BEEF CATTLE RESEARCH UPDATE

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Feeding Behavior of Feedlot Cattle Transitioning from a High-Forage to a High-Concentrate Diet

Feedlot cattle are transitioned as fast as possible from a high-forage diet to a high-grain finishing diet to ensure higher average daily gain and better feed efficiency. However, too rapid a transition can cause a substantial decrease in ruminal pH that can lead to acidosis which is the most prevalent digestive disorder in feedlot cattle. Recent Canadian research investigated the ruminal pH profile and feeding behavior of feedlot cattle during a transition period from a high-forage to a high-concentrate diet.[1] In this study, 16 ruminally cannulated heifers (847 lb) were transitioned from a high-forage (45% concentrate) to a finishing diet (90% concentrate, barley based) over 21 days using three steps. The two intermediate diets contained 60 and 75% concentrate, respectively. Each step-up diet was fed for 7 days. Dry matter intake (DMI), feeding behavior (average meal size and total meal duration per day), and continuous ruminal pH were measured during each step-up period.

These researchers reported that following the initiation of each transition step, mean daily ruminal pH declined and DMI, meal size and meal duration were reduced. They observed that during step 1, when animals were on the 60% concentrate diet, acute (pH < 5.5) and sub-acute acidosis (pH < 5.8) lasted between 3 to 14% and 10 to 26% of a 24-hour period, respectively. This increased to between 6 to 32% and 13 to 44% for acute and sub-acute acidosis, respectively, during step 2 (75% concentrate diet). During the last step of the transition period (90% concentrate diet) animals experienced acute and sub-acute acidosis for 27 to 42% and 44 to 54% of a 24-hour period. Thus, as the proportion of concentrate in the diet increased, the severity and duration of acidosis increased.

These researchers concluded that changes in feeding behavior can be indicative of sub-optimal ruminal pH conditions during periods of dietary transition. They suggested that adaptation protocols such as more steps with smaller grain increments or shorter initial and longer final steps should be investigated as alternate feedlot management practices to reduce the incidence of acidosis.

Effects of Dehorning Techniques on Behavior and Wound Healing in Feedlot Cattle

It is recommend that horn buds in calves be removed sometime between birth and 4 month of age. A 2007-08 USDA survey of 2,872 beef cow-calf operations in the United States found that about 6 of 10 operations in the South Central and Eastern U.S. (62.9 and 60.8%, respectively) did not dehorn any horned calves during 2007, compared with about 3 of 10 operations in the Western and Central U.S. (31.0 and 26.3%, respectively).[2] A higher percentage of operations in the West (57.6%) and Central (58.9%) regions dehorned all calves born with horns, compared with operations in the South Central (18.9%) and East (28.7%) regions. For operations that dehorned calves, the average age at which they were dehorned was about 119 days. Since not all cattle are dehorned as calves, removing the horns of cattle when they arrive at feeding facilities is a common practice to reduce injury to other cattle and handlers. In addition, there is an increase in in bruising on carcasses of cattle that have been housed in pens that contain horned cattle. Bruises from the horns are trimmed out resulting in lost carcass weight, devalued primal cuts and reduced carcass value.

Kansas State University researchers used 40 crossbred steers and heifers (average weight = 686 lb) to determine the effect of dehorning methods on pain, cattle behavior, and wound healing.[3] The cattle were assigned to four treatments: 1) non-dehorned controls, 2) banded using a high tension elastic rubber, 3) mechanically removed using a keystone dehorner placed 0.5 inch below the base

of the horn, and 4) tipped using a hand saw at the point where the horn diameter was 1.25 inches. The banding method restricts blood circulation to the horns, resulting in necrosis causing the horns to eventually fall off.

The cattle in this study were dehorned by their respective treatment on day 0. Chute behavior and vocalization were recorded during the dehorning process. After dehorning, the cattle were placed in a single pen and fed together during the trial. During this 28 day trial, the cattle were visually scored daily for wound healing, depression, gait and posture, appetite, and lying. In addition, the cattle were individually weighted on days 0, 7, 14, 21, and 28.

These researchers reported that vocalization scores at dehorning were highest for mechanically dehorned and banded cattle. Mechanical dehorning had a more pronounced effect on discomfort during the dehorning procedure, but the effects were short lived and vocalization stopped on release of the animal from the chute. The banded cattle had lower vocalization scores at the time of dehorning but greater vocalization after dehorning, indicating lingering discomfort from the presence of the band. In addition, banded cattle tended to exhibit more depression, abnormal gait and posture, abnormal lying, and slower wound healing in the latter weeks of the trial than cattle in the other treatment groups. Tipped cattle exhibited the least amount of pain-associated behavior throughout the trial (similar to non-dehorned cattle). No difference was detected in performance between the different dehorning procedures.

The authors also reported that the success of banding was poor during the trial. Four of the bands fell off without removing the horn the first 4 days of the trial (4/20). During the trial only 3 (3/20) horns that had been banded fell off during the 28 day period, leaving 13 out of the 20 horns at the end of the trial with the bands still attached.

In conclusion, these data indicated that mechanically dehorning is a painful procedure for cattle at the time of the procedure. Banding is not an effective alternative to mechanical dehorning. Tipping horns resulted in the least amount of observable pain in the dehorned cattle.

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[1] Holtshausen, L., K. S. Schwartzkopf-Genswein, and K. A. Beauchemin. 2013. Short communication: Ruminal ph profile and feeding behaviour of feedlot cattle transitioning from a high-forage to a high-concentrate diet. Can. J. Anim. Sci. 93:529-533.

[2] USDA-APHIS. 2008. Pages 32-35 in Beef 2007-08, Part I: Reference of beef cow-calf management practices in the United States, 2007–08. USDA–APHIS–VS–CEAH, Fort Collins, CO. Available: http://www.aphis.usda.gov/animal_health/nahms/beefcowcalf/downloads/beef0708/Beef0708_dr_PartI_rev.pdf

[3] Neely, C. D., D. U. Thomson, C. A. Kerr, and C. D. Reinhardt. 2014. Effects of three dehorning techniques on behavior and wound healing in feedlot cattle. J. Anim. Sci. 92:2225-2229.