

BEEF CATTLE RESEARCH UPDATE

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Dietary Roughage Concentration and Health of Newly Received Cattle

The response and performance of feedlot cattle during the overall feeding period is affected by their health and performance response during the receiving period. The receiving period is crucial to the economic outcome of cattle feeding. For this reason, there is ongoing debate in the feedlot industry as to whether newly received cattle should be started on high roughage diets or high concentrate diets. In general, starting cattle on high roughage diets results in lower incidences of morbidity and mortality. Whereas, higher concentrate diets generally improve performance, thus reducing cost of gain.

In an effort to get a better handle on this dilemma, Texas Tech University researchers recently reviewed and summarized several receiving trials conducted at the Clayton Livestock Research Center during the 1970's and 1980's¹. These trials examined the use of different dietary concentrate/roughage concentrations on the performance and health of newly received cattle. In general, the cattle used in these trials were lightweight crossbred calves purchased at auction barns and shipped long distances (calves from Arkansas, Florida and Missouri), but some cattle were locally purchased and a few were yearlings. The purchase weight on these cattle ranged from 354 to 554 lbs with the majority of the cattle weighting less than 400 lbs. Diets were typically based on steam-flaked sorghum or whole-shelled corn as the grain source, with alfalfa hay, cottonseed hulls, or native grass has as the primary roughage source.

In this review, morbidity from bovine respiratory disease only decreased slightly as dietary roughage concentration increased (20% increase in roughage concentration only decreased morbidity by 1.35%). Whereas, average daily gain and dry matter intake were negatively affected by increasing roughage concentration (20% increase in roughage decreased gain by 0.39 lb and feed intake by 0.59 lb). In their economic analysis of this data, cattle started on a 40 vs 100% roughage diet made approximately 5 times more profit during the 28 day receiving period. It was concluded that the optimum dietary strategy for starting light-weight, highly stressed, newly received cattle on feed would be to feed a 50 to 75% concentrate milled diet. This allows cattle to perform well without economically important negative effects on receiving period health.

Weaning Beef Calves in Two Stages

Recent Canadian research² compared weaning calves in two stages with the traditional method of weaning by abrupt separation in a series of four trials. In the two-stage treatment, calves were

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prevented from nursing their dams for a period (stage 1) before their separation (stage 2). Nursing was prevented by fitting calves with an antisucking device (nose-flap) made of flexible plastic (Figure 1). Control calves nursed from their dams until they were separated.

Figure 1. Photograph of nose-flap (A). The nose-flap prevents nursing by providing a physical barrier between calf's mouth and the cow's teat (B).

Following separation, two-stage calves vocalized 96.6% less and spent 78.9% less time walking,

23.0% more time eating, and 24.1% more time resting than control calves. In three trials, daily gain by the two-stage calves (nose-flaps used for 3 to 5 days before separation) was equal or superior to that by controls when evaluated from the end of nursing. In a fourth trial, calves were fitted with pedometers that recorded the number of steps taken by the calves. During a 4-day period when two-stage calves were prevented from nursing, they took an average of 2,019 more steps per day than the nursing calves. Applying a standard calf stride length of 25.6 inches, this is equivalent to 0.8 miles per day. On the first four days after separation, control calves took an average of 8,887 more steps per day (3.6 miles) than two-stage calves. On the day following separation, control calves took 17,637 more steps (7.1 miles) than two-stage calves.

These researchers concluded that two-stage-weaning is a practical approach to minimize behavioral aspects of weaning distress in beef cattle. The nose-flaps cost less than \$1.00 each and are reusable. The nose-flap retention rate in these studies was 95% or greater.

Factors Affecting beef Cattle Performance and Profitability

Iowa researchers³ recently summarized 10 years (1988 thru 1997) of feedlot close-outs that were submitted by Iowa cattle producers using the Iowa State University Feedlot performance and Cost Monitoring Program. Their major findings follow:

- Steers consumed 2.4% more feed, gained 10.5% faster and were 7.3% more efficient than heifers. Steers tended to be more profitable (\$3.65/head)
- Cattle fed in open lots with access to overhead shelter were more efficient and were more profitable than cattle with access to shelter. Cattle with access to shelter tended to be more profitable (\$4.36/head).
- With increasing initial body weight, dry matter intake and daily gain increased and cattle became less efficient. Cattle initially weighing 600 to 800 lbs consumed 2.00 lb/day more dry matter than cattle initially weighing less than 600 lbs. Cattle weighing more than 800 lbs consumed 1.91 lbs/day more than cattle weighing 600 to 800 lbs.
- Cattle ate less, gained more and were more efficient with increasing dietary concentrate level (dietary energy). Cattle receiving lower levels of concentrate (<75%) were most profitable and those receiving intermediate levels (75 to 85%) were least profitable.
- Season of the year that cattle were placed on feed affected feed intake and efficiency. Cattle started in the winter generally consumed the least feed but were more efficient.
- As the number of cattle per pen increased, intake and daily gain decreased, but efficiency was not affected (3 groups: <100 head, 100 to 200 head, and >200 head). Pens with <100 head were more profitable.
- Feeder and fed cattle prices explained about 50% of the variation in profitability. Feed efficiency explains about 13% of the variation in profitability. Corn price and average daily gain only explain, respectively, about 2% and <1% of the variation in profitability.

¹ Rivera, J.D., M.L. Galyean, and W.T. Nichols. 2005. Review: Dietary roughage concentration and health of newly received cattle. *Prof. Anim. Sci.* 21:345-351.

² Haley, D.B., D.W. Bailey, and J.M. Stookey. 2005. The effects of weaning beef calves in two stages on their behavior and growth rate. *J. Anim. Sci.* 83:2205-2214.

³ Koknaroglu, H., D.D. Loy, D.E. Wilson, M.P. Hoffman, and J.D. Lawrence. 2005. Factors affecting beef cattle performance and profitability. *Prof. Anim. Sci.* 21:286-296.