BEEF CATTLE RESEARCH UPDATE

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Does Postnatal Metabolic Imprinting Increase Marbling Scores in Fed Cattle?
Several studies have suggested that that increasing exposure to high grain (starch) diets to early weaned calves results in greater fat deposition and increased carcass quality at slaughter.[1,2.] This suggests that postnatal metabolic imprinting events may be exploited as a management tool to improve cattle value. A joint research project by Virginia Polytechnic Institute and State University, the University of Minnesota, and the University of Wyoming determined the ability of a short, high energy dietary intervention for subsequently increasing intramuscular fat deposition in finishing cattle.[3] In this study, fall-born Angus sired steer calves were assigned to normal weaned (NW) or metabolic imprinted (MI) treatments. NW calves remained on their dam until 251 ± 6 days of age, whereas MI calves were weaned at 105 ± 6 days (298 lb) and were transitioned to a diet containing 20% crude protein and 57 Mcal/cwt NEg. The MI calves were offered 2.2 lb/day of grass hay and were hand-fed twice daily to approximate ad libitum intake. The protein levels of the diet were transitioned from the initial level of 20% to 14.5% through the course of the feeding period.

At normal weaning age, MI calves were heavier ($P < 0.05$) than NW calves (752 vs. 584 lb). Seven days after weaning of the NW calves, both treatment groups were combined and grazed on a mixed summer pasture from mid-May until early October. During the grazing phase NW steers gained more weight than MI steers (1.52 vs. 0.77 lb/day; $P < 0.05$). After grazing, the steers were adapted to a corn silage-based feedlot diet. After 75 days on feed, backfat thickness was measured via ultrasound to stage slaughter groups with an estimated 0.39 to 0.47 inches of backfat. Feedlot performance, backfat thickness and USDA yield grade were similar between treatments. However, MI steers weighed more at slaughter (1244 vs. 1155 lb; $P < 0.05$) and produced carcasses with higher ($P < 0.001$) marbling scores (645 vs. 517; 400 = Sm^0, 500 = Md^0 and 600 = Mt^0). These researchers concluded that calves consuming a high concentrate diet for a short period of time early postnatal yielded higher quality carcasses suggesting that metabolic imprinting mechanisms exist in growing beef cattle and may be used for economic gain by cattle producers and feedlot managers.

Effect of Feedlot Bunk Management on Feedlot Steer Intake
Feedlot bunk management plays a critical role in achieving maximum feedlot performance while avoiding digestive upsets. Bunk management means matching the amount of feed delivered to the amount of feed that cattle can handle.[4] Feed bunk management has changed over the years. Traditionally, cattle feeders attempted to keep bunks full, providing feed at all times. This approach to bunk management often resulted in spoiled feed that was either wasted or may have contributed to reduced intake if cattle were forced to clean the bunk. In recent years, slick or clean bunk systems have become a common practice in the feedlot industry. The aim of such a system is for feed bunks to be slick for a certain duration of time prior to the next day's feed delivery. It is believed that this system reduces cyclic intake patterns thereby reducing the incidence of digestive disorders. However, a slick bunk system may reduce dry mater intake (DMI) and thus, feedlot performance.

Recent Colorado State University research conducted at the Southeast Colorado Research Center in Lamar evaluated whether managing feed bunks under a slick bunk system would reduce DMI and influence the pattern of DM disappearance from feed bunks.[5] This study used 127 crossbred steers (1,096 lb) housed in 12 pens (20 x 60 ft) with 12 ft bunks. All of the pens were fed a steam-flaked corn based finishing diet twice daily (7 a.m. and 11:30 a.m.). Three 6:30 a.m. target bunk scores were evaluated: 0 = bunk devoid of all feed particles, ½ = a bunk containing up to 0.55 lb of feed per steer, and 1 = a bunk containing greater than 0.55 and up to 2.2 lb of feed per steer. At the start of the trial, each pen was randomly assigned to one of three groups (4 pens per group). Each group was fed to a different target bunk score over three periods. An adaptation period of 10 days was implemented for each period prior to four days of data collection. During the data collection phase, all feed bunks were read by a single observer at 4 p.m., 10 p.m., 2 a.m., and 6:30 a.m. the next morning. These researchers reported that overall, at the 6:30 a.m. bunk reading, the slick bunk steers had a score of 0 51% of the time, a score of ½ 49% of the time, and a score of 1 0.05% of the time.

These authors reported that daily DMI for steers fed to a target score of 0 (21.5 lb) was lower ($P < 0.05$) than that for steers fed to a target score of ½ (22.9 lb), which was lower ($P < 0.01$) than that for steers fed to a target score of 1 (24.7 lb). It was noted that the majority of treatment differences in DMI may have been due to differences in feed disappearance from 7 a.m. to 4 p.m. and apparently not due to disappearance differences from 10 p.m. to 6:30 a.m. Even though adequate feed was available in all bunks from 7 a.m. to 4 p.m. to support similar DMI during this time period for all treatments, steers fed to a target score of 0 consumed less feed (15.4 lb) during the day (7 a.m. to 4 p.m.) than did steers fed to a target score of ½ (16.7 lb; $P < 0.001$), which consumed less feed from delivery through 4 p.m. than did steers fed to a target score of 1 (17.4 lb; $P < 0.01$). In conclusion, these data suggest that slick bunk management systems may severely restrict DMI in feedlot steers, thus reducing feedlot performance. In addition, slick bunk management systems may alter feed consumption patterns.

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