

Emerging Research

Research shared on technologies, cow-calf assessments, transportation, and balking behavior.

by *Kasey Brown*, associate editor, & *Troy Smith*, field editor



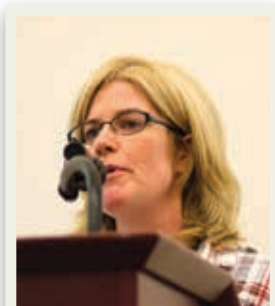
More than one presenter at the 4th International Symposium on Beef Cattle Welfare mentioned that this is an exciting time to be involved in animal welfare research. Good stockmen have known that treating animals well means better results all around, but now the reasons why are being discovered. Students and professors alike were invited to share their research projects with symposium attendees.

Identifying knowledge gaps and cattle welfare research priorities

Concern over potential negative consequences relative to animal welfare has prompted new studies of beta-agonist growth promotants used by many cattle feeders. According to animal scientist Cassandra Tucker, the beta-agonist situation illustrates the fact that science does not know everything about how and why certain production practices and products may affect cattle welfare.

An associate professor and cattle welfare researcher at the University of California–Davis (UC–Davis), Tucker talked about a recent review of scientific literature aimed at identifying gaps in knowledge and priorities for further research.

According to Tucker, the highest priorities for research in the short-term include the effects of technologies used to either promote growth or manage cattle in feedlots. She also prioritized identification of management risk factors for disease in feedlots, including weaning method, pain mitigation, feeding strategies, transportation and housing conditions. For the long-term, Tucker called for additional work to develop science-based recommendations for enhancing feedlot environment with features such as shade and dry lying areas (pen mounds).



► **Cassandra Tucker**, associate professor and cattle welfare researcher at the UC–Davis, discussed a review of scientific literature aimed at identifying gaps in knowledge and priorities for further research.

With regard to beta-agonists, Tucker explained that two types of research are already under way. One type involves controlled experiments that measure animals' behavioral responses to the use of these products. Thus far, evidence shows that some cattle fed beta-agonists spend more time lying down in a stretched out position.

"Is it because of discomfort, or is it because fast-growing animals need more sleep? We need more study to tease out the answers," said Tucker.

The other type of research involves epidemiological studies to determine if outcomes following use of beta-agonists are a result of interrelationships of genetics, feeding behavior and physiology of the affected animals.

Tucker said considerable research has already provided the information needed to develop best practices for managing some issues, yet gaps remain between knowledge and implementation. Calling bovine respiratory disease (BRD) prevention a good example, Tucker noted that risk factors and management strategies for reducing the incidence of BRD are well-understood.

"But preconditioning of calves is applied by a relatively small portion of the beef industry," said Tucker, citing evidence suggesting that, on average, feedlot managers know whether preconditioning occurred and how it was done for only 35% of incoming cattle. According to Tucker, this is both a public-relations and animal-health issue that will require leadership and financial incentives across all industry segments to gain widespread adoption of best practices.

"This is a case where action is needed, rather than more research," stated Tucker.

— by *Troy Smith*

Cow-calf welfare assessments

Assessment programs are one way to

convey information to the public and allow production practices to improve. While there are audits at the packer and feedlot levels,

Gabrielle Simon, graduate student at UC–Davis, notes there is not much available at the cow-calf level.

The Beef Quality Assurance (BQA) program has a voluntary self-review, but it does not give as much detail as other audits, Simon says. Her research goal was to develop, test and refine a comprehensive audit for the cow-calf sector.

Taking a page out of the BQA book, Simon designed the audit to include management-based

measures such as herd health plan, husbandry practices, biosecurity, veterinary client-patient relationship (VCPR), emergency action plan, and stockman training. Animal-based observations included body condition, lameness, injuries, sickness, cleanliness, cattle handling and cattle behavior in the chute.

After using the audit on 10 cow-calf ranches in California, she compiled individual benchmarking reports and received positive feedback from ranchers on areas in which they could improve.

After the pilot test, she observed some needed refinements. Facility-based measurements like fencing and availability of water were added.

From the pilot test, Simon explains that most ranches lacked written husbandry protocols, so verbal responses to targeted management questions were more valuable. These types of questions included at what age calves are weaned, whether pain control was used at dehorning or how often waterers are checked.

With refinements, the audit now includes an investigative approach to management-based measures, targeted sampling in the animal-based observations and facility-based measure observations.

A future research project will evaluate risk factors from 30 ranches to identify which areas influence cattle welfare.

— by *Kasey Brown*



Evaluation of long-haul stress for cattle shipped from Hawaii to the mainland

When the average U.S. citizen thinks about Hawaii, he or she probably doesn't think much about cattle ranches. Most people don't know that beef cattle production is a significant part of the island state's agriculture. Often, cow-calf producers from other states aren't aware of the challenges Hawaii's ranchers face. Hawaii has forage for grazing, but little else that doesn't have to be brought in by ship or airplane. The cost of inputs is very high.

Ashley Stokes takes pleasure in informing surprised people about beef cattle production in Hawaii. A University of Hawaii extension and research veterinarian, Stokes shared part of the story during the symposium. She explained how, for producers operating on the most isolated land mass in the world, taking cattle to feed is far more cost-effective than trying to feed cattle with shipped-in grain. Consequently, some three-quarters of the calves born on Hawaiian cow-calf operations are shipped to mainland North America to be finished and marketed.

Stokes explained how groups of calves bound for feedlots in California and Washington are housed in double-deck "cowtainers" during truck and barge transport from ranches to a port on the island of O'ahu. The specialized shipping containers are loaded aboard ship for the voyage to the mainland. Cattle remain in the containers for nine days.

Stokes and other researchers have studied groups of cattle to determine how health and welfare are affected during shipping. They monitored ambient temperature and humidity, as well as body temperatures of calves. Researchers also checked the animals' blood chemistry for signs of stress. The containers were equipped with video cameras in order to monitor behavior.

According to Stokes, some animal rights advocacy groups claim cattle should be allowed outside the shipping containers at stops where the containers are transferred from one mode of transport to another.

"I can't recommend that," stated Stokes, explaining container design allows for

ventilation, sanitation, space for animals to lie down and provision of feed and water at all times. "Cattle have a buffet in there," she smiled, "and they are very comfortable."

Stokes said body temperature and stress hormone indicators do spike a bit when containers are transferred, but quickly return to normal levels. White blood cell counts stay within the normal range, and the animals' immune function remains good.

Ten years of data on container-shipped cattle show morbidity rates during shipment were 0.3%. Morbidity rates for the cattle 60 days after arrival in mainland feedlots was 0.35%. Mortality rates were 0.97% and 0.16%, respectively.

"Shipping shrink was only 6.4%, and that's good for any kind of shipment," Stokes added.

— by Troy Smith



► For producers operating on the most isolated land mass in the world, taking cattle to feed is far more cost-effective than trying to ship grain, said Ashley Stokes, University of Hawaii extension and research veterinarian.

Effects of feedlot technology on behavior and mobility of finishing steers

According to the most recent National Animal Health Monitoring System (NAHMS) study, the U.S. cattle-feeding industry has embraced technology. NAHMS data indicate 90% of cattle feeders use monensin feed additive, 71% use tylosin feed additive and 94% use growth implants at least once during the period that cattle are on feed. Greater than 47% also used a beta-agonist feed supplement, according to the 2011 NAHMS data.

Oklahoma State University (OSU) researcher Bryan Bernhard noted how these technologies have afforded consistent advantages for average daily gain, dry-matter intake and feed conversion, as well as positive impacts on hot carcass weight and dressing percentage. He also talked about how, from the perspective of animal welfare and based on anecdotal evidence of negative effects to cattle mobility, beta-agonists have more recently come under scrutiny.

Bernhard told symposium attendees about OSU research aimed at determining the effects technology use can have on behavior and mobility of feedlot cattle. The study compared results from cattle that were finished without implants

and antimicrobial products to those of conventionally managed cattle that received growth-promoting implants and, if needed, treatment with antimicrobials. Results from those groups were compared with those from conventionally managed cattle that also received the beta-agonist zilpaterol during the last 20 days of the finishing period.

Researchers assessed animal temperament

at the chute and in their pens every 28 days until Day 84, and every 10 days during the period zilpaterol was fed. Pen activity and mobility were assessed. According to Bernhard, treatment did not affect overall chute temperament, exit velocity, pen temperament, standing time or time spent lying down. Neither did treatment affect mobility at the feedlot or packing plant.

"In our opinion," stated Bernhard, "current technologies have no negative effects on cattle behavior or mobility."

— by Troy Smith



► Bryan Bernhard, OSU graduate student, told symposium attendees about OSU research aimed at determining the effects technology use can have on behavior and mobility of feedlot cattle.

Balking behavior at processing plants and carcass implications

Why do some animals balk while others do not? Experienced animal handlers can attest to the fact that differences exist. Some critters will move willingly through a processing alley. Others balk. What are the factors that influence balking behavior?

Animal failure to maintain forward motion through packinghouse facilities can become an economic issue, costing time. It can become an animal welfare issue when keeping animals moving through the system requires aggressive coercion that increases animal stress. According to animal scientist Michelle Thomas, those were reasons

why she and her University of Arkansas colleagues started looking for factors that influence balking behavior.



► Animal failure to maintain forward motion through packinghouse facilities can become an economic issue, costing time, said Arkansas State animal scientist Michelle Thomas.



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“Objectives in this study were to determine if breed-type predominance, based on coat color or gender, had an effect on balking behavior, and if that behavior affects carcass economics,” said Thomas.

According to Thomas, the researchers assessed cattle seven times during a 12-month period, as the animals entered the packing plant processing line. They scored animals (1 to 5) according to the intensity of balking behavior displayed, or the lack of it.

They also collected carcass data for the same animals, which included a variety of breeds and breed combinations.

“It was Holsteins that balked most,” reported Thomas. “Fed Holsteins balked more, compared to beef breeds, which suggests a breed-type effect. Heifers also balked more frequently than steers.”

According to Thomas, results also showed that the animals with high balking scores posted lower hot carcass weights and

significantly lower dressing percentages. She believes evidence of possible correlations between balking and carcass characteristics warrants additional research.

“Cattle also sorted themselves out according to feedlot source,” added Thomas. “It suggests that the feedlot may be a source of variation in balking behavior.”

— by Troy Smith

