



FEEDLOT[®]

FEEDER INFORMATION HIGHLIGHTS

Volume XXIV Number 3

April/May 2016

Feedlot Focus

- Backgrounding Management Effects on Finishing Cattle Performance
- Antibiotic Stewardship
- Wall Of Fame Or Shame
- Fatigued Cattle Syndrome
- VFD Questions Answered by CVM

Stocker Special

- You're Doing It Wrong
- Summer Pnuemonia In Calves

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Feedyard Camp opens doors for future cattle feeders

In a time when the agriculture workforce is aging, and thousands of ag-related jobs go unfilled every year, the Texas Cattle Feeders Association is doing their part to encourage young people who are interested in a career in the feedyard industry. The 8th annual Feedyard Camp will be June 27-29, 2016. TCFA hosts the program in conjunction with the Texas A&M AgriLife Extension Service and West Texas A&M University.

The Junior Fed Beef Career & Leadership Program, aka "Feedyard Camp," is open to any incoming high school juniors or seniors who have an interest in pursuing a career in the fed beef industry. Those participating stay in dorms at West Texas A&M during the program.

Participants receive hands-on instruction about feedyard operations, as well as career opportunities in the fed beef industry. Students participate in operation problem solving and leadership activities. Activities will include tours of commercial cattle feeding operations, a tour of a beef processing

facility, the opportunity to fabricate a beef half, and participate in a consumer beef taste panel.

Students will also spend a day learning day-to-day operations of a feedyard and have the opportunity to participate in a job shadow program at a local feedyard following the conclusion of the program.

Past participants have given the program high marks. "Feedyard Camp was an amazing and eye opening experience for me because it showed me a different part of the beef industry than the cow-calf producer side of things. One of the main reasons I wanted to attend the camp was to learn more about the feedlot industry and if I'd be interested in any careers related to the industry. Feedyard Camp helped to solidify my future goals

of getting my degree in agricultural communications and working in the agricultural industry. I will never forget the amazing hands-on experience I gained from attending!" said one individual.

TCFA Market & Membership Manager Brady Miller said anytime you have the opportunity to help shape the future leaders of our industry that it is time well spent. "It can be by developing the physical hands on piece or just creating a student who can speak and have knowledge of the industry."

Applications are available at tcfa.org/news-events/feedyard-camp.html and are due no later than May 15. **FL**



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PRODUCT DESCRIPTION: Each mL of Enroflox 100 contains 100 mg of enrofloxacin. Excipients are L-arginine base 200 mg, n-butyl alcohol 30 mg, benzyl alcohol (as a preservative) 20 mg and water for injection q.s.

INDICATIONS:

Cattle - Single-Dose Therapy: Enroflox 100 is indicated for the treatment of bovine respiratory disease (BRD) associated with *Mannheimia haemolytica*, *Pasteurella multocida*, *Histophilus somni* and *Mycoplasma bovis* in beef and non-lactating dairy cattle; and for the control of BRD in beef and non-lactating dairy cattle at high risk of developing BRD associated with *M. haemolytica*, *P. multocida*, *H. somni* and *M. bovis*.

Cattle - Multiple-Day Therapy: Enroflox 100 is indicated for the treatment of bovine respiratory disease (BRD) associated with *Mannheimia haemolytica*, *Pasteurella multocida* and *Histophilus somni* in beef and non-lactating dairy cattle.

Swine: Enroflox 100 is indicated for the treatment and control of swine respiratory disease (SRD) associated with *Actinobacillus pleuropneumoniae*, *Pasteurella multocida*, *Haemophilus parasuis* and *Streptococcus suis*.

RESIDUE WARNINGS:

Cattle: Animals intended for human consumption must not be slaughtered within 28 days from the last treatment. This product is not approved for female dairy cattle 20 months of age or older, including dry dairy cows. Use in these cattle may cause drug residues in milk and/or in calves born to these cows. A withdrawal period has not been established for this product in pre-ruminating calves. Do not use in calves to be processed for veal.

Swine: Animals intended for human consumption must not be slaughtered within 5 days of receiving a single-injection dose.

HUMAN WARNINGS: For use in animals only. Keep out of the reach of children. Avoid contact with eyes. In case of contact, immediately flush eyes with copious amounts of water for 15 minutes. In case of dermal contact, wash skin with soap and water. Consult a physician if irritation persists following ocular or dermal exposures. Individuals with a history of hypersensitivity to quinolones should avoid this product. In humans, there is a risk of user photosensitization within a few hours after excessive exposure to quinolones. If excessive accidental exposure occurs, avoid direct sunlight. For customer service, to obtain a copy of the Material Safety Data Sheet (MSDS) or to report adverse reactions, call Norbrook at 1-866-591-5777.

PRECAUTIONS:

The effects of enrofloxacin on cattle or swine reproductive performance, pregnancy and lactation have not been adequately determined.

The long-term effects on articular joint cartilage have not been determined in pigs above market weight. Subcutaneous injection can cause a transient local tissue reaction that may result in trim loss of edible tissue at slaughter. Enroflox 100 contains different excipients than other enrofloxacin products. The safety and efficacy of this formulation in species other than cattle and swine have not been determined.

Quinolone-class drugs should be used with caution in animals with known or suspected Central Nervous System (CNS) disorders. In such animals, quinolones have, in rare instances, been associated with CNS stimulation which may lead to convulsive seizures. Quinolone-class drugs have been shown to produce erosions of cartilage of weight-bearing joints and other signs of arthropathy in immature animals of various species. See Animal Safety section for additional information.

ADVERSE REACTIONS: No adverse reactions were observed during clinical trials.

ANIMAL SAFETY:

In cattle safety studies, clinical signs of depression, incoordination and muscle fasciculation were observed in calves when doses of 15 or 25 mg/kg were administered for 10 to 15 days. Clinical signs of depression, inappetence and incoordination were observed when a dose of 50 mg/kg was administered for 3 days. An injection site study conducted in feeder calves demonstrated that the formulation may induce a transient reaction in the subcutaneous tissue and underlying muscle. In swine safety studies, incidental lameness of short duration was observed in all groups, including the saline-treated controls. Musculoskeletal stiffness was observed following the 15 and 25 mg/kg treatments with clinical signs appearing during the second week of treatment. Clinical signs of lameness improved after treatment ceased and most animals were clinically normal at necropsy. An injection site study conducted in pigs demonstrated that the formulation may induce a transient reaction in the subcutaneous tissue.

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Backgrounding Management

It is a common belief amongst many stocker cattle operators and backgrounders in all parts of the country that feedyard owners will not want their cattle if they were fed at higher rates of gain and/or implanted aggressively while in the growing phase of their lives. The perception that rate of gain in excess of 2 lbs/day for growing cattle cuts down on both rate of weight gain and feed efficiency in the feedyard has been around for years. This most likely has been due to the fact that cattle that have been backgrounded at lower rates of gain and then moved to the feedyard usually explode in terms of growth the first 50-100 days on feed. This phenomenon is termed compensatory growth and it has been well documented over many years of cattle feeding. Furthermore, there sometimes are misconceptions about how growth rate during the backgrounding phase will affect carcass quality, whether in a positive or negative manner.

Feeding Management

It has been established that backgrounding cattle at lower, but varied rates of gain and different pasture types does not negatively affect feedlot performance or carcass quality. Work done at the University of Nebraska and summarized by Klopfenstein and others in 2000 showed that 372 calves over 5 years were grazed during the winter at rates of gain of 0.5 or 1.34 lb/head/day. After finishing the calves and adjusting to equal rib fat, it was determined there were no differences in feedlot performance or quality grade among differing rates of gain while being backgrounded. Similarly, in 418 summer grazed calves over 7 years, calves grown at either 1.25 or 1.85 lbs/day and then finished also had no differences in feedlot performance and quality grade when compared

at equal rib fat thickness. In several instances, calves that gained at higher rates during the growing phase actually had slightly higher average daily gains and improved feed efficiencies during the feedlot phase in this summary.

The authors concluded that if cattle are fed to a common rib fat endpoint and rates of weight gains reported in the study fall within the given ranges, then the backgrounding program has little to no effect on marbling and carcass quality grade of finished cattle. Additionally, it was noted that calf-fed in these trials had steaks that were more tender than their yearling fed counterparts. This has also been pointed out in other studies which have shown that lower gains during backgrounding could actually compromise beef tenderness and juiciness.

When looking at cattle being backgrounded on mixed rations and in drylots, Coleman and others found that steers fed a high silage diet at ad libitum intake or a high concentrate diet limit fed achieved similar gains during the backgrounding phase also had similar gains among treatments in the finishing phase. Silage fed steers that had a smaller rate of gain during backgrounding did eat more feed and gain more weight while being finished, but were 4.3% less efficient at converting feed to gain. In the end, carcass characteristics were similar between the two treatments.

To compare different winter feeding programs on growth of steers during the background phase, McCurdy and co-workers at Oklahoma State fed steers one of four ways through the winter and then studied feedlot performance. For the growing phase of the trial (112 days), cattle were fed in 1 of 4 ways: Ad lib fed a high concentrate diet (CF), grazed on wheat pasture (WP), fed a silage based growing diet (SF), or program fed a high

Effects on Finishing Cattle Performance

concentrate diet (PF). For finishing, all steers were adapted to and fed a high concentrate finishing diet and harvested at a common backfat thickness. Corn was the main component for the concentrate portion of the diets used.

Carcass characteristics were not negatively impacted by growing phase feeding treatment. In fact, silage fed and program fed cattle had higher marbling scores than wheat pasture grazed cattle, while also increasing ribeye area and lowering yield grade. The researchers concluded the following from this trial: "Dry-lot feeding programs that are targeted for growing cattle can provide a viable alternative to winter wheat pasture grazing. Winter growing diets consisting of silage and/or high-concentrates, fed in a restricted amount, may result in greater, more efficient gains during finishing as compared to grazing. Additionally, these types of backgrounding diets may enhance carcass yield grades."

Implants

For feedlot cattle, it is typical that the use of a properly managed implant program will provide between \$40 and \$80 of additional income. That number for backgrounding cattle could easily be that high, or higher.

If cattle are fed to a common fat endpoint of about 28% empty body fat, there is no negative impact of implanting on carcass quality. Since most feedlot studies in the past have compared implanted vs. non-implanted cattle at the same days fed rather than the same fat endpoint, the results can often be misleading regarding the impact of implant use on quality grade. (Erickson, University of Nebraska –Lincoln). Data shows that feeding steers and heifers that are implanted an additional 7 to 14 days will result in similar quality grades as non-implanted

cattle. Of course, doing so will also increase carcass weights.

It has been argued that the use of low potency implants during the cattle growing/backgrounding phases will result in much higher responses from moderate and high potency implants during the finishing phase. Just by looking at one study, one could see that this is certainly not always true.

In several instances, calves that gained at higher rates during the growing phase actually had slightly higher average daily gains and improved feed efficiencies during the feedlot phase in this summary.

In the OSU trial, cattle were implanted with Component[®] ES (moderate potency implant that contains Estradiol Benzoate and Progesterone) during the growth phase, and Revalor[®] S at finishing. Gains shown while cattle were being finished would illustrate that the use of a moderate potency implant during backgrounding certainly didn't hurt gains in the finishing phase by commercial feedyard standards in terms of gain in this trial.

In some work recently published from Williamson and coworkers from Arkansas, they found that steers and heifers implanted with a moderate potency implant (Synovex[®] S or H) increased average daily gains by 0.3 lbs per day during the backgrounding phase and did not impact finishing average daily gains.

Additionally, the use of more moderate powered implants during

the growing phase usually results in a slightly longer payout than the conventional low dose implants. In work done in grazing steers by McMurphy and others at OSU (OSU Research Report, 2009), while studying the effects of supplement type on late summer grazing in backgrounding steers, they also used either Ralgro[®] or Component[®] TE-G implants against non-implanted controls. Implanted cattle gained similarly for the first 98 days of the grazing period, with Component[®] implanted cattle gaining 2 lbs more than Ralgro[®] implanted cattle during this time. However, from day 98-126, cattle implanted with the Component[®] implant gained 8% more than Ralgro[®] implanted cattle (0.17 lbs/day more). During this time, the Ralgro[®] cattle gained the same as the non-implanted controls. This illustrates that the use of a moderate potency implant not only can improve gains in backgrounding cattle, but those gains can be sustained for a longer period than low potency implants in the same program.

It is important to remember that there are several different ways to achieve successful results when backgrounding cattle for the feedlot. It is also important to remember that you don't have to leave money on the table while doing so. Putting together a total management plan can be a daunting task when faced with all the possibilities of how to grow calves and yearling cattle these days. Let us at Great Plains Livestock Consulting, Inc. help you put together a program this spring that will allow you maximum use of feeding technologies and maximum success with your backgrounding and feedlot cattle for the rest of the year.

Zeb Prawl is a consulting nutritionist for Great Plains Livestock Consulting, www.gplc-inc.com 



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Antibiotic Stewardship: Moving the Industry Forward

Antibiotic stewardship is a popular buzz word in the industry right now, and experts don't see attention to the topic waning anytime soon.

Whether it's the veterinary and medical communities, consumers or the government, the use of antibiotics has garnered a lot of attention. As producers, we understand that antibiotics are an important "tool in the toolbox" of animal production.

Director of Clinical Microbiology at Kansas State University, Brian Lubbers, DVM, PhD, said definitions of antibiotic stewardship vary among people, but the message is the same: judicious use of antibiotics

is essential. "My personal definition is a continuous commitment to reduce and refine the use of antibiotics," Lubbers said.

"The beef industry is too diverse to design a simple stewardship plan that will work for everybody. I think the public thinks the cookie cutter approach will work just fine, but it's doomed to fail," he said. Few things in the cattle industry and production cycle are static, but instead production systems are dynamic. He believes our definition of stewardship should be as well.

Lubbers said when talking about reducing antibiotic use, the first step is to look at prevention techniques and management tools that can keep animals from getting sick in the first place. Vaccination,

housing, parasite control, nutrition and genetics can all come into play. He said it's important to evaluate the effectiveness of prevention techniques, and see what management changes could help.

"We use the tools as we have them to the best of our ability," he said. "Do what we can to prevent disease and we won't have to use antibiotics. Then when we need to administer antibiotics, we need to look back and see why we had to treat. Sometimes there is no easy answer."

Kristen Peck, Zoetis Executive Vice President and President of U.S. Operations, said, "...even when given the best possible preventative care, animals may become sick just like people do. When they do, we know that veterinarians strive to prescribe antibiotics in a responsible way." Peck noted that responsible use is important not only to cure infection but also to reduce the unintended risk of antimicrobial resistance that can happen over time in animals.

Removing antibiotics from the "tool box" is not a viable option for animal production. Although some advocacy groups and restaurants have touted that possibility, Dr. Kerry Keffaber with Elanco said there are unintended consequences of eliminating food animal antibiotics. "Are you going to let animals suffer? Euthanize them? Delay and deny treatment?"

The Veterinary Feed Directive is viewed by many as a step in the right direction. Although it is a regulation the industry is not accustomed to, the oversight could ensure the ability to utilize antibiotics in food animals in the future.

Keffaber said the VFD will illustrate animal agriculture is doing the right thing with antibiotics. He also said it will ensure a veterinarian is

A Hot Item for Feedyards This Year

Add Fat or Molasses to the Ration

This year the price of grain and hay have shown the benefits of fat and molasses in feedlot rations. But a critical factor in their use is the storage for fat or molasses. Palmer has been building a heated, sloped bottom, all welded steel tank for fat and molasses storage for over 25 years. The heaters, gas or electric, are in a heating chamber below the storage area. This prevents the products from scorching. The top of the heat chamber is the bottom of the storage tank, it is sloped so all fine solids flow with gravity out the bottom with the liquid ingredients.



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brought into the picture to help make decisions on what antibiotics to use.

Zoetis also supports steps taken by the FDA that require a veterinary prescription when antibiotics that are important to people and animals are needed to treat infections in animals. "We have long believed that veterinary professionals are uniquely qualified and should play a central role in decisions about the use of antibiotic medicines in animals," Peck said.

During the NCBA Convention, Dr. John Davidson, Senior Professional Services Veterinarian with Boehringer Ingelheim Vetmedica, spoke in the Learning Lounge on "The Trend That's Here to Stay." One of the trends he highlighted was rising feedlot mortality associated with bovine respiratory disease. Likewise, he said the dollars spent on antibiotics used to treat and prevent BRD have been climbing at a staggering pace.

"While much attention has been paid to livestock stewardship in recent times, the same should be done for improved stewardship of our antibiotic resources," Davidson said. "The judicious use of antibiotics is critical to ensuring readily available access to effective therapies for cattle affected with bacterial diseases."

He underscored the importance of prevention of disease. "The concept of prevention is not new. Rather it has been lost amidst a very segmented beef cattle industry where many producers are unaware of the impact to the calf when not properly vaccinated before entering the market channels."

Lubbers said if producers don't have a stewardship plan for their operation, it is important to develop one and agreed prevention should be a big part of the plan.

"You may already have something in place, but as producers need to emphasize disease prevention, it needs to be specific to diseases at your operation." Lubbers also suggested including tactics for antibiotic selection, which animals

are treated, for how long and at what dose.

Pharmaceutical companies are working hard to develop additional anti-infectives, exploring areas significant to veterinary medicine that are not likely to be utilized in human medicine.

Keffaber said he will be the first to admit that regulations like the VFD will be a change from what

producers are used to. "It's going to be a hassle at first, but there will be tools to get it done, and there will be pathways to make it work."

Making antibiotic stewardship a priority is important. Keffaber summed up the sentiment with, "We need to all participate. And if we don't do it right, it will be negative for the industry." **FL**

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WALL OF FAME OR SHAME?

“Unforgettable,” croons Nat King Cole, “...that’s what you are. Unforgettable, though near or far.”

The charming voice and smooth lyrics of the classic song sure make being “unforgettable” sound like an awfully good thing.

Even when applied to cattle, it certainly can be. There are those “bell ringer” groups that gain and grade. They never get sick and they earn premiums upon harvest.

If a cattle feeder remembers your pen, these are things you hope are running through their head. You want them to smile when thinking about the ease with which the cattle went on feed and how they really never had a bad day.

But there are times when unforgettable is not such a positive thing.

Last fall, my colleague Paul Dykstra was part of a session entitled, “How to Build the Perfect Feedlot Steer,” and during it mentioned

that the feedlot pen rider knows what the industry does not need.

“You do not want him to become familiar with your cattle.”

You see if there is an imaginary “Wall of Fame,” full of cattle that buyers hope to purchase again, there is an equal and opposite “Wall of Shame.” An owner’s name just might cause them to shudder at the likely “wreck.”

They might remember numerous pulls and repeated treatments or cattle that faced many challenges as they came on feed. Or maybe it’s the attitude that sticks out the most—the mean and hot-headed critters they cared for each day.

Just as you never want to be on the “do not accept checks from” list behind the counter at your local convenience store, you certainly don’t want to be on this list.

It might not be a published register, but it’s just as important to

your bottom line. The cattle business is a small one after all, and word travels. Your reputation (or your cattle’s) may precede you in the auction barn or as you try to make a direct sale with a neighboring feedyard.

That’s why small things all add up. Vaccine handling and administration, the details involved with calving health and weaning, year-long herd nutrition—they all make a difference. That can help animals express genetic potential, though proper management doesn’t help mask poor choices.

It might take extra work to get feedback from buyers, but if you can open a communication loop, it will be worth the effort.

Because when you hear that your cattle were (channel your inner Nat King Cole here) “unforgettable...in every way,” you want to be sure that’s a positive description. **FL**

YOUR “POCKET GUIDE” FOR CONVERSATIONS ABOUT BEEF



Want to talk to your friends, neighbors and acquaintances about beef but not sure what to say? The beef checkoff offers a booklet, titled “Having the Beef Conversation,” which moves toward a better understanding of how to have effective conversations about key issues for the beef community.

Conversations about how beef is raised are happening in our local and virtual communities, and farmers and ranchers need to be engaged. This guide includes tips for engaging in beef conversations as well as key messages, tough questions and facts to share, as well as providing you a list of additional resources you can access to quickly get more information.

This booklet is the go-to conversation aid for anyone interested in becoming actively engaged in the beef conversations. “Having the Beef Conversation” follows the framework set forth in the Cattlemen’s Stewardship Review and

features sections about the Beef Lifecycle, Good Food, Healthy Animals, Healthy Environment, Strong Communities and the Beef Checkoff. Each section includes the latest talking points, updated facts to share and a tough question and answer section, not to mention a reference page with additional websites for more information.

One of the best ways to begin your conversations is to follow the simple ‘E.A.S.E.’ outline: Engage, Acknowledge, Share and Earn Trust.

Additional information and a downloadable booklet are available at www.beefboard.org/pocket-guide/index.html. **FL**

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Preventing Fatigued Cattle Syndrome: What can be done?

The effort to teach the beef industry about Fatigued Cattle Syndrome begins this month.

Fatigued Cattle Syndrome, or FCS, is a physiological condition that affects cattle movement just prior to slaughter. Downer cattle, and even slow-moving cattle, are an increasing problem for the beef industry.

“We want to focus on educating producers about proper handling to prevent FCS, and which cattle are the highest risk,” says Dr. Dan Thomson DVM, PhD, director of the school’s Beef Cattle Institute, who led the research team behind the effort.

K-State will offer modules on its Animal Care Training website. The three to five minute videos are designed to highlight bullet points of the issue. The K-State team is also developing power point presentations for extension personnel. “We want to amplify the message,” says Thomson, who will feature expert guests on his RFD-TV DocTalk television program.

In addition, they are teaming up with Beef Quality Assurance to provide education for truckers on shipping timing and handling.

The issue stems from a research conducted at K-State in response to an increased rate of cattle with mobility problems at the packing plant.

“In the past three years, we’ve seen cases of cattle reluctant to move into the stunning area,” says Thomson. “Some are slow movers, some won’t move at all. The numbers seem to increase in the summer and vary from facility to facility.”

FCS cattle exhibit labored breathing with an abdominal grunt, lameness, muscle tremors and a reluctance to move.

The problem is similar to Fatigued Pig Syndrome in swine, a well-researched malady for a couple of decades. But why the sudden increase in cattle?

The question put before the research team was whether or not the problem was caused by beta-agonists.

They started examining affected cattle, and quickly found the most consistent data element was the inconsistency of Beta Adrenergic Agonists (BAA) feeding.

Thomson turned to a 1973 study on stress and cattle with muscular hypertrophy by Holmes, Ashmore and Robinson in the *Journal of Animal Science*. The study exposed normal and double muscled cattle to various types of stress – feed, water, exercise and epinephrine. The results showed overwhelmingly it was the vigorous exercise that triggered the greatest physiological stress response in

the double-muscled cattle compared to the normal animals.

Thomson began to suspect the size of the cattle was making a difference. As he studied the swine research, he saw evidence of aggressive handling as a culprit (Anderson et al., 2002).

The adverse effects were measured by two blood serum levels – lactate and creatine kinase, an indicator of muscle damage or exertion. In the swine with FPS, scientists detected creatine kinase levels comparable to a human who had sustained an automobile accident or other such crushing injury.

In the name of new research on cattle, the team compared slaughter cattle on Ractopamine, Zilpaterol, and a “natural” control group. The cattle were not slow moving, and test showed no difference in serum chemistry between the groups. All levels were normal. As the cattle were presented at slaughter, levels in all the animals were slightly elevated, as one might expect following the stress of transport and movement at the plant. The Ractopamine and Zilpaterol treated cattle showed levels slightly elevated from the natural group, but no more than the product label predicts.

In the few animals that exhibited severe FCS symptoms, however, lactate and creatine kinase



levels were drastically elevated regardless of experimental group.

That led the research team to ask: Could they create physiological stress that would model FCS in cattle not fed beta agonists?

The experiment was set up to make two comparisons: aggressive handling vs. low stress handling, and more finished vs. not as finished.

To assess the effects of handling, the cattle were moved through a 400-meter course. The aggressively handled bunch was kept at a minimum of a trot by 4-wheelers and occasional hot shots. The low stress group was kept at a walk, not allowed to run. Blood samples were taken at the baseline, half mile, one mile, and one and two hours after.

Elevated creatine kinase levels and blood lactate levels showed they could indeed create FCS by aggressive handling.

They also found there was little to no difference in blood serum levels in thin cattle no matter how they were handled, but animals with a higher degree of fatness responded more dramatically. Those with a large frame that were aggressively handled showed a significant, some dangerously high, response.

A repeat study with all BAA-fed cattle provided the same results. Thus, the research shows it is cattle size and handling that put animals at risk for FCS, whether or not they were fed beta-agonists.

“The really interesting thing is cattle who were walked through the course showed virtually no change in lactate level before and after,” says Thomson. “But when we start to run these animals, and handle them in a more aggressive manner, that’s when we start to see these physiological reactions.”

The experiment results led to the development of the Fatigued Cattle Syndrome Stewardship Program.

“It’s all about understanding how to handle big, finished cattle,” says Thomson. “This is something we need to discuss as an industry. If we’re going to finish bigger cattle,

and the economics say we are, then we have to look at the stressors that affect them.”

Thomson sees more research in the future focused on the growth and health of cattle during their last 100 days on feed. “We’ve changed the animal. So we have to change the husbandry.”

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trucks built for larger animals. Avoiding hot mid-day temperatures. And now, paying closer attention to handling and heat stress, are all part of the industry moving forward with animal welfare in mind.

“It’s really about developing the culture within the industry,” says Thomson. “It’s about understanding the stressors that affect the animal, and using common sense.” **FL**



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YOU'RE DOING IT WRONG

4 Ways You're Putting Yourself in Danger Handling Yearlings

Every year, stocker operators get injured during routine cattle working. But all too often, these costly and painful events could be prevented. Dr. Ron Gill, professor and Extension livestock specialist for Texas AgriLife Extension and nationally renowned low-stress cattle handling expert, says by avoiding four common practices, cattlemen and women can improve their odds of staying injury-free.

Don't be a speed demon.

Gill says speed often becomes an issue when trying to catch an animal to doctor it.

"A lot of times we have the mentality that we need to chase them down like a team roper and rope them," he says. "We need to take the philosophy they do up in the states where they have frozen ground and ice and that's to catch them while they're standing still. It takes some of the thrill out of it, but it takes a lot of accidents out of it, too."

Don't apply pressure at the wrong time.

Once you've made it to the corals, Gill says applying too much pressure or pressure at the wrong time can cause accidents — especially when on horseback.

"If we put too much pressure on them and they don't have a place to go or don't proceed where you

think they are going to go, they can run back under the horse. That can turn the horse over, smash him up against the fence, or whatever it might be," Gill says. "We see a lot of ankles, legs, shoulders and heads injured that way."

Don't work alone.

Good help is hard to come by. And often, any help is, considering many stocker operators are one-man outfits. But Gill says working alone often leads to accidents.

"We try to do stuff without having enough or any help," he says. "We put ourselves in these situations where things get out of control and there's really not any way to prevent a wreck from happening."

"I see that a lot of times. They might try to go bring in one or two



Gill says even though many stocker operations are one-man outfits, it's advisable to work with someone when doctoring cattle.

and they get in a cutting match with them out in the pasture. When they chase them or go to rope them, the horse goes down or the cinch breaks or whatever it might be, and they have a pretty good wreck. That's something that could be avoided if we just asked for help sometimes."



Dr. Ron Gill

Don't skip on acclimation.

Gill says so many accidents occur due to uncontrollable cattle — but they don't have to. By taking some time when they first bring the yearlings onto their place, stocker operators can train the cattle to be easier to handle.

"It makes everything simpler," he says. "The pen work, the processing — everything will be easier and simpler."

And to those who don't think there's time? Gill has an answer for that, too.

"It's hard for them to see the benefits of taking that extra time that first day or two," he says. "Everybody says they don't have time, but they don't have time to be laid up in a hospital, either. Their livelihood is being out there every day and they cannot risk being hurt."



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Summer Pneumonia in Calves

Respiratory disease can affect calves of any age. Most of the bacterial pathogens that cause pneumonia are already present in the calf's upper respiratory tract. They become a problem in the lungs only when immune defenses are compromised, such as by viral infections or stress.

Dr. Eugene Janzen, Assistant Dean, Veterinary Medicine, University of Calgary (Alberta) says some ranches have considerable respiratory disease in baby calves. "When many people calved in January, February and March, putting calving cows through the barn so calves didn't freeze their ears, calves often picked up pathogens from the confinement/contamination," he says. But going to later calving, outdoors, hasn't completely resolved calfhood respiratory problems; some ranches are seeing "summer pneumonia" in young calves.

Studies have looked at this problem in groups of cattle on community pastures. Often these herds have more trouble on dry years, when conditions are dusty when gathering and working cattle. Dust

can irritate the respiratory tract, making animals more susceptible to problems.

"When calves inhale dust, the first line of defense may be overwhelmed. If the inside of the nostrils and upper respiratory tract gets clogged with dust, bacteria are not as readily exposed to nasal secretions which tend to kill them or flush them out. If bacteria cling to dust particles, they can also be sucked down into the lungs," says Janzen. Dust and irritation inhibit normal action of cilia—tiny hair-like structures that line the windpipe, moving in wave-like motions, continually moving mucus, dust and foreign material up out of the respiratory tract to be coughed out.

"If the cowboys had a bad year for dust they were treating more calves for pneumonia. Out of this experience a protocol for communal grazing systems was developed. If ranchers were planning to bring calves to those pastures, they were asked to vaccinate for certain diseases," Janzen explains.

"They initiated definitive protocols. That strategy worked fairly well in western Canada's community pasture system because with

a formal governance structure, the vaccination protocol was strongly encouraged," says Janzen.

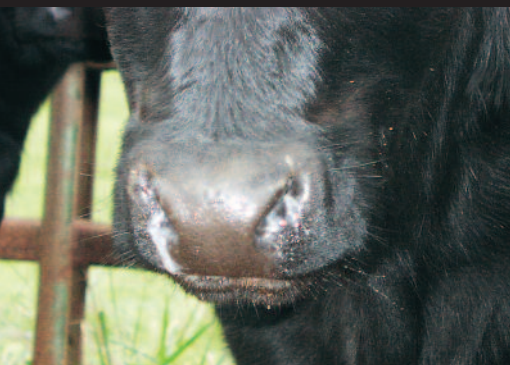
Here in the U.S. there are also studies on summer pneumonia. Dr. Amelia Woolums, Professor of Large Animal Medicine, University of Georgia, has been working with other researchers looking at pneumonia in pre-weaned beef calves. "There is very little in the scientific literature about risk factors for this disease, compared to feedlot pneumonia. We are trying to understand why some ranches and farms have a problem year after year, and others don't," she says.

She helped with a case-control study in the Dakotas and Nebraska. "We enlisted herds that had summer pneumonia, and randomly selected other herds (from the same veterinary practice) that had not had summer pneumonia. We looked at herds that had to treat at least 5% of their pre-weaning calves, and compared them with herds that treated less than half a percent of their calves," says Woolums.

People tend to think of respiratory disease as stress-related, but most of these calves out on pasture or range are not experiencing stress that time of year unless it's an unusual weather situation. On some operations ranchers move cattle periodically for rotational intensive grazing, or there may be sub-populations brought together for branding, or for AI programs.

"Mingling cattle from different sources is a risk factor for feedlot BRD, but we don't know if mingling young calves from different sub-populations on the same ranch can also increase risks for respiratory disease," says Woolums. When cattle on range are moved several times during summer to new pastures there might be stress if it's hot, dusty or a long drive, but for cattle that aren't being moved or handled, we don't know what might predispose these calves to





respiratory disease.

“In a mail survey of producers, we looked at summer pneumonia in 2 ways—whether or not they saw any calves with respiratory disease, and the proportion of calves that they treated for pneumonia. Some things were associated with whether they saw respiratory disease, and different things associated with the proportion of calves treated for respiratory disease. For example, if a farm had calf diarrhea they were more likely to also see calves with respiratory disease. If a farm did AI, they were more likely to treat a larger proportion of their calves,” says Woolums. Those calves may have experienced stress, being gathered and sorted away from their mothers for a short time.

Depending on the conditions—stressful handling, hot or inclement weather, or dusty corrals—there might be factors that make them more vulnerable. “It’s also possible that when calves are sorted away from their mothers and grouped together they have more opportunity to spread respiratory viruses or bacteria among themselves,” she says.

Age of calves can also be a factor—whether they are still protected by colostrum antibodies, or whether a calf received adequate colostrum to begin with. “Some factors may be more important risks on some operations and other factors might be more important on other operations,” she explains.

Usually these calves are in a healthy environment, with very little crowding or contamination. There are still cases of respiratory disease, however, and we don’t know what triggers them. Some

producers have started vaccinating calves at spring turn-out and think it helps. Veterinarians in some regions recommend vaccinations, and it may help, depending on age of the calves at that time, and products used. Success may depend on whether calves are old enough their immune systems would respond to vaccination, since maternal antibodies from colostrum may interfere, in certain cases.

“There is some research that supports the thinking that calves 60 to 90 days of age can respond to vaccination. In some instances they do, and sometimes they don’t, depending on different variables,” says Woolums. At any rate, adding a respiratory vaccine to calves’ vaccination protocol at branding age seems to help, on some farms and ranches, reducing the incidence of summer pneumonia. **FL**



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1 Production Best Practices (PBP) to Aid in the Control of Foodborne Pathogens in Groups of Cattle. Beef Industry Food Safety Council Subcommittee on Pre-Harvest. Spring 2015. Accessed March 19, 2015.
2 Tabe ES, Oloya J, Doetkott DK, Bauer ML, Gibbs PS, Khaitsa ML. Comparative effect of direct-fed microbials on fecal shedding of *Escherichia coli* O157:H7 and *Salmonella* in naturally infected feedlot cattle. J. Food Prot. May 2008; 31(5): 539-544.
3 Lallemand Animal Nutrition. Unpublished. United States, 1996.
4 Hutcheson D and Lallemand Animal Nutrition. Unpublished. United States, 1986.

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VFD questions answered by the Center for Veterinary Medicine

As the industry prepares for the implementation of the Veterinary Feed Directive (VFD), specific questions have been asked regarding a variety of topics related to implementation, enforcement and penalties, situations for feed mills and more. Many of these questions were first posed during 12 regional workshops sponsored by the Farm Federation in 2015. In March, the USDA Department of Health and Human Services released a letter answering several lingering questions about the VFD. The Deputy Director for Science Policy, William T. Flynn, DVM, MS, with the FDA Center for Veterinary Medicine issued the answers on 30-plus topics addressed at the meetings.

The following is a summary of some of the questions and answers released in Dr. Flynn's letter related to the VFD.

What is the proper method of disposal for VFD feed that is no longer needed/left over? Disposal of the feed should be done in accordance with state or local requirements for medicated feed.

Who is responsible for enforcement? The FDA intends to use a phased enforcement strategy for implementation of the final rule as OTC drugs become VFD drugs. The FDA first intends to provide education and training for stakeholders subject to this final rule, such as veterinarians, clients (animal producers), feed mill distributors and

other distributors. FDA will then engage in a risk-based general surveillance, as well as for-cause inspection assignments. The FDA intends to work closely with state regulatory partners and state boards of veterinary medicine in their enforcement strategy. In instances where a state VCPR (vet client patient relationship) applies, the state may also pursue enforcement.

What are the associated penalties? There are several actions FDA can pursue for a violation of prohibited acts including injunction, seizure, monetary penalties and criminal charges. According to Section 303(a) of the FD&C Act, the monetary and criminal penalties include imprisonment for not more than one year or fined not more than \$1,000, or both. If a person commits such a violation after a conviction or if a person commits a violation with the intent to defraud or mislead, the person shall be imprisoned for not more than three years or fined not more than \$10,000, or both.

Does a feed bill have to be in the same state as the animals/licensed vet? No

How do we get the CVM (Center for Veterinary Medicine) to answer questions related to the VFD? Email questions to AskCVM@fda.hhs.gov

How will electronic VFDs work? What constitutes a valid signature (part 11)? Does Global Vet Link satisfy requirements for the vet, producer and feed mill? Electronic records, such as an electronic VFD that meets the requirements of the rule may be used in lieu of a paper VFD. Part 11 applies to records in electronic form that are created, modified, maintained, archived,

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retrieved or transmitted, under any FDA records requirements. The VRD is required to be signed by the veterinarian. If the veterinarian chooses to sign the VFD electronically, the electronic signature needs to be part 11 compliant. If the veterinarian signs a paper copy, then scans the VFD, that is not considered an electronic signature. According to a news release on Global Vet Link, the company's digital signatures are part 11 compliant. An eVFD can be done with a compliant digital signature.

Can technical vets for animal health companies write a VFD? In order for a technical services veterinarian for a drug company to write a lawful VFD, the veterinarian issuing the VRD must be 1) licensed to practice veterinary medicine, and 2) be operating within the course of the veterinarian's professional practice and in compliance with all applicable veterinary

licensing and practice requirements, including maintaining a VCPR as defined by the State. Additional information determining VCPR definitions in your state can be found at fda.gov/AnimalVeterinary/Development/ApprovalProcess/ucm460406.htm

Do you have to write a new VFD if a feed mill goes down and you need to switch to a new mill? The distributor that the veterinarian or client gives the VFD to should be the only distributor filling the entire order. In special circumstances (ie. if a mill runs out of a VFD drug and the client needs the VFD feed immediately or if a feed mill goes down unexpectedly) there may be a need for two mills



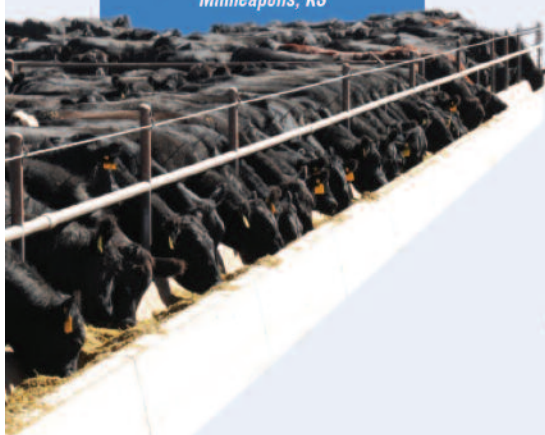
to fill the entire order. If that is the case, the client and distributors should all keep records documenting the situation so it is clear that animals received only the treatment authorized by the VFD.

If a producer has medicated feed on their farm on January 1, 2017, do they need a retroactive VFD for that feed? On January 1, 2017, all products with approvals that have transitioned from OTC to VFD must be used in ►

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VFD questions... from previous page
 compliance with VFD regulations, even if the product has the older OTC label. The producer would need a VFD prior to feeding the medicated feed to their animals.

Does the veterinarian have to specify the feed mill on the VFD? The VFD regulation requires the veterinarian to send a copy of the VFD to the distributor via hardcopy, fax or electronically, but does not require the veterinarian to specify the distributor on the VFD. If the veterinarian provides the client with a hardcopy to take to the distributor, the client can go to the distributor of their choice. If the veterinarian is issuing the VFD directly to the distributor, the client should tell the vet which distributor to send the VFD to.

In writing a VFD that is to be distributed to multiple ranches, do you need a separate one for each physical address? The veterinarian may write a VFD that covers animals in multiple locations to be fed the VFD by the expiration date on the VFD, provided he or she can do so in compliance with professional licensing and practice standards and provided the VFD feed is supplied to such multiple locations by a single feed manufacturer/distributor. The veterinarian would also need to be authorizing the same use for all of the animals covered under the VFD (i.e. the indications, species, age range, etc.)

Does the FDA have a timeline to eliminate all OTC antibiotics? Guidance for Industry 209 (GFI #209) outlines the FDA's current thinking on judicious use of medically important antimicrobials in food-producing animals. The primary concern underlying the judicious use principles outlined in GRI #209 is antimicrobial resistance in animals and humans. This includes antimicrobial drugs that are considered important for therapeutic use in humans. At this time, there are no plans to change the marketing status of any additional products.

However, the FDA will continue to evaluate the appropriate marketing status of animal drugs based on available information.

Are educational materials available in Spanish? Currently, VFD brochures are only available in English, however the FDA agrees that preparing educational materials for Spanish-speaking farm workers would be beneficial.

Can video/photos count as "being familiar" with an operation to establish a VCPR? Due to the federal definition of VCPR for the purposes of issuing a VFD, a VCPR can not be established by video/phone.

Will medicated milk replacer go VFD or prescription status (medicated feed vs. medicated water?) The FDA expects that certain antimicrobial drugs of human medical importance will change the marketing status from OTC to VFD. Those uses in young animals that are presently approved OTC as a Type A medicated article, or Type B or C medicated feed (milk replacers) will become VFD, while those uses that are presently approved OTC to be added to drinking water or milk (soluble powder) will become Rx.

Is the feedmill responsible for ensuring the VFD is valid? All involved parties must share responsibility in ensuring that a lawful VFD has been issued and the VFD feed is manufactured and used according to the terms of the VFD as issued by the veterinarian.

What does success look like? The successful implementation of any new regulation depends on those subject to the regulation understanding and voluntarily following the requirements. That is why the FDA intends to use a phased enforcement strategy for implementation



that focuses first on education and training for the stakeholders subject to the final rule. The FDA will then engage in risk-based general surveillance, as well as for-cause inspection assignments to determine compliance.

Does the FDA staff write a "warning ticket" before a "speeding ticket?" FDA intends to use a phased enforcement strategy for implementation of this final rule as OTC drugs become VFD drugs. The FDA typically issues advisory actions such as untitled or warning letters prior to pursuing enforcement actions such as injunctions, seizures, monetary penalties or criminal actions.

For feed mixing and delivery purposes, must the DVM/client/distributor calculate based on feed batches and full loads, or will short loads need to be produced (and charged for) for the duration of use calculations? There is no requirement that the amount of feed be on the VFD order. It must have the approximate number of animals to be fed the VFD by the expiration date of the VFD; indication for which the VFD is issued, and level of VFD drug in the feed and duration of use. This provides flexibility for trained nutritionists to calculate the amount of feed needed.

The complete response from the FDA can be viewed at: <http://files.ctctcdn.com/bc9fd869001/07af45e8-72b0-4d2b-99d3-99d0a6660b8c0.pdf>





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VISIT YOUR BREED ASSOCIATION WEBSITE FOR MATERNAL BREED INDEXES

Selection indexes are valuable resources for cattle producers.

BY KRIS RINGWALL,
BEEF SPECIALIST,
NDSU EXTENSION SERVICE

Hidden treasures for beef producers are the various breed association websites, which are the doorway to better understanding the performance of the cattle available within each breed.

One fairly new addition to sire summaries is a selection index, available from several breed associations. The selection index allows a producer to select bulls based on multiple traits through a single expected progeny difference (EPD) value. The selection index EPD value can meet maternal cow-calf selection or terminal beef production objectives. Today, I highlight the maternal indexes.

The bull registration numbers are the keys that open the door to lots of information and provide a simple approach to review these available selection indexes within a breed. These indexes help group various traits, establish a relative importance for each trait and present the answer as a single EPD value for a particular bull for that particular trait.

The North Dakota State University Extension Service publication "Understanding Expected Progeny Differences for Genetic Improvement in Commercial Beef Herds" (<https://www.ag.ndsu.edu/pubs/ansci/beef/as1770.pdf>) explains how a selection index is formed for a set of traits that have production importance within the beef cattle industry. The index should correlate with herd production or financial goals and combine performance records with economic weights, then generate a selection index value.

As noted in the publication, in the cattle industry, these generally are reported as dollar values to indicate the amount of profit or savings the producer could expect when utilizing that index. The indexes are utilized the same way as performance EPD traits and do allow for a more streamlined approach to the utilization of multiple traits.

As with all EPD values, without producer goals and objectives, consistent and repeated selection criteria will not be achieved. Producers need to research the various indexes available and make sure the selection end point matches their herd goal. Once that decision is made, then consistently following through in the years to come can accomplish the desired end point.

This sounds complicated, but indexes do work. If a producer is looking for maternal influence within the herd, here are some examples (as noted in the publication):

- The American Hereford Association Baldy Maternal Index (BMI\$) is an index to maximize profit for commercial cow-calf producers who use Hereford bulls in rotational crossbreeding programs on Angus-based cows.

- The American Gelbvieh Association \$Cow (AGA \$Cow) is an index of value expressed in dollars for a replacement female relative to other animals in the herd. AGA \$Cow includes stayability, reproductive efficiency, milk, calving ease, moderate mature weight, calf gain, feedlot feed efficiency and carcass value.

- The American Angus Association Weaned Calf Value (\$W), an index value expressed in dollars per head, is the expected average

difference in future progeny performance for preweaning merit. The \$W index includes revenue and cost adjustments associated with differences in birth weight, weaning direct growth, maternal milk and mature cow size.

- The American Angus Association also provides a Cow Energy Value (\$EN). This is an interesting maternal index that, according to the American Angus website, assess differences in cow energy requirements, expressed in dollars per cow per year, as an expected dollar savings difference in future daughters of sires. The index assesses the impact of energy intake needed for lactation, along with the difference in mature cow size.

- The American Red Angus Association of America HerdBuilder index (HB) is an index using Red Angus bulls mated to cows and heifers, with replacement heifers retained from within the herd and all remaining progeny sold on a quality-based carcass grid. By using the HerdBuilder index, producers can increase the sustainability of the cow herd and, ultimately, their operation.

- The American Simmental Association All-Purpose Index (API) is an index that evaluates sires for use on the entire cow herd (bred to Angus first-calf heifers and mature cows), with the portion of their daughters required to maintain herd size retained and the remaining heifers and steers put on feed and sold on grade and yield.

Let me repeat: Indexes are great tools, provided the producer has a long-term objective and bulls are selected to meet that objective through time. Study the various indexes available. They are a potential key for beef cattle selection. **FL**



Larson Electronics

Larson Electronics, a company that specializes in industrial grade lighting solutions, announced the release of a 40 watt low profile LED light fixture.

The HAL-LED-CPR-C-40 hazardous location LED light fixture is a low profile fixture that provides operators with a powerful and energy efficient alternative to metal halide luminaries. This Class 1 Division 2 hazardous location LED light fixture provides 4,000 lumens of light while drawing only 40 watts of power. This low profile LED light fixture is constructed of durable die cast aluminum and comes with a tempered glass lens which provides protection for the twenty-four individual LEDs that offer high-quality light in a 120° beam spread. This light fixture is rated for 100,000 hours of lamp life and is an excellent upgrade option when replacing older fixtures.

CASE Construction Equipment

CASE Construction Equipment introduces the new 521F wheel loader that meets federal Tier 4 Final emissions standards using Selective Catalytic Reduction (SCR) technology. The high performance wheel loader moves up to 212 tons of material per hour while using 12 percent less fuel. The 22,948-pound wheel loader has a bucket breakout force of 19,303 pounds with 2.3-cubic-yard bucket capacity. The SCR technology allows the machine to handle inconsistent engine loads while running at peak performance without compromising power.



T-L Irrigation

T-L Irrigation Co., the exclusive world manufacturer of hydrostatically powered pivot irrigation systems, announced they have been awarded two patents for their GPS Navigation Corner System. These patents present the unique method of waypoint navigation that T-L Irrigation Co. has implemented for their GPS Navigation Corner System. Also included is the addition of a Wheel Angle Sensor, exclusively offered by T-L Irrigation, for improved track on track accuracy, pass after pass, year after year. **FL**



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PROJECTIONS AND PRICING



In the March Supply and Demand report, USDA revised slightly their projected quarterly beef price and production estimates. Currently, USDA projects a 3.2% increase in production this year over last year for the 1st quarter, 4.4% increase in the 2nd quarter, 4.9% increase in the 3rd quarter and 1.8% increase in the 4th quarter. In review, years 2014 and 2015 record reductions in beef production, caused by drought induced liquidation of the cow herd, nearly nationwide led us to this year – a year of rebuilding. It takes years to recover so production in 2016 is still less than years prior to 2014.


Projected price bands, according

to USDA, are as follows: 1st quarter 132 to 135, 2nd quarter 136 to 142, 3rd quarter 132 to 144 and 4th quarter 133 to 145. Frankly, it is difficult to project prices the further out you go. But it is apparent that doomsday is not being considered by USDA at the present time. It is interesting that the futures price is well under USDA projections. Perhaps the marketplace knows something we don't. What we think we know is Australia and New Zealand will likely export less beef to the US since they have experienced their own drought. Retail price is not drawing down near as fast as cattle price which could be affecting demand (though we doubt

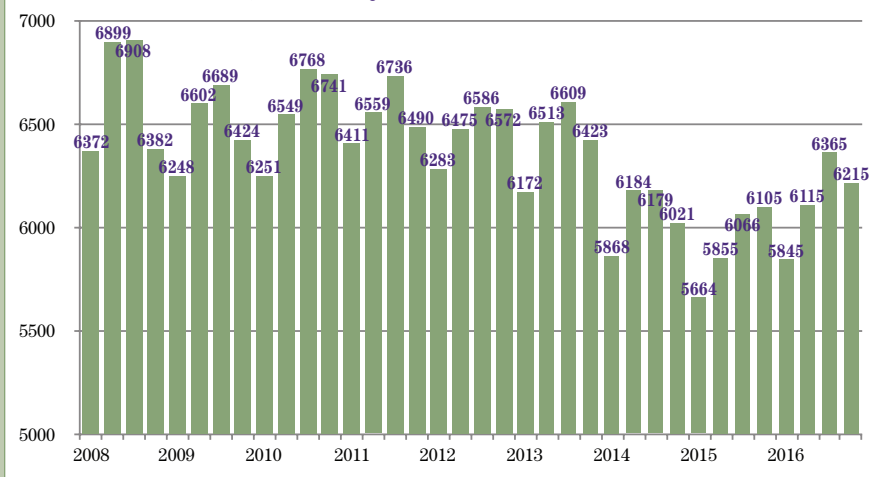
that since we eat it all). Competing meats are decreasing demand for beef (we think the affect is smaller than argued).

Bottom line, production is increasing so rallies in the market will likely be sold. Use rallies to hedge production using options. At the money options, in our opinion, are a better choice in this market climate because fundamentals change so rapidly. In other words, something could happen in the world marketplace that causes an unexpected significant rally. Options give the hedger the best advantage of both up and down markets. If the market goes down, the hedges are protecting them. If the market goes up, the hedger gains in the cash market.

The corn market looks sideways to us. Unless there is a significant weather event, price is likely to move sideways. However, the funds are very short the grain markets and if they decide to buy their way out of their short positions, an unexpected rally would be the result. We think feed costs should be covered using call options on pull backs.

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FETAL PROGRAMMING

The Importance of Nutrition in Early Pregnancy

BY HEATHER SMITH THOMAS

What a pregnant cow eats during early gestation—quantity and quality of various nutrients—can have long-lasting effect on the future of her calf. Most of the important organs and body systems of the fetus are formed during that time. Metabolism, muscle mass and consistency, and other important factors that become permanent traits for that calf are also influenced during those crucial early weeks.

Stephen P. Ford, PhD, Director, Center for the Study of Fetal Programming, University of Wyoming, did research on sheep for a number of years, and more recently with beef cattle. In 2001 he received a USDA grant to study impacts of decreased nutrition in cows, on growth and development of the fetus, and post-natal development.

Many producers calve early so they can take advantage of grass when it is most productive. “Females on a range/forage-based diet tend to be undernourished during

the first half of gestation,” he says. Fall forage may be dry, and some of the winter feeding programs may be inadequate for both the cows’ and fetuses’ needs. Cows may lose weight until green grass appears.

“We used to think these tiny fetuses didn’t need much nutrition in early gestation. Producers supplement cows during the last 1/3 of gestation, to bring body condition up before calving. But unfortunately this may be too late. We saw this after the drought in Wyoming. Quality of calves were born during those years was significantly reduced, even though body condition of cows at calving was good. But they’d been undernourished earlier—with poor grass growth during the drought,” says Ford.

During the first half of gestation is when the placenta develops (carrying all the nutrients to the fetus) and many vital fetal organs are developing. “They are developing the composition of cells they need,



to function at normal level. If cellular composition is altered, even if you increase the fetal size during late gestation with supplemental feeding, the composition will still be abnormal,” he explains.

He conducted an under-nutrition study in which a group of range beef cows from the University of Wyoming was underfed from day 30 to day 125 of gestation. “It is during this period that skeletal muscle fibers develop, and the pancreas, kidneys brain and other important organ systems are developing in the fetus. I wanted to under-nourish them 50% like we did with our sheep studies, but due to factors beyond my control, we didn’t drop to that level; they were fed about 60 to 70% of requirements,” says Ford.

“We had two groups. We underfed one group from day 30 to day 125 and fed the other group a normal maintenance ration. At day 125 we collected some fetuses, and fed the remaining undernourished cows—from day 126 to term—to bring body condition scores up so they equaled the normal group by day 220 of gestation.” This is similar to what happens on ranches when producers supplement their thinner cows during the latter

Early deprived fetuses had about half the normal number of nephrons in their kidneys. The nephrons are very important in helping remove toxins and metabolites from the blood stream for excretion.



cows and fetuses responded to under-nutrition. We had randomly assigned cows to these groups, but observed two distinct responses in our undernourished cows. Younger cows—either first or second calvers—gave different results than cows that had produced 3 or more calves prior to the study,” says Ford.

In younger cows, by mid-gestation their fetuses were significantly smaller than the fetuses of controlled cows due to intra-uterine growth retardation. Up to about 4 years of age, cows are still growing, so some of the nutrition goes toward continued growth of the cow’s body rather than into her fetus. Fetuses from those individuals were significantly deprived of nutrition, which decreased their growth rate.

By contrast, the older cows tended to have fetuses near normal in size at mid-gestation. “In the growth-retarded fetuses from

young cows, we found enlarged hearts, altered pancreatic and kidney development, and increase in brain size. The brain tends to grow at a normal rate even if the fetus is undernourished, because the brain is vital for fetal survival. There was a much heavier brain-weight-to-body-weight ratio in those growth-retarded fetuses,” explains Ford.

“We also saw decreases in skeletal muscle fiber development in undernourished fetuses. Since embryonic development of muscle tissue is complete by mid-gestation, this would theoretically result in decreased skeletal muscle mass in post-natal development. We let some fetuses go to term and discovered the insidious nature of this situation. All the calves were born at a similar weight, whether from the controls or the undernourished (and later “caught up”) animals. So the producer would never know, based on weight of the calf, whether the fetus had been ►

part of gestation.

“We collected some fetuses at mid-gestation. We found there was an effect of cow age on how the

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FETAL PROGRAMMING... from previous page deprived of nutrition at a critical point during gestation,” says Ford.

Post Natal Consequences

Calves born from nutrient-deprived cows had long-lasting effects. They seemed normal at birth, but were unable to remain healthy and perform optimally. Early deficiencies affect them the rest of their lives.

“We collected some fetuses right before term and found the one big difference—even though they had equalized in weight by the end of gestation—was that the early-deprived fetuses had about half the normal number of nephrons in their kidneys. The nephrons are very important in helping remove toxins and metabolites from the blood stream for excretion. If the number of nephrons is reduced and you put these animals in a feedlot,

they won't be able to process toxic compounds as efficiently. They are fed maximal amounts of nutrition and generating tremendous amounts of metabolites. If their kidneys are not functioning properly, they can't filter these metabolites as efficiently, which will affect growth rate and health,” Ford explains.

“If the kidney doesn't accomplish enough filtration, it produces a hormone that increases blood pressure, to force more blood through the kidney. This increase in blood pressure can have significant health effects, since these animals' cardiovascular system is adversely



affected and their hearts are already enlarged and sub-functional,” says Ford.

There were decreases in skeletal muscle mass in the nutrient-deprived off spring as they grew, and increases in adipose (fat) tissue. Early fetal malnutrition shifted carcass characteristics in a negative way.

“Young cows are growing until they are at least 4 years old. In

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Wyoming, and many other areas in the West, producers tend to baby first calf heifers—putting them in their own pastures and supplementing with extra nutrition. But once they've had a calf, these younger cows get thrown in with older cows." They can't compete effectively with older animals for feed, and tend to lose weight.

"Our data suggests that there are significant alterations in the quality of their calves if they are undernourished during this critical time in early gestation," says Ford. Even if birth weight is normal and these calves have normal viability, the way they respond to later situations in life is abnormal.

"Most people have heard about genotype and DNA and that a particular set of genes make that animal what it is. In recent years, we've found that intrauterine environment can alter gene expression patterns of an animal after birth, a process referred to as epigenetics. These changes in gene expression will alter the phenotype of an animal and thus its quality," he explains.

Even though you have two animals with identical genotype, if they are gestated in females on different nutritional regimens, they will turn out different. "They may look the same at birth, but if

you put them both in a feedlot one of them may get sick and the other may not. One may grow well and the other may not. The animal undergoes many more changes before birth than it ever will after birth," he says. If we don't enable the fetus to develop optimally and express a normal pattern of organ and tissue development, we alter the composition and quality of those organs. No matter what is done to the animal after it is born, we can't fully correct this early damage.

There are many implications for ranchers, to help them raise better quality calves. "Understanding nutritional needs of young cows versus older cows is important. We are learning more about fetal programming, and that we are actually able to change the phenotype of the fetus." **FL**



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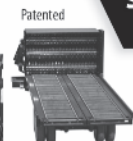
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Frazier Named to Lead NCBA

DENVER (March 22, 2016) – The National Cattlemen’s Beef Association has named Kendal Frazier its new chief executive officer. NCBA president Tracy Brunner made the announcement, saying he is confident that the nation’s oldest and largest cattle industry association is in good hands.

“It was the belief of the officers and others involved with the search process that NCBA owed it to our members, our stakeholders and the beef community to take

our time as we selected the right individual to serve as the next chief executive officer,” said Brunner. “Today, we can say with confidence that Kendal Frazier is the right leader for the association. With many years of experience working for state and national beef organizations, he has helped to guide our industry through some of its greatest challenges.

“Kendal’s dedication to NCBA and his leadership abilities have been tested and proven while serving as interim CEO since June 2015.

During that time, NCBA has not wavered from its responsibility to its members and affiliates as a grass-roots policy organization. Likewise, NCBA has continued its partnership with state beef councils to protect and increase beef demand.” **FL**

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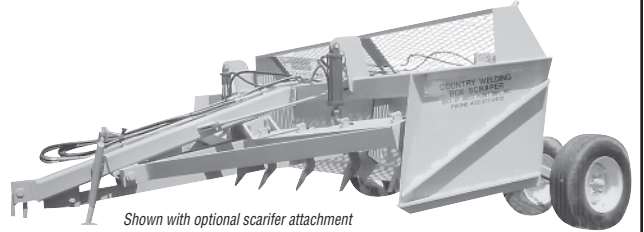


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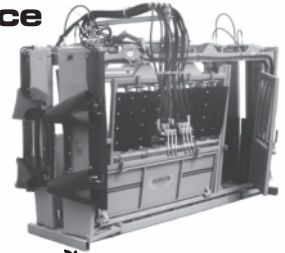


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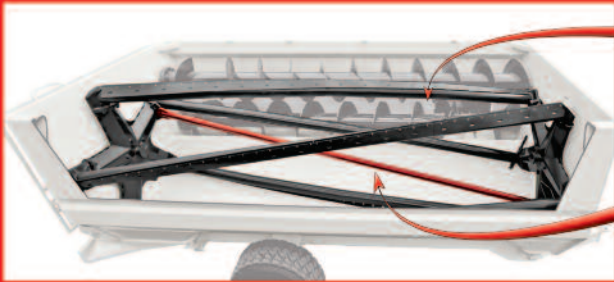
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