Temperament Plays Key Role in Cattle Health

Calves were chosen for studies based on their temperament scores, which categorized them as most calm, intermediate, and most temperament.

Challenging Behaviors

"Depending on whether an animal is classified as being really calm or really high strung, we're seeing differences in the way it deals with illness," Carroll says. In the study, Brahman calves were classified by temperament and transported 478 miles from Overton to Lubbock. After the trip, blood samples and body temperatures were taken before, during, and after administration of an endotoxin to simulate illness. Sickness behavior was scored on a 1- to 5-scale that measured the severity of calving behavioral responses to the challenge. A score of 1 indicated normal maintenance behaviors, and 5 indicated the greatest amount of sickness behaviors, such as head distension, increased respiration, and labored breathing.

"You could immediately tell that the calm animals had been given an immune challenge, because they showed visual signs and became ill," Carroll says.

The more temperament animals continued to act high-strung and flighty after the endotoxin challenge. If a temperament animal doesn't show signs of illness, managers might not realize that the animal is sick and needs treatment.

"We're not talking about one breed compared to another breed," Carroll says. "We're talking about animals within the same breed type, and the only difference is their temperament." Results showed that the endotoxin increased body temperature and induced secretion of epinephrine and cortisol, hormones associated with coping with stress, says Tom Welsh, Texas A&M AgriLife Research endocrinologist in College Station, Texas. When animals are transported, they become stressed, contributing to the incidence of disease, Randel says. Therefore, identifying cattle that are more susceptible to stressors and subsequently have altered immune responses may help to reduce the impact of sickness after transport.

Previous studies indicate that human-animal interactions are probably the most stressful events that the majority of cattle encounter. The duration of transportation is not the problem, Randel says. "It's the action of being handled and loaded into the trailer that is producing the stress." If cattle are handled in an appropriate manner and given water and food at no more than 12 hour intervals, then getting on and off the trailer is the major stressor, he says.

Making the Grade

While the handling process is more stressful for animals, transportation duration and condition can have negative effects on intramuscular fat, says Rhonda Vann, MSU associate research professor. "When animals are transported, they will use or mobilize intramuscular fat very quickly for fast sources of energy," Vann says. "The degree of intramuscular fat or marbling, determines the quality grade of beef. High levels of marbling improve quality grade, whereas lower levels reduce it.

Vann and her colleagues looked at the combined effects of transportation and animal temperament on body composition traits. They took ultrasound images of muscle ribeye area, rib fat, intramuscular fat, and rum fat to evaluate and measure fat mobilization. Temperamental cattle appeared to use more fat stores when stressed, Vann says.

Also, as the hauling distance increased, the percentage of intramuscular fat decreased.

"From a production standpoint, temperament of animals does make a difference in the ultimate quality grade—for example, choice versus select," Vann says. "As stressors and transportation times increase, temperamental animals could potentially have lower quality grades, and that could mean lower profits.

Tactics for Taming

Results show that temperamental cattle require special management practices to reduce stress before, during, and after transportation. Also, because temperament and resistance to bovine respiratory disease are both heritable traits, future research will include developing gene-based methods to select calm, stress-tolerant, and disease-resistant cattle.

"Information derived from our studies will enhance gene-based approaches to improving animal health and performance," Welsh says. In the meantime, cattle producers can use temperament scoring to select calmer bulls for breeding less temperamental cattle and use pen scoring for replacement females to eliminate the more temperamental cows, Randel says.

"I'm not suggesting selecting for the calmer cattle," he says. "I'm suggesting that producers eliminate animals that are most temperamental to improve herd health and productivity, ensure animal welfare, and to protect animal and worker safety.

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To reach scientists mentioned in this story, contact Sandra Avant, USDA-ARS Information Staff, 5601 Sunnyside Ave., Beltsville, MD 20705-5129; (301) 504-1627; sandra.avant@ars.usda.gov.

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