounds) grazed pastures for 84 days in spring and 56 days in autumn for two years. Steers were shipped post-grazing in Prairie, Mississippi, to Macedonia, Iowa, for finishing.

- Mean herbage mass was not different among pastures.
- Steers grazing *KY31 E*+ had greater post-treatment rectal temperatures (103°F) during spring.
- Spring hair coat scores were greatest on *KY31 E*+ at day 56 and day 84.
- Steer average daily gain was least on *KY31 E*+ in spring (1.2 pounds) and depressed on *KY31 E*+ (1.1 pounds) and Jesup AR542 E+ (1.1 pounds) in autumn.
- Spring grazing average daily gain was greater on *AGRFA 150* (2.24 pounds) than Jesup AR542 E+ (1.98 pounds) and *AGRFA 140* (2 pounds).
- No body weight differences among pastures were seen at reimplant during feedlot finishing.
- Pasture had no effect on average daily gain after reimplant, days on feed or final body weight.
- Exposure to fescue toxicosis did not affect carcass traits.
- Hair coat price discounts applied for spring-grazed steers on *KY31 E*+ affected initial steer monetary values.
- There were no pasture differences for finishing costs or final carcass value.

Elite tall fescue cultivar and novel endophyte combinations improve growth performance of grazing calves over *KY31 E*+. Producers whose calves graze *KY31 E*+ tall fescue should consider retaining ownership of these cattle through feedlot finishing to avoid market discounts and capture value from compensatory body weight gains during finishing.
Stocker cattle production practices may affect subsequent performance of cattle in economically meaningful ways. Literature was reviewed to summarize possible carryover effects of stocker cattle management on finishing performance and carcass traits.

- The most consistent effects of stocker-phase practices on finishing-phase and carcass performance of cattle appear to be explained by changes in placement weight of feeder cattle.
- Increasing placement weight typically is confounded with age at placement, average daily gain during stocker period and duration of the stocker period. It may also be confounded with other factors, such as season of grazing and/or finishing.
- Data from studies comparing calf-fed to yearling-fed cattle indicate that as age or body weight at feedlot entry increased, finishing average daily gain, dry matter intake and hot carcass weight increased, whereas gain to feed and days on feed decreased.

Stocker cattle systems are complex, integrated systems in which producers typically seek to maximize their own economic return with little regard for subsequent performance. If cattle are owned across both stocker and finishing phases of production, then management decisions should focus on maximizing return over the entire ownership period, not just within one segment of ownership. Of the traits of feeder cattle that can be affected by stocker cattle systems, body weight is the primary determinant of their value when they are placed into commercial feedyards.

**Carry-Over Effects of Stocker Cattle Systems on Feedlot Performance and Carcass Characteristics**

(R. R. Reuter and P.A. Beck, Samuel Roberts Noble Foundation and University of Arkansas)

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A meta-analysis was conducted to examine phenotypic relationships between feed efficiency, scrotal circumference and semen quality traits in yearling bulls. Data evaluated were obtained from five postweaning trials involving Angus (n = 92), Bonsmara (n = 62) and Santa Gertrudis (n = 50) bulls fed diets that ranged from 1.70 to 2.85 Mcal ME/kg dry matter. After an adaptation period of 24 to 28 days, feed intake was measured daily, and body weight was measured at 7- or 14-day intervals during the 70- to 77-day trials. Ultrasound carcass traits and scrotal circumference were measured at the start and end of each trial. Semen samples were collected by electroejaculation within 51 days of the end of the trials, when the age of bulls averaged from 365 to 444 days, and were evaluated for progressive sperm motility and morphology. Residual feed intake was calculated as the difference between actual dry matter intake and expected dry matter intake from linear regression of dry matter intake on average daily gain and midtest body weight.6.75, with trial, trial by average daily gain and trial by midtest body weight40.75 as random effects.

- Across all studies, bulls with low residual feed intake phenotypes consumed 20% less dry matter and had 10% less 12th rib fat thickness but had similar average daily gain, scrotal circumference and semen quality traits, compared with high-low residual feed intake bulls.
- Gain-to-feed ratio was strongly correlated with average daily gain and weakly correlated with initial body gain and dry matter intake.
- Residual feed intake was not correlated with average daily gain, initial age or body weight but was correlated with dry matter intake, gain-to-feed ratio and 12th rib fat thickness.
- Initial scrotal circumference, gain in scrotal circumference and percent normal sperm were correlated with gain to feed ratio, but only sperm morphology was found to be weakly associated with residual feed intake.

These data suggest that residual feed intake is not phenotypically associated with scrotal circumference or sperm motility but is weakly associated with sperm morphology.
An Economic Evaluation of Estrous Synchronization and Timed Artificial Insemination in Suckled Beef Cows

(J. C. Rodgers et al., University of Minnesota, Mississippi State University, University of Florida and North Dakota State University)

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Partial budget analysis was used to determine the economic outcome of estrous synchronization and timed artificial insemination in commercial cow-calf production. Suckled beef cows from eight locations were assigned randomly within each location to one of two treatment groups: 1) Cows were inseminated artificially after synchronization of ovulation using the CO-Synch + CIDR protocol, which includes a 100-µg injection of GnRH when a controlled internal drug-releasing device (CIDR) was inserted. The CIDR was removed seven days later, and cows received a 25-mg injection of PGF2α, followed in 66 hours with timed artificial insemination and a second 100-µg injection of GnRH (n = 582). 2) Cows were exposed to natural service without estrous synchronization (control; n = 615). Within each herd, cows from both treatments were maintained together in similar pastures and were exposed to bulls 12 hours after the last cow in the timed artificial insemination treatment was inseminated.

- Overall, the percentage of cows exposed to treatments that subsequently weaned a calf was greater for timed artificial insemination (84%) than control (78%) cows.
- Weaning weights per cow exposed to treatments were greater for cows in the timed artificial insemination treatment (425 pounds) than those cows in the control treatment (387 pounds).
- Overall, increased returns plus decreased costs ($82.32) minus decreased returns plus increased costs ($33.18) resulted in a $49.14 advantage per exposed cow in the timed artificial insemination treatment compared with the control treatment.

Location greatly influenced weaned calf weights, which may have been a result of differing management, nutrition, genetic selection, production goals and environments. We concluded that estrous synchronization and timed artificial insemination had a positive economic impact on subsequent weaning weights of exposed cows.