BEEF CATTLE RESEARCH UPDATE

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Differences in Lifetime Productivity of Beef Heifers that Conceived to AI or Clean-up Bulls as a Yearling

Recent Colorado State University compared the lifetime productivity between heifers that conceived to artificial insemination (AI) or clean-up bulls via natural service as yearlings.[1] In this study, calving and breeding records were acquired from 1991 to 2010 resulting in 6,693 records from 1,173 purebred Angus females. Data recorded included weaning weights for each cow annually until they were culled, yearling weights, and age at AI. Each year the females were subjected to estrous synchronization and AI with natural service beginning approximately 10 days later. On heifers, the same sires were used for both AI and natural service. Heifers were classified as conceiving to AI or natural service as yearlings based on a 290 day gestation length added to the AI date.

These researchers reported that females that conceive to AI as a yearling were older (429 vs. 418 days) and heavier as yearlings (681 vs. 662 lb) than were females conceived to a clean-up bull via natural service ($P = 0.02$). In addition, females that conceive to AI as a yearling had greater average weaning weight for calves produced during their lifetime ($P = 0.04$, 463 vs. 452 lb) and weaned more weight ($P < 0.0001$, 2364 vs. 1398 lb) and more total calves ($P < 0.0001$, 5.2 vs. 3.0 calves) throughout their lifetime than did females that conceived to natural service as a yearling. Since the same sires were used for AI and natural service on yearling heifers, the researchers attributed differences in lifetime production to earlier conception as yearlings.

Lifetime revenue was calculated using price and weaning weight date for each calf produced using four pricing methods: actual market prices at time calves were marketed, average price received over the entire period (1991 to 2010), and two synthetic price regimens representing extreme weight- price interactions. With all pricing scenarios, females that conceived to AI as yearlings, yielded greater lifetime revenue ($P < 0.0001$, $922 to $974 greater) than did females conceived via natural service.

These researchers concluded that replacement females that conceive earlier in the breeding season, accomplished via the use of estrus synchronization and AI have increased longevity. They noted that estrus synchronization with AI can be an effective management tool to produce replacements that are older at breeding, become pregnant early in the breeding season, and have the potential to consist of superior genetics.

Economics of Estrous Synchronization and Timed Artificial Insemination in Beef Cows

University of Minnesota research determined the economic outcome of estrus synchronization and timed artificial insemination (TAI) in commercial cow-calf production.[2] In this study, 1,197 suckled beef cows from 8 locations in Minnesota were assigned randomly at each location to 1 of 2 treatment groups: 1) cows were inseminated artificially after synchronization of ovulation using the CO-Synch + CIDR protocol (TAI; 582 cows) or 2) cows were exposed to natural service without estrous synchronization (Control; 615 cows). The TAI cows were initially injected with gonadotropin-releasing hormone (GnRH: OvaCyst, Teva Animal Health) concurrent with insertion of a controlled internal drug-releasing device (CIDR; Pfizer Animal Health). The CIDR was removed 7 days later and cows received an injection of Lutalyse (Pfizer Animal Health) followed in 66 hours with TAI and a second injection of GnRH. 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 TAI treatment was inseminated. The length of the breeding season in the individual herds ranged from 42 to 71 days.

These researchers reported that a greater (P = 0.006) percentage of cows exposed to the TAI treatment (84%) weaned a calf during the subsequent calving season compared with cows in the control treatment (78%). In addition, a greater percentage of cows exposed to TAI calved during the first 20 days of the calving season than control cows (40 vs. 22%, P < 0.01). However, during days 21 through 50 of the calving season, more control cows calved than TAI cows (56 vs. 42%, P < 0.05). Weaning weights per exposed cow were 38 lbs greater (P = 0.004) for cows in the TAI treatment than control cows (426 vs. 388 lb). Similarly, when including only cows that calved, weaning weights per cow calving was 27 lb greater (P = 0.017) for cows in the TAI treatment than control cows (470 vs. 443 lb). However, when including only cows that weaned a calf, weaning weights per cow weaning a calf were similar (P = 0.252) between TAI and control cows (514 vs. 509 lb). The increased calf weaning weights of calves from TAI cows can be attributed to a combination of calves being born earlier in the calving season and improved genetic growth potential. However, in this study the authors noted that AI bulls and natural service bulls were selected using similar selection criteria, and thus, no improvement in weaning weights among treatments was anticipated on the basis of improved genetic growth potential. In an economic analysis, the timed artificial insemination cows returned $49.14 more per exposed cow to treatment than did control cows when calves were valued at $121/cwt.

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[1] French, J. T., J. K. Ahola, J. C. Whittier, W. M. Frasier, R. M. Enns, and R. K. Peel. 2013. 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. Prof. Anim. Sci. 29:57-63.

[2] Rodgers, J. C., S. L. Bird, J. E. Larson, N. Dilorenzo, C. R. Dahlen, A. Dicostanzo, and G. C. Lamb. 2012. An economic evaluation of estrous synchronization and timed artificial insemination in suckled beef cows. J. Anim. Sci. 90:4055-4062.