



# BEEF CATTLE RESEARCH UPDATE

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## **Effects of Weaning Period Length on Growth and Health of Preconditioned Beef Calves at Conventional Weaning Ages**

Numerous studies have shown that preconditioning weaned calves for 30 to 45 days post-weaning is beneficial to stocker and feedlot operations (less morbidity and mortality, improved post-weaning performance, and higher carcass quality). Most industry-sponsored preconditioning programs require a ranch-of-origin weaning period of 45 to 60 days. Since calves preconditioned on the ranch of origin may be at lesser risk for morbidity than market-sourced calves, Kansas State University research evaluated the effects of the length of the ranch-of-origin weaning period on the health and performance of preconditioned, spring-born beef calves originating from, finished in, and slaughtered in the Great Plains.<sup>1</sup>

In this study, 433 head of spring-born Angus × Hereford calves from the Kansas State University Commercial Cow-Calf Unit – Manhattan (CCU) and the Western Kansas Agricultural Research Center – Hays (WKARC) were weaned at conventional ages (~190 days of age) and assigned to treatments that corresponded to a length of time (days) between separation from their dam and transport to a feedlot: 60, 45, 30, 15, or 0 days. The weaning date varied by treatment; but, all calves were transported on a common date and at a common age (220 days). The average age of calves at the time of weaning was 160, 175, 190, 205, and 220 days for calves weaned 60, 45, 30, 15, and 0 days before shipping, respectively. All calves were vaccinated against common diseases 14 days before weaning and again on the day of weaning. At weaning, the calves were transported (< 12 miles) to a ranch-of-origin weaning facility and penned according to treatment. During the preconditioning phase, the calves were fed a complete diet containing 16.9% crude protein (dry matter basis, DM) at an expected DM intake of 2.5% of body weight. On a common date (November 7), all of the calves were transported 4 hours (~239 miles) to a commercial auction market and held for 14 hours, and then subsequently transported one hour (~35 miles) to a feedlot (WKARC). After arrival at the feedlot, the calves were penned by treatment and fed the same preconditioning diet for a 60 day receiving period. After the receiving period, heifers (211 head) were removed from the experiment to be retained as herd replacements, and steers (222 head) were adapted to a finishing diet over a period of 21 days.

These researchers reported that after the ranch-of-origin preconditioning phase, calf weight at shipping was greater ( $P = 0.02$ ) in calves weaned before shipping (569 lb) than in calves not weaned before shipping (545 lb) and increased linearly ( $P = 0.01$ ) as the length of the weaning period increased. Transport shrink and receiving morbidity were greater ( $P = 0.01$ ) in unweaned calves than in weaned calves (8.7 vs. 6.6% and 16.1 vs. 4.1%, respectively for shrink and morbidity). It was also noted that morbidity appeared to be greater among calves weaned 15 (8.8%) and 60 days (7.2%) before shipping than those weaned 30 (1.2%) or 45 days (2.3%) before shipping. Calf weight at the end of the receiving period was greater ( $P = 0.01$ ) for weaned than unweaned calves (644 vs. 604 lb) and increased linearly ( $P = 0.01$ ) as weaning-period length increased. Calf gains during receiving and finishing were not affected by treatment. Steer final finishing weight and carcass weight tended ( $P = 0.07$ ) to be greater in weaned calves than in unweaned calves (1275 vs. 1235 lb and 790 vs. 756 lb, respectively for final weight and carcass weight) but were not different ( $P \geq 0.11$ ) among preconditioned calves.

These authors concluded that under the conditions of this experiment that pre-transport weaning periods of 15 days or longer improved the health and performance of calves during feedlot receiving. They also concluded that this data suggest that “cattle originating from commercial-scale ranches in

the Great Plains that are finished in the Great Plains require a relatively short preconditioning period (~15 days) for optimal health and performance at the feedlot.

### **Effects of Weaning Period Length on Growth and Health of Preconditioned Beef Calves at Early Weaning Ages**

Additional Kansas State University research evaluated the effects of the length of the ranch-of-origin weaning period on the health and performance of early weaned spring-born beef calves originating, finished, and slaughtered in the Great Plains.<sup>2</sup> In this study, 409 head of Angus × Hereford calves from CCU and WKARC were weaned early (~130 days of age) and assigned to treatments that corresponded to a length of time (days) between separation from their dam and transport to a feedlot: 0, 15, 30, 45, or 60 days. The weaning date varied by treatment; but, all calves were transported on a common date (August 24) and at a common age (160 days). The average age of calves at the time of weaning was 160, 145, 130, 115, and 100 days for calves weaned 0, 15, 30, 45, and 60 days before shipping, respectively. All other experimental procedures were similar to those used in the previously reviewed experiment. After the receiving period, heifers (216 head) were removed from the experiment and steers (193 head) were adapted to a finishing diet over a period of 21 days.

These researchers reported that after the ranch-of-origin preconditioning phase, calf weight at shipping was not different ( $P = 0.13$ ) in calves weaned before shipping than in calves not weaned before shipping, but shipping weight decreased linearly ( $P = 0.04$ ) as the length of the weaning period increased. These results contrast with those observed in the previously reviewed experiment (conventional weaning ages) in which shipping weight increased as the length of the weaning period increased. These authors speculated that suckling calves in the early weaning study (calves weaned between June 30 and August 9) were on a greater plane of nutrition than calves maintained under drylot conditions and fed a concentrate-based diet. Whereas, in the conventional weaning age study (calves weaned between September 8 and November 7), the suckling calves were likely on a lesser plane of nutrition than calves maintained under drylot conditions and fed a concentrate-based diet since Great Plains forage quality declines rapidly in the fall.

During the receiving phase, calves not weaned before shipping tended to gain slower ( $P = 0.08$ ) than weaned calves (2.49 vs. 2.66 lb/day). In addition, gains increased linearly ( $P = 0.02$ ) as length of the ranch-of-origin weaning period increased. In contrast to the previous experiment, receiving morbidity and calf weight at the end of receiving period did not differ between treatments. Furthermore during the finishing period, gains, days on feed, final weight and carcass weight were not different ( $P \geq 0.11$ ) between weaned and non-weaned calves.

These authors concluded that under the conditions of this experiment, ranch-of-origin weaning periods of 15 days or longer improved gains of early-weaned calves during feedlot receiving but had minimal effects on health, finishing performance, or carcass characteristics. They also concluded that this data suggested that “early-weaned calves originating from the Great Plains may go into the feedlot after weaning without expectations of a significant health challenge”.

### **Effect of Early Weaning on Cow Performance**

In both of these preconditioning studies, body condition scores (BCS) were assigned to cows 60 days before and 60 days after the date calves were shipped to the feedlot. The cows were artificially inseminated (AI) in late June after implementation of a timed-AI synchronization protocol. After timed AI, cows were returned to pastures for 10 days before beginning a 35-day (WKARC) or 50-days (CCU) natural-service breeding season. Natural breeding was delayed for 10 days to allow for distinction between AI-bred cows and cows bred via natural service. Dam pregnancy to timed AI was determined via ultrasonography 34 days after insemination and final pregnancy was determined by rectal palpation approximately 120 days after the end of the breeding season.

These researchers reported that the initial BCS of cows did not differ among treatments in both experiments. In the conventional weaning age study, cow BCS change from 60 days before to 60 days after transport of calves increased linearly ( $P = 0.01$ ) as the preconditioning weaning-period length increased. Timed-AI pregnancy rate by cows was not effected by weaning treatments applied to calves during the prior year. However, cows suckling calves weaned immediately before transport had lower ( $P = 0.03$ ) overall pregnancy rates than cows suckling calves weaned before transport (86.2 vs. 93.3%). In addition, pregnancy rate tended to increase linearly ( $P = 0.09$ ) as the length of preconditioning increased. In this study, the weaning treatments were applied 8 to 10 months before the subsequent breeding season.

In the early weaning age study, cow BCS change over the 120 day period also increased linearly ( $P = 0.01$ ) as the preconditioning weaning-period length increased. Timed-AI pregnancy rates during the subsequent breeding season tended to increase linearly ( $P = 0.08$ ) as the length of the weaning period increased. However, there was no difference ( $P = 0.94$ ) in timed-AI pregnancy rates between cows with calves not weaned before shipping and cows with calves weaned  $\geq 15$  days before shipping. Cows suckling calves weaned immediately before transport had lower ( $P = 0.03$ ) overall pregnancy rates than cows suckling calves weaned before transport (87.5 vs. 94.7%). In this study, the weaning treatments were applied 10 to 12 months before the subsequent breeding season.

In conclusion, both studies illustrate that early weaning of calves reduces the nutrient requirements of the cows, enabling them to recover body weight more easily (gain BCS). This leads to improved cow reproductive performance (increased pregnancy rate).

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<sup>1</sup> Bailey, E. A., J. R. Jaeger, T. B. Schmidt, J. W. Waggoner, L. A. Pacheco, D. U. Thomson, and K. C. Olson. 2015. Effects of weaning period length on growth and health of preconditioned, spring-born beef calves originating from the Great Plains. I. Conventional weaning ages. *Prof. Anim. Sci.* 31: 20-29.

<sup>2</sup> Bailey, E. A., J. R. Jaeger, T. B. Schmidt, J. W. Waggoner, L. A. Pacheco, D. U. Thomson, and K. C. Olson. 2015. Effects of weaning-period length on growth and health of preconditioned, spring-born beef calves originating from the Great Plains. II. Early weaning. *Prof. Anim. Sci.* 31: 30-39.