

For the Welfare of All

Industry takes cattle welfare to heart.

by **Kasey Brown**, senior associate editor, and **Troy Smith**, field editor

Producers and academia gathered in Manhattan, Kan., June 8-10 to discuss and improve animal welfare in the cattle industry. The fifth annual International Symposium on Beef Cattle Welfare, hosted by the Beef Cattle Institute on campus at Kansas State University—Manhattan, provided opportunity for the cattle industry to consider challenges to cattle welfare and possible solutions. Topics ranged from managing maternal separation to antibiotic usage to requirements for religious slaughter.

What follows is a sampling of presentation summaries from the symposium. Please reference the index below for the topics presented here. A comprehensive listing of summaries from the conference is provided at <http://bit.ly/2016-ISBCW>.

Tips for loading, unloading cattle

According to Texas A&M University Extension Livestock Specialist Ron Gill, designing and building loading facilities for cattle doesn't have to be complicated, but you need to understand animal behavior. Gill said the design can be simple. He offered the "Bud Box" as an example, noting the loading or processing facility design favored by the late animal-handling guru Bud Williams takes advantage of the natural inclination of cattle to return to the gate through which they entered the facility.

Gill offered the audience food for thought applicable to laying out loading facilities favorable for staging of cattle, sorting and maintaining flow to a loading area. He recommended that facilities be designed so cattle can be sorted quietly into loading groups, and handled so they flow easily to a chute.

Regarding the question of whether solid or open-sided alleys are preferable, Gill said both can work. Open sides are fine, depending on where personnel are situated during handling. If the objective is to block animals' view of potential distractions, the solid portion of the sides should be high enough that cattle cannot see over them.

Discussing loading chutes, Gill said the ramp should not be overly steep. He recommends the long, moderate grade offered by a ramp length of 16 feet (ft.) to



PHOTOS BY TROY SMITH

► "If we sort and load cattle quietly, they typically are more quiet and calm on the truck," stated Ron Gill, Texas A&M University Extension livestock specialist.

20 ft. He advised use of non-slip flooring, preferably with cleats. Bumpers should be situated where the trailer backs up to the chute to prevent gaps that an animal's leg could slip through, causing injury.

Noting that many cattle are transported by stock trailer, Gill reminded the audience that many modern trailers are designed such that the clearance between ground level and trailer floor is greater than in the past. He recommended that loading facilities be designed to minimize the step-up distance.

Gill said how cattle are handled has much to do with how cattle load and behave during transport.

"If we sort and load cattle quietly, they typically are more quiet and calm on the truck," stated Gill. "We don't want to unload cattle too fast either. Cattle exiting rapidly can 'draw' those behind them to follow too quickly and increase chances of injury."

— by Troy Smith

Bruising during transport

Kansas State University veterinarian and researcher Tiffany Lee believes significant strides have been made in improving beef cattle welfare. However, an aspect that she considers deserving of more attention is bruising of beef cattle carcasses as a result of physical trauma experienced prior to slaughter. In Lee's opinion, the incidence of bruising among fed cattle is

significant enough to have serious economic implications for the beef industry, as well as being a welfare concern.

Lee explained research exploring the relationship between traumas sustained when cattle were unloaded at a packing plant, and bruising among carcasses from the same cattle. The study involved approximately 9,800 head delivered to three different slaughter facilities.

According to Lee, trained observers recorded all potentially traumatic events occurring as animals exited the trailer, and, subsequently, the prevalence and location of carcass bruises. Nearly 70% of carcasses exhibited bruises, with more than half located along the dorsal midline.

"Generally, there was a relationship to the prevalence of traumatic events at unloading, and the relationship was stronger with the incidence of bruising along the dorsal midline," said Lee. "There was a significant correlation between trauma incurred at unloading and carcass bruising, especially bruising along the back."

Lee noted the opportunity for animals

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► In Tiffany Lee's opinion, the incidence of bruising among fed cattle is significant enough to have serious economic implications for the beef industry, as well as being a welfare concern.

to experience trauma along the length of their backs, when entering and exiting the belly compartment of typical "fat-feeder combination trailers." While the maximum height of the compartment is 66 inches (in.), clearance is nearer 55 in. at the ramp area where cattle enter and exit. In trailers designed specifically for finished cattle, the overall belly height is 69 in. and the entrance-

exit area has 57 in. of clearance.

According to Lee, ramp brackets in the entrance-exit areas of trailers typically are rubbed clean by contact with animals' backs, raising suspicion that trauma from contact with ramp brackets contributes to linear bruising resulting along the dorsal midline of carcasses.

While cattle trailer design has changed little over the decades, cattle have changed in frame size and musculature. However, Lee reported that a trailer manufacturer has produced some fed-cattle trailers with a different deck and ramp configuration allowing more than 62 in. of clearance.

"I would like to resume studies to include a comparison of new and old trailer designs and their potential contribution to trauma and prevalence of carcass bruising," stated Lee.

—by Troy Smith

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Compromised cows

The beef industry is in the market to sell cattle, but what happens to old or injured cows? Treatment of cull cows can help or hurt the industry simply by how it impacts

consumer confidence.

There is very little research done on compromised cows, so Karen Schwartzkopf-Genswein, researcher at the Lethbridge Research and Development Centre for Agriculture and Agri-Food Canada, shared her ongoing research on the incidence, characterization and disposal of compromised cattle arriving at auctions and processing plants.

She noted the difference between compromised and unfit cattle for transport, admitting that most still have to look up the requirements when a questionable case comes up. According to the Canadian Food Inspection Agency's Compromised Animal Policy, compromised cattle have a reduced capacity to withstand transport, but with a special provision: they can be transported without undue suffering. This includes local transport to receive care, be euthanized or humanely slaughtered. Unfit cattle have a reduced capacity to withstand transport with a high risk, so that transport would lead to undue suffering. This includes local transport for veterinary treatment and diagnosis.

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Examples of cattle that cannot be transported, and are therefore labeled as unfit, include those unable to stand or move without assistance; emaciated, dehydrated or exhausted; having a rupture of pre-pubic tendon or a fractured limb or pelvis; in shock or dying; suspected or confirmed of having a nervous system disorder; having a fever; likely to give birth; less than 48 hours of age; or exhibiting severe lameness.



► Karen Schwartzkopf-Genswein, researcher at the Lethbridge Research and Development Centre for Agriculture and Agri-Food Canada, noted the difference between compromised and unfit cattle for transport, admitting that most still have to look up the requirements when a questionable case comes up.

All too often, Schwartzkopf-Genswein said, she's heard, "I shipped her because ..." with a variety of excuses like she looked fine when she went on the trailer, she wasn't that bad, she was still worth money and more.

She explained that her research team is looking to assess the number of cattle arriving at auctions and processing plants in a compromised condition, and to characterize which conditions are most prevalent. They also want to document the relationship between compromised cattle and age, and catalogue the disposal of compromised cattle. Additionally, she said, they want to find out the magnitude of compromised cattle.

She shared 2015 slaughter data vs. a pilot data in 2016. The incidence of lameness increased from 5% in 2015 to 23% in 2016; injuries went from 5% in 2015 to 10% in 2016; and body condition score of 3 or less and/or weakness went from 10% in 2015 to 8% in 2016.

They sampled large and small auction markets; and large, medium and small processing plants, with a host of data collection methods. They looked at arrival conditions, risk factors and disposal methods. Research is ongoing, but she said they hope to characterize the incidence and type of

compromise at different collection points to see the magnitude of the problem. Is there an association with potential risk factors like age, breed or distance travelled? They also want to ID the fate of compromised animals and improve assessment and tracking of compromised cattle.

— by Kasey Brown

Feedlot lameness

Lameness, a leg or foot problem that modifies an animal's gait, is a big deal in the cattle industry. However, we know very little about it, noted Schwartzkopf-Genswein. She shared results of her study looking at the occurrence, characterization and risk factors associated with lameness within Alberta feedlots.

Part of the study included a health-records study of 29 feedlots and 111,015 cattle over a five-year period. The other part included a live-animal study that evaluated more than 10,000 head in two feedlots weekly during a two-year period.

Cattle were assigned a lameness severity score on a scale of 1 to 5 after evaluating their gait. Physiological measurements were also taken, including substance P, immune function indicators, cortisol levels, body temperature and inflammation noted. Pen conditions were scored and tag scores (levels of dirt on the hide) were noted.

Study sheds light on lameness prevalence and mitigation strategies.

The incidence of lameness was 5.89% per year compared to 9.44% for respiratory disease, so lameness is indeed a big deal. Schwartzkopf-Genswein said lameness represented 30.38% of all treated animals per year, and relapse rates were 8.07%. Lameness caused 7.76% of euthanized cattle.

Treatment costs varied between \$8.40 and \$42.20. With each additional pull, the cost increased by \$3.50. Overall, she reported, production loss was estimated at \$81.40 per animal.

The two largest types of lameness were foot rot at 45.7%, followed by digital dermatitis at 23.2%. Others included swollen joints or joint infections, injury, laminitis, P3 necrosis, lame but no swelling, and problems with the proximal limb.

Schwartzkopf-Genswein admitted that the cowboy diagnosis at the time of pull and the diagnosis of the research staff

only matched 33%, which shows that by improving lameness diagnosis, welfare can be improved and antibiotic use can be reduced. To improve diagnosis, you must examine the feet and claws, she asserted.

Rough handling, muddy pen condition, type of cattle, pen density and diet all contribute to lameness. She said lameness decreases 1.5% for every 3.3 feet (1 meter) of bunk space, and lameness decreases 0.8% for every 1% increase in forage.

Lameness is incredibly important to welfare and economics. Schwartzkopf-Genswein said future plans include designing a decision tree to improve mitigation strategies.

— by Kasey Brown

Fatigued cattle syndrome

Mobility of cattle at slaughter facilities got a lot of attention in the summer of 2013, and two heat events provided some anecdotal evidence against the use of beta-agonists like Zilmax® and Optaflexx®. In the two events, cattle showed a reluctance to move, and some even sloughed hoof walls. Seventeen cattle were euthanized. It brought animal welfare issues to the forefront of summer handling, and the syndrome was termed fatigued cattle syndrome (FCS).

Jacob Hagenmeier, veterinarian and doctoral student at the Kansas State University College of Veterinary Medicine, explained that these cattle exhibited elevated levels of lactate and creatine kinase (CK), which signify muscle damage.



► Jacob Hagenmeier said fatigued cattle syndrome is caused by multiple factors.

He shared that the pork industry had a similar event 20 years before in which a higher incidence of transport losses occurred. It was called fatigued pig syndrome and was most prevalent among heavily muscled hogs that were reluctant to move and had

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increased levels of lactate and CK. Several studies found that extreme muscling and heavy body weights, aggressive handling, long distances traveled, and high doses of beta-agonists fed all contributed to the issue.

FCS is also caused by multiple factors, including beta-agonist use, aggressive handling, increased live weights at slaughter [having increased by 150 pounds (lb.) in the last 15 years], heat stress, and distance traveled — both within larger feedyards to the trailer and while on the truck, he explained.

Hagenmeier shared several studies on the effects of cattle handling and beta-agonist use. He reported that aggressive handling, which in this case was running cattle from their feedyard pen to the load-out pens, caused acute metabolic acidosis in both cattle fed beta-agonists and those not fed beta-agonists. The stressful handling did not affect carcass characteristics, but was detrimental to normal physiological function. It is important to remember that cattle are not athletes; cattle have 30% the capacity of equine lungs but 250% of the requirements.

He suggested staging heavy cattle near load-out facilities and continually acclimating cattle to handling, even after arrival at the feedyard. When a pen rider rode in front of the cattle to encourage movement, the cattle moved quietly. Avoid shipping cattle during extreme heat loads, and be cognizant of the temperature-humidity index when handling cattle. Additionally, when weighing out cattle, weigh them in smaller groups to reduce stress.

— by Kasey Brown

Novel interventions for BRD

There is ample evidence suggesting that supplementing cattle diets with yeast can benefit the rumen microbial community, but Jeff Carroll thinks the benefits may go far beyond enhancement of digestion. Based at the USDA Agricultural Research Service (ARS) Livestock Issues Research Unit in Lubbock, Texas, Carroll studies how the physiological and behavioral responses to stress impact the immune function of food animals. He believes yeast, when added to cattle diets, holds much promise for mitigating the effects of certain stressors and improving cattle health.

More specifically, Carroll's findings suggest that feeding live yeast strains and yeast cell wall products may be a viable way to battle bovine respiratory disease (BRD).

Carroll noted that BRD remains as the leading cause of morbidity and mortality in

U.S. feedlots, representing an average cost of \$23.60 per head for treatment. Tools for treating BRD are limited, he added, calling antibiotic therapy the primary strategy.

“The future use of antibiotics is unsure, and alternatives must be explored,” stated Carroll, alluding to growing scrutiny of antibiotics used by animal agriculture.

Carroll said experiments at Lubbock were designed to determine the effects of yeast supplementation on immune response and metabolism of cattle facing a challenge from viral-bacterial agents associated with BRD. Results indicated that, compared to a control group, yeast-supplemented cattle experienced reduced need to call upon metabolic energy resources typically associated with immune response. Yeast-supplemented cattle tended to have decreased inflammatory response to disease challenge and levels of blood neutrophils (white cells summoned to combat inflammation) were lower. Yeast supplementation also reduced the severity of nasal lesions associated with respiratory infection.

“Collectively, this data suggests that providing a combination of live yeast and yeast cell wall products may be beneficial in reducing severity of bovine respiratory disease in feedlot cattle,” stated Carroll.

Additionally, the study showed that water consumption among yeast-supplemented cattle increased after the disease challenge. Frequency of visits to water and total intake both were increased — behaviors aiding mitigation of higher temperatures.

“We may be onto some supplementation strategies that could increase heat resistance,” opined Carroll. “There may be a ton of things yeast products can do, but we need more research.”

— by Troy Smith

Mitigation option for heat stress

Heat mitigation is an increasingly important issue, and there are several strategies at cattlemen's disposal, especially in the feedlot. Shade, ration changes, changing feeding times, spraying or misting, and improving water availability are all tools within the toolbox, but morbidity and mortality continue to be a significant issue in U.S. feedlots. Heat stress has cost the industry at least \$369 million, said Carroll, research leader in livestock issues research for USDA ARS in Lubbock, Texas.

The Texas researcher shared that previous studies indicated supplementing yeast products during a period of naturally



► More research will be useful, but Jeff Carroll said the majority of the data would indicate that supplementation with live yeast and yeast cell wall product to feedlot heifers may mitigate some of the negative effects associated with heat stress.

occurring heat stress improved feed intake and gain without jeopardizing the health of the cattle. It also enhanced overall health status and showed a greater resistance to an endotoxin challenge after the heat event.

Carroll shared a recent study from his research team evaluating whether supplementing the diet of near-finished beef cattle with a yeast product would mitigate the negative impact of a controlled heat stress on physiological and endocrine responses.

Beef heifers were supplemented with a live yeast and a yeast cell wall product for 50 days, which Carroll said was a normal receiving situation. Thirty-two head were transported to the USDA Bovine Immunology Research and Development Complex, in which humidity and temperature could be controlled. The diet was steam-flaked corn, and the supplemented group received a top dressing of the yeast supplement.

A heat event was created to simulate what feedlot cattle have to deal with, especially when it doesn't get cool enough at night to fully recover.

Carroll admitted that the data set was small, but he shared that the yeast-supplemented cattle had a consistently lower vaginal temperature during the heat-stress event, though they consumed much more water. They exhibited lower respiratory rates during the heat-stress event. They also lost 6.34 lb. less than the control-group animals.

Additionally, supplemented cattle had lower cortisol levels over time, and he noted that they acclimated well in stress hormone response. There were no significant changes in glucose levels or nonesterified fatty acid (NEFA) concentrations.

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— *by Kasey Brown*

Rumen acidosis

Rumen acidosis is a malady that many cattle-savvy people associate with grain

overload. Acidosis is the likely outcome when a large quantity of grain is introduced to an unadapted ruminant digestive system. However, it can occur in animals grazing forages only, provided the forages contain highly soluble carbohydrates.

According to veterinarian and researcher Kelly Lechtenberg, acidosis can result from excessive ingestion of any feeds rich in fermentable components. While even grazing cattle can be affected, the owner of Midwest Veterinary Services and Central

States Research Centre, at Oakland, Neb., said acidosis is more often a feedlot issue. Lechtenberg talked about this digestive disorder and its implications.

Lechtenberg said acidosis occurs when rumen pH declines from the normal range of 6.5-7 to below 5.8. Acute acidosis typically results from an abrupt increase in an animal's intake of feedstuffs that can be rapidly fermented by rumen microbes. This increases lactic-acid production and accumulation in the rumen. The low pH environment favors an increase in acid-producing microbes and the further production of lactic acid exceeds the rate at which it can be removed from the digestive tract.

This leads to increased endotoxin production; decreased blood and urine pH; and multiple secondary effects, including lethargy, anorexia and laminitis.

“And there's the diarrhea. Bubbly diarrhea is a symptom of classic acidosis,” added Lechtenberg, explaining that the excrement bubbles because it contains still fermenting rumen substrate.

In addition to lameness of gait, indications that animals are in pain may include the inability to find a comfortable standing position and grinding of teeth. Lechtenberg says animals often become lame within 24 hours of acidosis onset, but usually respond to analgesic therapy.

“We used to think managing acidosis was all about adapting the digestive system by stepping up cattle rations at the start of the finishing period,” said Lechtenberg, explaining how cattle are shifted from rations containing mostly roughage to those containing more concentrates. “But adaptation may have to happen more than once — even near the end of the finishing period. It happens after any disruption to normal feeding patterns and consumption levels.”

Lechtenberg said management to lessen the risk of acidosis includes providing ample bunk space, pen maintenance and providing easy access to ample supplies of drinking water. A consistent feeding schedule, heat stress mitigation and low-stress cattle handling also help control external stimuli that affect cattle feed intake. The goal, said Lechtenberg, should be to manage the environment in ways that foster frequent small meals and prevent opportunities for hungry cattle to “load up” on feed.

— *by Troy Smith*

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Liver abscess control and prevention

There is a 2-inch trip from the rumen to the liver, and if the rumen isn't well, then issues will transmit to the liver, said Lechtenberg.

Calves most often get liver abscesses because of acid generation from ruminitis, he said, and changes can occur quickly. There are five entry spots for bacteria into the liver, including the hepatic artery, bile duct, umbilical vein, direct extension and the portal vein, which is most common in fed cattle. Ruminal wall abscesses or abrasions will send bacteria to the liver.



► Calves most often get liver abscesses because of acid generation from ruminitis, and changes can occur quickly, said Kelly Lechtenberg, Midwest Veterinary Services and Central States Research Centre.

The liver has a good immune system; however, leukotoxins similar to *Mannheimia haemolytica* fight the liver's immunity well and can overcome it. He noted that many bacteria can cause abscesses, but *Fusobacterium necrophorum* is the biggest culprit.

He said veterinarians can see 75% of the liver's volume with ultrasound, so large abscesses are visible. Abscesses that are less than 1 centimeter (cm) tend to resolve themselves, but when they consolidate and form a bigger abscess, they cause issues.

He shared data from Elanco on liver-abscess prevalence in beef breeds and Holsteins since 2005. Beef breeds remained relatively consistent around 15%-16%; Holsteins were consistently in the 20% range, jumping to the mid-30% range in the last few years. He suggested this could be because dairy steers are fed longer or potentially have a genetic predisposition toward them.

As abscessation prevalence goes up, so do the instances of A+ abscesses, the term for the large abscesses. This is an issue because A+ abscesses have a negative effect

on carcass weight and welfare, he noted. Reasons for prevalence include those of rumen acidosis, namely days on high-concentrate feed. He did note that there are regional differences in prevalence, which may be attributed to feedstuff seasonality and intake patterns.

He concluded that calves with liver abscesses are often thought to have BRD, though liver abscesses are susceptible to BRD treatments.

— by Kasey Brown

Come to terms with antibiotic rules

Cattle producers might as well accept it. Increasingly, livestock are being managed in a glass house. Because consumers are interested and sometimes worried about food animal production practices, they want transparency. To a K-State veterinarian's way of thinking, that means the use of antibiotics in food production must change. It is changing, according to Mike Apley, a practitioner-turned-professor at K-State's College of Veterinary Medicine.

Apley told ISBCW attendees that public concern about bacterial resistance to antibiotics is growing. People worry that animal agriculture's use of antibiotics is part of the problem. Apley told producers to accept two facts:

- First, the antibiotic resistance issue is not just a product of public paranoia. It is real.
- Second, use of antibiotics in food animals does play a part in human medicine-related resistance issues. It is a pretty small role, but it matters.

Antibiotics matter to cattle production, too. Apley said antibiotic treatment for BRD keeps one in seven animals from dying. Used prophylactically (mass medication), antibiotics prevent one in five from getting sick. Antibiotics do make a difference, and there is ample science to show it.

"We can bury consumers in data about how much good antibiotics do for animals, and the consumer is still going to ask, 'But will it harm me?'" said Apley.

There is need, in Apley's opinion, for more data to explain some things that are not well-understood. He thinks veterinary medicine needs a better understanding of how magnitude and duration of exposure to antibiotics relates to the development of resistance by bacteria. There is need for better understanding of the balance between duration of therapy and treatment success, failure or relapse rates.



► Antibiotic resistance is real, and use of antibiotics in food animals does play a part in human medicine-related resistance issues, said K-State's Mike Apley. However, they also play a role in animal health and welfare.

Referencing new federal veterinary feed directive (VFD) regulations, Apley said antibiotic use is becoming more restricted. He believes regulations will become even more restrictive, and antibiotic use will be within that glass house. If, in the future, any antibiotics are to be allowed for use in livestock production, Apley believes the following must occur:

- veterinarian control over all use of antimicrobials in animals;
- research focused on "duration of therapy;"
- continued emphasis on prevention of infectious disease;
- adherence to protocols and recordkeeping; and
- true stewardship practices by veterinarians and producers.

"To me," stated Apley, "the answer is responsible use and demonstrating the stewardship cycle."

Apley said that means first asking whether there is a nonantibiotic alternative that will appropriately prevent, control or treat a disease challenge. If not, then an antibiotic that has been demonstrated safe and effective for the purpose can be chosen. It should be used appropriately to assure safety and efficacy. To complete the stewardship cycle, though, we must keep asking whether there is some nonantibiotic alternative action that could be applied next time.

— by Troy Smith

Heavy considerations

How has cattle feeding changed in recent years? As a technical services manager

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for Merck Animal Health and a *bona fide* industry watcher, Wade Nichols has seen feeding periods extended to 150 days — even to 180 days. Accordingly, finished cattle weights now reach levels seldom seen before. Hot carcass weights have increased, now averaging in excess of 830 lb. Dressing percentages are up, too, as is the percentage of cattle grading Choice or better for quality.

“What’s the incentive for increased days on feed? It’s because it improves margin,” Nichols told the ISBCW audience. “We feed cattle longer to reach heavy weights because we can.”

Nichols explained that cattle feeders are rewarded for taking cattle to very heavy weights when they sell on a carcass basis, with premiums awarded for carcass merit. Indeed, 85%-90% of fed cattle are sold that way, rather than live. Nichols said little more than 20% of finished animals are sold live for a negotiated cash price.

According to Nichols, the trend has been accompanied by consequences related to animal welfare. Cattle fed to today’s heavier weights must be managed differently than shorter-fed, lighter-weight cattle. Nichols said management of nutrition is particularly



► “We feed cattle longer to reach heavy weights because we can,” said Wade Nichols, technical services manager for Merck Animal Health. The trend has been accompanied by consequences related to animal welfare.

important, calling consistency of diet critical for long-fed cattle. He also talked about associated maladies that must be managed.

“We need to consider the increased susceptibility [of long-fed, heavyweight cattle] to heat stress, which we can mitigate by manipulating rations and providing shade, water sprinklers and ample [drinking] water. Bedding can help, too. Using straw actually

Consider welfare, other ramifications of feeding cattle to larger end points.

keeps a pen’s surface cooler by reflecting heat,” explained Nichols. “We also need to handle cattle appropriately to avoid heat stress.”

Nichols advised, as a routine practice, the “staging” of cattle for shipment. To avoid excessive handling and overexertion of cattle, they should be moved to a pen near the load-out area some time near the end of the finishing period but well ahead of shipping day. Nichols’ other handling tips included keeping cattle off concrete whenever possible and avoiding situations that leave cattle standing too long on a loaded trailer. He noted the importance of adequate, well-maintained load-out facilities and competent, well-trained personnel.

— by Troy Smith

Welfare concerns at packing plants

Animal welfare is an important issue,



and Mike Siemens, Cargill's head of welfare and animal husbandry, said packing plants have as much of a stake in the game as cattlemen. Greater attention to welfare is an industry initiative, he emphasized. It is not a marketing tool, because that creates a "close enough" mentality and makes for a meaningless and thoughtless supply chain. It is the right thing to do, and the cattle industry can't just hide behind the science of performance, he asserted.

Cargill executive shares welfare focus areas.

He shared that consumer trust has eroded because negative stories have greater footholds, aided by many active activist groups.

So, Cargill has many areas of focus in regard to animal welfare. Of those, antibiotic resistance is a high priority. He said the company wants to reduce antibiotic usage by 20% in the cattle it owns, and plans to tie requirements to Beef Quality Assurance (BQA), the dairy industry's Farmers Assuring Responsible Management (FARM),



► The cattle industry can't just hide behind the science of performance, Mike Siemens, Cargill's head of welfare and animal husbandry, told those gathered at the fifth International Symposium on Beef Cattle Welfare.

and Canada's Verified Beef Production programs in terms of nutrition and humane handling.

By partnering with these programs, they hope to get more education out to farmers on how to handle cull cows by marketing them sooner or euthanizing bad cases at the farm instead of transporting them to the packing plant.

There are many sources of stress in the last 30 days on feed, including biological stress, heat stress, metabolic stress and more. He added that Cargill is working on a Beef Transport Quality Assurance (BTQA) with BQA to ensure that livestock are handled as well as possible during transportation, noting that bruising costs the industry \$117 million in carcass trim.

"There is a difference between learning to drive a truck versus learning about livestock," Siemens noted. This program would provide training for drivers and education for animal handlers.

In the future, he predicted enhanced programs and audit requirements for all phases of animal production and harvest, with increased legislation and regulation at the plant level with a possible extension back to the farm level. Additionally, consumers will increase pressure to raise the bar on welfare issues until changes are made, noting gestation stall and cage-free eggs as major examples. Those in agriculture should defend what is scientifically proven, but understand societal concerns, he concluded.

— by Kasey Brown

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For the Welfare of All CONTINUED FROM PAGE 217**Pain management update**

Consumers care about pain management for livestock, and they are putting more pressure on cattlemen to provide pain management to their cattle when conducting painful procedures. That's not to say cattlemen themselves don't care; they simply have limited options. The trouble is that there are no approved legal analgesics, or drugs that relieve pain, available to U.S. cattlemen, says Mike Kleinhenz, veterinarian and research graduate assistant at the College of Veterinary Medicine at Iowa State University.

Describing drugs as a management tool

in the toolbox, he lamented that in terms of pain management, cattlemen have very few tools available to them. None are legally approved except for extralabel use through the *Animal Medicinal Drug Use Clarification Act* of 1994 (AMDUCA). To meet requirements for extralabel use, they must

- ▶ have a valid veterinarian-client-patient relationship,
- ▶ use an approved human or veterinary drug (no compounds),
- ▶ be able to establish appropriate withhold times, and
- ▶ maintain animal ID and treatment records for up to two years after the animal leaves the farm.



▶ Mike Kleinhenz, veterinarian and research graduate assistant at the College of Veterinary Medicine at Iowa State University said few pain management tools are available to cattlemen.

OIE/ISO animal welfare update

We live in a world flooded with alphabet soup. Acronyms like ATM, FAQ, LOL and a host of others have become part of the language of common conversation. Cattle folk might talk about USDA, FSA, GMOs and NCBA, but what do they know about the OIE and ISO?

Gary Egrie, farm animal welfare coordinator for USDA's Animal and Plant Health Inspection Service (APHIS) talked about the entities those acronyms represent during the fifth International Symposium on Beef Cattle Welfare hosted June 8-10 in Manhattan, Kan.

Egrie explained that OIE stands for the World Organisation for Animal Health. That's confusing until you know that the group's original name, when it organized in 1924, was the Office International des Epizooties. The new name was adopted in 2003, but the old acronym remains in use.

According to Egrie, the OIE is composed of some 175 member countries and territories whose governments collaborate in an effort to harmonize standards for managing animal health. Since 2005 the OIE has sought to provide recommendations and standards covering animal welfare practices.

"The OIE is concerned with how countries will respond to a given issue and makes recommendations for appropriate response. The OIE doesn't set the rules, but it sets standards that nations use in drafting their own regulations," said Egrie, noting that the OIE missions statement calls for "science-based" standards for livestock transportation, slaughter and farm production practices.

Egrie said the World Trade Organization (WTO) has designated the OIE as its scientific reference body, meaning the WTO uses relevant OIE standards when settling trade disputes between nations.

The challenge for Egrie and his APHIS colleagues when working with the OIE is to prevent the language used in the standards from being overly prescriptive and impractical for application in a variety of production systems.

The International Organization for Standardization (ISO), said Egrie, is a non-governmental organization of 161 national standards bodies that strives to implement consensus-based standards for thousands of goods traded internationally, including food.

"The ISO is trying to create platforms for business transactions using OIE standards — essentially turning broad or vague language into technical specifications," explained Egrie, who says reaching consensus on specifications covering animal welfare is a challenging task.

— by Troy Smith, field editor



▶ According to Gary Egrie, farm animal welfare coordinator for USDA's Animal and Plant Health Inspection Service, the OIE is composed of some 175 member countries and territories whose governments collaborate in an effort to harmonize standards for managing animal health.

Kleinhenz shared research on potential drug options for the future. Gabapentin is a GABA analogue developed to treat epilepsy that is used to treat chronic and neuropathic pain in humans. It works well with nonsteroidal anti-inflammatory drugs (NSAIDs). The drug concentrations of gabapentin and NSAIDs mirror each other, he said.

One study showed that calves given oral meloxicam — an NSAID that is approved for use in Canada and is used extralabelly through AMDUCA in the United States — administered with gabapentin experienced increased average daily gain (ADG) and feed efficiency (FE) compared to the control calves after dehorning. The biggest takeaway was that from repeated meloxicam administration, a 21-day withdrawal time prior to slaughter is adequate.

Another study looked at whether oral meloxicam could reduce stress after long-distance transportation. The study showed a reduction in cortisol in the meloxicam-dosed calves, as well as less shrink, higher average daily gain, and a higher gain-to-feed ratio after being trucked about 820 miles, Kleinhenz explained.

New options include firocoxib, which is used in small animals and equine. It was applied to a dehorning-pain model and showed a statistically significant reduction in prostaglandin E and cortisol. Another option is carprofen, which is labeled for use in the European Union. He shared that it minimally reduced pain biomarkers and a decrease in pain sensitivity.

Per dose to treat a 100-lb. calf, meloxicam is the cheapest at 6¢, then gabapentin at 16¢, firocoxib at 78¢, and carprofen at 93¢.

— by Kasey Brown



Managing maternal separation

“There is no event that we impose upon cattle that is more stressful than weaning. Looking at behavior is in our toolbox to evaluate welfare,” said Joe Stookey, professor of animal behavior in the Western College of Veterinary Medicine at the University of Saskatchewan.

Weaning creates an immunocompromised calf, so more calves are treated for health reasons immediately postweaning than at any other time in their lives. A behavioral sign of stress at weaning is calling, both by calves and cows. This is out of character, per se, because calling is a risky behavior for a prey animal, Stookey noted. Weaning stress also causes a noticeable setback in gain.



► “There is no event that we impose upon cattle that is more stressful than weaning. Looking at behavior is in our toolbox to evaluate welfare,” said Joe Stookey, professor of animal behavior in the Western College of Veterinary Medicine at the University of Saskatchewan.

“I wish we could change shipping fever’s name to weaning fever, which is really what it is,” said Stookey. He shared research on the effect of weaning stress on disease susceptibility. Forty percent of the preweaned calves prior to feedlot shipment experienced sickness three to four days after, while 80% of the calves abruptly weaned at transport got sick. Preconditioning delayed the onset and frequency of sickness.

The issue with preconditioning is that producers rarely have an economic incentive to do it, he admitted. It helps feedlot health and gain rates, though if cattlemen sell their calves at weaning, they get little profit from increased welfare later in the system.

Stookey shared survey data in which 50% of cattle producers send their calves to market on the same day as weaning. Additionally, about 60% of the respondents never vaccinated their calves for respiratory

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What is normal?

“I get so excited when my students finally realize that animals are not furry little people. Animals perceive things differently,” said Ed Pajor, professor of animal behavior and welfare at the University of Calgary Faculty of Veterinary Medicine. He added that too often we think of measuring animal welfare, but it is like health. You can measure attributes like heart rate and cholesterol, but not health as a whole. Welfare is similar.

Pajor spoke at the International Symposium on Beef Cattle Welfare in Manhattan, Kan., June 8-10.

He shared part of the World Organisation for Animal Health’s (OIE) definition that says, “Animal welfare refers to the state of the animal; the treatment that an animal receives is covered by other terms such as animal care, animal husbandry and humane treatment.”

Animal welfare isn’t improved by putting new flooring in, Pajor explained. The animal not slipping improves animal welfare.

Animal welfare is a mixture of an animal’s natural behavior, function and feelings. A large emphasis has recently been put on ensuring positive experiences for animals, not just minimizing suffering.

Behavior is where welfare differs from health. It shows the initial change to indicate a problem, and can be used to assess physical health. It is measured noninvasively and gives information about an animal’s needs, preferences and internal state.

Understanding normal behavior includes understanding basic biology, Pajor explained. Cows rely on their hearing and vision to perceive their environment. They have 300 degrees of vision with good distance vision. They can see some color, but they have bad depth perception.

Understanding animal behavior gives a baseline for comparison, even in differing environments.

However, he warns, “Normal does not mean what you see every day. Don’t let abnormal become normal.” Normal does not mean common.

Pajor granted that variation or absence of behavior does not indicate poor welfare, per se, because animals adapt to different environments. Knowing the motivation and function behind the behavior adds understanding on a deeper level. For instance, behavior is an early indication of illness.

General principles for welfare of animals include genetics; selection for health, behavior and temperament; environment; social behavior; feed, water and air quality; disease and parasites; handling, knowledge and skill; and pain management.

Pajor noted several welfare assessment programs, and noted that the best include

- management criteria — recordkeeping, standards of procedures, general management practices;
- input criteria — things like safe facilities, stocking rates, air quality, etc.; and
- output criteria — performance outputs.

Audits for these assessments are merely a snapshot of time, he warned. Behavior is rarely used in these, but behavior outcomes such as quiet handling are used frequently. Animal welfare assessments are here to stay, he concluded, and will become part of sustainability programs.

— by Kasey Brown, senior associate editor



► Animal welfare assessments are here to stay and will become part of sustainability programs, concluded Ed Pajor, professor of animal behavior and welfare at the University of Calgary Faculty of Veterinary Medicine.

Determination of normal animal welfare helps ensure correct measurements.

For the Welfare of All CONTINUED FROM PAGE 210

disease. He said the general response to these was, “No one pays us to do that,” to which he responded that it is just responsible beef production to vaccinate calves. That in itself can cut down on antibiotic use and need.

There are many stressors that go with traditional weaning: age at weaning, new social environment, physical separation, premature end of lactation, transport, new location and a new diet. Which of these is the most prominent?

He shared some research that showed fenceline weaning reduced calling by both cows and calves by about one-third, reduced walking, and increased lying down time and performance. The process is not perfect, and it requires good fences, but the cows and calves being able to see each other is better than being apart.

Another study looked at whether the overarching issue of weaning stress was the stopping of milk or the separation. The idea of weaning in nature is mutually agreed upon, and the milk stops, Stookey explained. The study used nose flaps on the calves to stop the access of milk about a week before separation, called two-stage weaning. The research team learned that the separation was the culprit; the milk loss was not.

While the calves still exhibited fence walking, calling and reduced eating, each was considerably less than the control group of abruptly weaned calves. The abruptly weaned calves walked 15 additional miles. With increased walking, increased calling and much less eating, it's no wonder abruptly weaned calves get sick, he added.

It is possible to leave nose flaps in too long, however. Three to seven days is ideal, because

some calves can learn to cheat if they are left in longer. Additionally, the longer the nose flap is in, the looser and sloppier the flap gets. He added that two-stage weaning allows for “truck weaning” without the adverse effects of abrupt weaning.

— by Kasey Brown

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Investigating new weaning strategies

In Ireland, grass-based cow-calf production systems often involve a period during which beef cattle are removed from pasture and housed. It's a practice driven mostly by climate, but it's not because the animals need shelter from the elements. According to animal scientist Bernadette Earley, housing cattle during Ireland's typically wet winters prevents pasture

Religious slaughter

Religious slaughter has the goal of producing good food for all — scientifically, culturally, religiously and emotionally, said Joe Regenstein, professor emeritus of food science at Cornell University and head of the Cornell Kosher and Halal Food Initiative. He spoke to more than 100 attendees from five countries at the fifth International Symposium on Beef Cattle Welfare in Manhattan, Kan., June 8-10.

He shared some initial clarifications, saying both kosher and halal are not classified as such because of blessings. A product is or is not kosher or halal according to whether it follows the rules, not because the rabbi or imam is there, he explained. The rabbi and imam provide a third-party audit to assure that the rules are followed. However, both groups do say a blessing with respect to slaughter: Muslims bless each animal, and Jews bless each batch of animals.

So, what are the rules? Generally, kosher and halal cover the

allowed animals and the prohibition of blood, he explained. Kosher allows ruminants with split hooves and that chew their cud, such as a cow, sheep, goat, deer and giraffe. Halal allows non-carnivorous animals, which includes the same animals plus camels and rabbits. Kosher allows traditional birds — but not ostrich, emu or rhea — and fish with fins and

removable scales. Halal includes birds like the ostrich, emu or rhea, and all animals that spend their entire life in the water, but many Muslims are more restrictive in practice, he noted.

Both have specific slaughter requirements, most notably that animals are made unconscious by a cut across the neck. Kosher includes inspection of animals after slaughter, deveining, and soaking and salting. Both require that all byproducts derived from animals must be obtained from religiously slaughtered animals.

He noted that there are many other rules, but added that a few more key rules include the separation of milk and meat and special Passover restrictions for kosher, and prohibition of alcohol for halal. Both respective religions have procedures for making equipment acceptable for kosher and halal.

He shared a statement by Temple Grandin, professor of livestock



► Religious slaughter has the goal of producing good food for all — scientifically, culturally, religiously and emotionally, said Joe Regenstein.

behavior and welfare at Colorado State University, on kosher slaughter: “Recently, I participated in a ritual kosher slaughter — in this ritual, the way it was meant to be done, I must say. This was at a plant where the management really understood the importance and significance of what they were doing, and communicated this to their employees — and to the animals, as well, I believe.

“After some practice, I learned that the animals would stand quietly and not resist being restrained if I eased the chin-lift up under the animal's chin. Jerking the controls or causing the apparatus to make sudden movements made the cattle jump. ... Some cattle were held so loosely by the head-holder and the rear pusher gate that they could easily have pulled away from the rabbi's knife. I was relieved and surprised to discover that the animals don't even feel the super-sharp blade as it touches their skin. They made no attempt to pull away.”

He concluded that research on religious slaughter should be careful of issues that are not “religious requirements” but which confound the research results, like people, facility, equipment and non-slaughter stress. These need to be optimized before looking at the impact of the religious slaughter procedure.

— by Kasey Brown, senior associate editor

Religious slaughter requirements explained.



►“Results suggest that reducing the cumulative effects of multiple stressors, by deferring housing for a 35-day postweaning period and offering concentrates preweaning, will lower the stress response,” said Bernadette Earley of Ireland’s Teagasc Animal and Grassland Research and Innovation Centre.

“pugging” — the damage to plants and soil resulting from excessive hoof action on soaked sod.

Weaning of spring-born calves often coincides with the time herds are moved indoors, explained Earley. A researcher with Ireland’s Teagasc Animal and Grassland Research and Innovation Centre, Earley talked about research related to the physical, psychological and nutritional stress calves experience as a result of movement into confinement, change of diet, transportation and commingling of calf groups.

More specifically, Earley explained studies related to stress-influenced alterations of immune function in weaned calves, and increased susceptibility to disease, especially to BRD.

“It is important to study weaning as a stressor in order to determine its effects and the mechanisms through which it exerts these effects. The knowledge gained may identify effective weaning strategies to prevent or treat disease. With the ultimate aim of improving the health and welfare of beef calves around the time of weaning, our overall aim was to gain a better understanding of the effects of weaning stress in beef calves,” stated Earley.

To determine how producers might improve postweaning calf health and welfare through a different weaning strategy, research studies compared stress responses of calves that were abruptly weaned, housed in slatted-floor sheds and fed a diet of silage plus concentrates, with the responses of calves that were returned to familiar pasture immediately after weaning.

According to Earley, findings suggest that the abruptly weaned and housed calves did

experience higher stress response, as indicated by levels of neutrophils and lymphocytes — white blood cells involved in immune function. A subsequent study showed that calves offered preweaning concentrate supplementation showed a reduced stress response, compared to calves that were not supplemented prior to weaning.

“Results suggest that reducing the cumulative effects of multiple stressors, by deferring housing for a 35-day postweaning period and offering concentrates preweaning, will lower the stress response,” said Earley.

What about the cow? How much stress does a beef cow experience due to the abrupt weaning of her calf? Does separation from her calf cause changes to physiological and immunological processes similar to those experienced by the calf?

Earley said observation of behavior suggests that it is so, and blood analysis indicates that cows do experience weaning stress similar to that exhibited by calves. In terms of its magnitude and duration, however, weaning-stress response in cows typically is less than it is for calves.

According to Earley, Teagasc researchers are hopeful that their studies will help identify potential biomarkers of stress-susceptible animals likely to succumb to postweaning disease infection.

— by Troy Smith

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BCS indicates welfare status

Most cow folk are familiar with the body condition scoring system of gauging the relative fatness of beef cows. Commonly used in the United States is a 9-point scale ranging from body condition score (BCS) 1, denoting severe emaciation, to BCS 9, representative of a very obese animal. The BCS system is widely recommended as a tool for assessing the nutritional status of a cow herd. However, K-State veterinarian Bob Larson believes it may also serve as a metric for beef cattle welfare.

A professor of clinical sciences at K-State’s College of Veterinary Medicine, Larson reminded the audience that a dam’s BCS is a relatively good tool for assessing the welfare of her calf. Cow body condition, particularly during the last trimester of gestation, influences calf birth weight, percentage of live calves at birth and weaning, and calf weaning weight. Cow body condition also influences the time needed to return to estrus and rebreed.

Larson advised listeners to think about what BCS suggests with regard to a cow’s

welfare. Very low BCS is cause for concern about either disease or inadequate nutrition, and very high BCS should raise questions about potential calving difficulty, metabolic disease or musculoskeletal disease.

As an example, Larson cited studies showing that cows least likely to be pregnant, and cows most likely to abort, included those whose BCS was less than 5 (moderate



►“In a herd where most cows are BCS 5 and 6, I would expect to see a few 7s and a few 4s. But, if you find a 3 within a herd averaging 5 to 6, there’s probably something wrong with her,” said Bob Larson, advising producers to look at the extremes on either end and assess those animals individually.

fat cover) at the time of pregnancy testing. Larson would not expect to see many cows like that among spring-calving herds that are preg-checked in the fall.

“I think it tells me something about the health status of that kind of cow — now and probably in the past. She’s probably sick, or has been, or she has bad teeth,” said Larson, noting how BCS is thus an indicator of a problem related to the health and welfare of such individuals.

Larson noted, however, that there will be variation within any population, even though all animals receive the same diet. A range of BCS within a given herd is to be expected and is compatible with good welfare.

“In a herd where most cows are BCS 5 and 6, I would expect to see a few 7s and a few 4s. But, if you find a 3 within a herd averaging 5 to 6, there’s probably something wrong with her,” said Larson, advising producers to look at the extremes on either end and assess those animals individually.

Larson advised the audience to remember that poor BCS is indicative of poor welfare, but not necessarily poor nutrition. It might be something else and warrants investigation.

— by Troy Smith

