FEEDLOT®

FEEDER INFORMATION HIGHLIGHTS

Volume XXVIII Number 4 June 2020

$5.00

The Complete Feeding System

The combination of Roto-Mix stationary feed mixers and the correct size Roto-Mix feed delivery box make an accurate, efficient ration batching and delivery system.

Batch rations up to 1220 cu. ft. with a Roto-Mix Horizontal or up to 1300 cu. ft. with a Roto-Mix Vertical mixer. Combine the quick, gentle mixing action of a Roto-Mix Stationary with the efficient, cost effective delivery of a RDB belt floor or FDB chain floor delivery box to maximize profitability. Roto-Mix delivery boxes allow you to either match your feeder to the capacity of your stationary mixer, or with capacities up to 1900 cu.ft., choose to deliver multiple stationary batches in one trip!

RCFB-systm

Made in U.S.A.

www.rotomix.com

Call for more information! 620.225.1142

ROTO-MIX®

FEEDLOT

Volume XXVIII Number 4
June 2020


Jill Dunkel
Editor
feedlot@st-tel.net


Annita Lorimor
General Manager
feedlot@st-tel.net


Amy Spillman
Digital/Circulation Manager
circulation@feedlotmagazine.com


Greg Strong
Publisher


Robert A. Strong
Editor Emeritus

For National Sales Contact: **Bob Brunker,** J.L. Farmakis, Inc., 24 East Ave., #1350, New Canaan, CT 06840 / Email: bob@jlfarmakis.com / Sales Office: 203-834-8832

FEATURES

FEEDLOT FOCUS

Are Your Cattle Utilizing All the Nutrients Provided? 6
A look at anti-nutritional factors that can reduce nutrient uptake

Silage Making Priorities 10
Safety, scheduling, density and seal are just a few key items to consider

Ammoniation of Low Quality Forages 18
And old practice with new relevance

STOCKER SPECIAL

Sourcing the Southeast 8
Management upon arrival can turn risk into reward

PEST & PARASITE CONTROL

Deworming: An Important Piece to the Cattle Health Puzzle 13
Multiple factors plays a role in profitability

Anaplasmosis Update 14
Contemporary strains complicate treatment

Innovative Spray Technology for Fever Ticks 24
Field testing soon to be underway

MARKETING/MANAGEMENT

Crisis Leadership Strategies 22
Effective leadership requires a clear strategy

Cover photo by Amy Spillman

BY JILL J. DUNKEL

THE SURVIVOR Mentality

Surely many of you watched the television show "Survivor" at one point or another. If you haven't, individuals are placed in a remote area and must figure out how to survive and complete challenges along the way. Soon into the adventure, you see alliances forming, all the while people who are not as successful are sent packing. Soon these groups are smaller, and ultimately there is only one winner.

For the last two months, I feel like the beef industry has been on the set of "Survivor."

It's no secret there are differences of opinion within the industry. Topics like trade, mandatory Country of Origin Labeling, and the Beef Checkoff have divided cattlemen for years. But lately, with a giant helping of social media, we seem more divided than ever. And people who know little to nothing about these hot topics are sharing factoids left and right, blindly assuming everything you see on Facebook is accurate.

I'm willing to bet if you're on social media, at least a few of your friends have shared info-graphics about beef. Whether it's a push for "Only USA Beef Should Be In the USA" or "Why Does My Beef Cost So Much," they are spreading information.

Right now, our industry is in the spotlight. In the last few months, agriculture has taken center stage. Urban Americans who had no idea where their food came from are getting a glimpse at how important agriculture is to their survival. Farmers, ranchers, truck drivers, health care workers – they've all become heroes.

And that's why so many non-cattlemen have jumped on the beef factoid band wagon. Last month, I saw many of my non-ranching friends sharing inaccurate facts about our industry. I shook my head as they passionately spouted off wrong information all while I was thinking, "They just don't know." I finally got to the point I couldn't take it any more. These friends thought they were supporting ranchers, but really, they were duped into "facts via Facebook."

That's when I wrote a post about the need for beef trade, and explained how trade supported a good portion of cattle prices. My uneducated friends were amazed, and were so glad for my information. They wanted to support ranchers, but had no idea they were sharing inaccurate material. The last time I checked, my post had been shared over 500 times.

Then last week another friend – an educator at a college – commented, "We really need to look into the sanitation at meat packing plants because all these workers are getting sick!" Talk about undermining the perception of our product! If you've ever been in a major meat processing facility, you know they take sanitation seriously. However, much of the spread of coronavirus tied to processing facilities is due to the transportation and living arrangements of some of the workers.

Folks, our episode of Survivor is about half way through the season. Allied groups have formed, and the pool of players is getting smaller. But it doesn't have to be that way. In a time when our food supply is keenly in the public eye, it's time to educate. Education doesn't come in the form of a video rant. And education doesn't have to take sides. We are each entitled to our opinion on hot topics. But when it comes to the safety and wholesomeness of beef, we need to educate our consumers in a thoughtful way. As an industry, we are all on this "remote island" together, and we all need to win this game of Survivor. FL

MICRO-CELL®

Even the Smallest Components Can Have a Big Impact

Micro-Cell® probiotics are a small yet critical component and help your cattle maintain an ideal intestinal balance.

According to research trials, the strain *Lactobacillus acidolphilus* BT-1386 found in Micro-Cell probiotics has been shown to:

- Decrease shedding of *E. coli* O157:H7[1]
- Reduce re-infection of *Salmonella*[1]
- Increase average daily gain[2]
- Improve feed to gain[3]

Ask your nutritionist about including Micro-Cell in your ration today!
Learn more at Micro-Cell-US.com.

1 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; 3(71): 539-544.
2 Lallemand Animal Nutrition. Unpublished. United States. 1996.
3 Hutcheson D and Lallemand Animal Nutrition. Unpublished. United States. 1986.

LALLEMAND ANIMAL NUTRITION* ■ *SPECIFIC FOR YOUR SUCCESS
www.lallemandanimalnutrition.com

LALLEMAND

Are Your Cattle Utilizing All the Nutrients Being Provided?

A lot of resources go into building a good feedlot ration, including optimized ingredient sourcing, proper mixing and timely delivery of feed to ensure cattle are getting the right nutrients. But are the cattle utilizing all of the nutrients being delivered? Or is nutrient uptake getting blocked?

A panel of beef nutritionists from Provimi recently discussed anti-nutritional factors that can reduce nutrient uptake and their recommendations for mitigating them, so cattle can get all the nutrients they need in the most effective and efficient way.

What is nutrient utilization?

Tim Osborn, PhD: Nutrient utilization is the conversion of nutrients in the feed to meet the maintenance, growth and production requirements of the animal. These requirements could be in the form of animal gain, milk production, tissue maintenance and more. An alternative way to think about it is the amount of nutrients the animal is able to use as opposed to what they are actually eating —nutrient capture versus nutrients passing through the system. The main goal of a balanced ration is to help the animal capture as many nutrients as possible without wasting and passing them into the environment. Proper nutrient utilization means the animal is processing the nutrients in the most economical way for the producer, the most efficient way for the animal and the most sustainable way for the land.

What are anti-nutritional factors?

John Marks, MS: Anti-nutritional factors can be anything that prevents nutrient uptake in the body. They can come from just about anywhere and could be in the form of poor management practices, environmental factors, physical factors and metabolic factors, to name a few. Some examples of anti-nutritional factors include molds and yeasts, poor bunk management, antagonists like trace minerals, incorrectly balanced rations, particle size, animal pen space and weather.

Dusty Abney, PhD: As nutritionists, we tend to see nutrient imbalances quite a bit which can have a huge impact on animal productivity. A prime example would be zinc. Many correctly think of zinc as a very necessary nutrient, but if you get too much of it in the diet, it becomes an antagonist. When there's too much zinc in the diet it can greatly reduce the absorption of copper by the animal, potentially creating a copper deficiency. Too much of a good thing can turn bad, which is why creating balance and synchrony in the diet is vital to reducing anti-nutritional factors in feed. This is just one example why it's important to work with your trusted nutritional advisor when making changes to your operation, whether it's something like bunk management or adjustments to the diet.

How do you know if there's an issue with nutrient utilization?

Steve Stafford, MS: While looking at feed intake over time, hair coat, manure, and performance can be helpful, these are lagging indicators and don't necessarily give an updated look into the current state. It takes vigilance in ration formulation and a holistic look at external factors to determine any issues with nutrient utilization. Since anti-nutritional factors can be a very broad problem, it's important to look at the whole picture. Has there been a heat stress event? Was a drastic change to the diet made without consulting a nutritionist? Is the animal exhibiting signs of illness? Is the TMR mixer working properly? Is the TMR being mixed long enough? Having a trusted advisor that understands your entire operation can really pay off when it comes to identifying and resolving potential problems.

John Marks, MS: Once you've reviewed your operation and management practices, taking bunk samples can be very helpful in understanding what was formulated versus what the animals were fed. A personal example I can share perfectly exhibits why we have to take all factors into consideration when looking for potential anti-nutritional factors. In this case, I sent bunk samples from a feed yard for analysis and when I got the results back, it didn't look anything like the

ration I formulated. As it happens, one of the trucks had an issue and was in and out of the shop on four separate occasions, which had an impact on feed mixing. Due to this one factor, the ration I had put together on paper looked very different from the ration in the bunk.

What can producers do to combat anti-nutritional factors?

Anna Taylor, PhD: Understanding the background of the cattle you're sourcing can have a huge impact on how to adapt cattle to the feedlot. The nutritional program cattle came from prior to the feedlot, can be a major anti-nutritional factor. Variations in feed quality, nutrient balance and overall management can have implications on the success of the animal once it gets to your feedlot. When possible, identify any previous management used with a set of cattle which can help producers make better purchasing decisions.

Dusty Abney, PhD: Taking a team approach can be extremely helpful when working towards your operational goal and limiting your risk of anti-nutritional factors. Gathering your team together can help open the paths of communication among ownership, nutritionists, the feed mill crew, etc. Overall, it is better to look for anti-nutritional factors before they become a problem rather than waiting until issues begin to arise. Prevention is almost invariably more cost effective than the cure after a problem is apparent. Putting standard operating procedures in place and training employees on the importance of these procedures can make a huge difference in long-term success. When everyone on the team can understand the goals and the path to achieving them, profitability becomes much more likely.

Do you have any final recommendations to help ensure nutrient utilization?

Wesley Moore, MS: When buying ingredients, make sure you understand exactly what you're buying and how it fits into your program. Oftentimes inexpensive, and likely poor quality, ingredients are how anti-nutritional factors begin. Work with your nutritionist to determine whether feed additives are appropriate and where you might utilize them. Don't get lax on your nutritional program; it takes continuous management and may change throughout the year. Finally, get out there and look at your cattle. Keep a constant eye out for external factors that may be negatively impacting your animals' nutrient utilization. While anti-nutritional factors may not be completely avoidable, proper management and a good ration can help reduce your operation's risk. FL

BY DR. JOE RODER, DIRECTOR, CATTLE TECHNICAL SERVICES AT HUVEPHARMA, INC. (U.S.)

Sourcing the Southeast

Management upon arrival can turn risk into reward

When it comes to sourcing and receiving cattle from the southeast – where one third of calves come from - following management protocols can reduce risk, both for the calves and those managing them. Using proactive management protocols, when receiving freshly weaned calves at stocker or feedlot facilities, can make a positive difference in calves' future health and performance. Those who take the time to manage high risks calves have figured out that through management it's possible to bring out each calf's full potential.

So, what management techniques work best when receiving calves? Here's five steps to take when the trucks roll in.

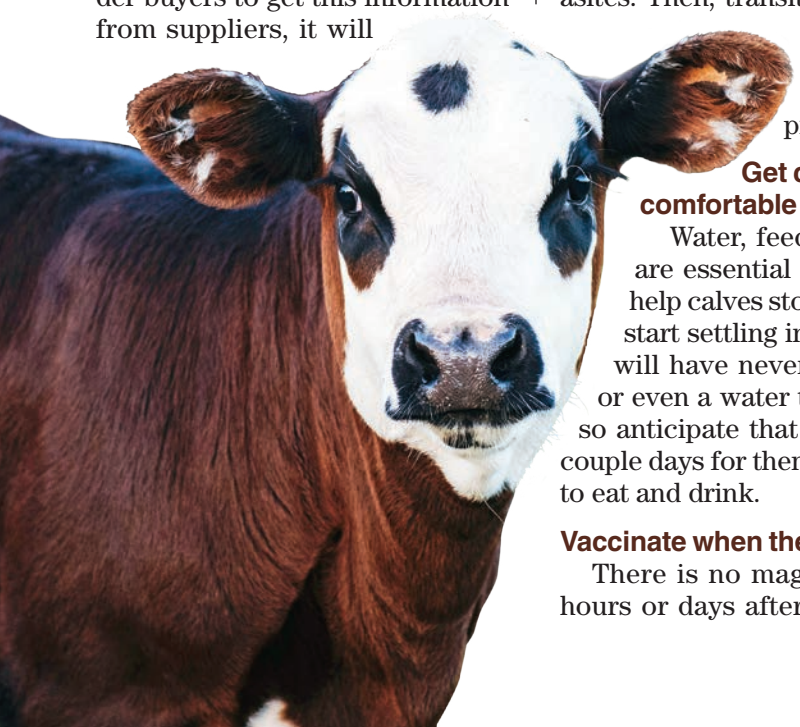
Consider the source

When possible, evaluate where the calves came from and the source of their stress. Was it a long haul? Is it a mixed group of calves from different farm sources? During transport, did the calves move through wet or cold weather? How were the calves handled before they got on the truck and when were they weaned? If you can build a relationship with order buyers to get this information from suppliers, it will help determine the level of stress calves may be experiencing and how much attention they need at receiving.

Recognize that if calves originated on smaller-sized farms - which is typical in the Southeast – they likely had to be mixed together to fill a potload, and possibly came from an operation that may not have had the facilities or manpower to do pre-weaning management. These calves still have potential but are going to need extra management.

Take immediate action

While it's nice to hope for the best, it's more practical to expect the worst. If calves have an unknown health history, you should presume that worms and coccidia are robbing nutrients from the calf's gut and prohibiting its immune system from fully responding. To effectively deworm animals for both internal and external parasites, immediately upon arrival, consider a two-pronged approach using both an ivermectin injectable and a soluble drench. Also consider administering a coccidiostat in the water or feed for the first 30 to 45 days to help control coccidian parasites. Then, transition to a monensin product for continued coccidiosis prevention.



Get calves comfortable

Water, feed and bedding are essential ingredients to help calves stop bawling and start settling in. Many calves will have never seen a bunk or even a water trough before, so anticipate that it may take a couple days for them to learn how to eat and drink.

Vaccinate when the time is right

There is no magic number of hours or days after arrival when vaccines should be administered. It's going to depend on the group of calves. It could be 12 hours or several days. Calves need to be rested and filled up with feed and water in order to maximize the number of successful responses to the vaccination. Watch for calves to be up eating and drinking and no longer bawling. Then, consider administering a 3-way or 5-way vaccine that protects against the major viral pathogens including Infectious Bovine Rhinotracheitis (IBR), Bovine Viral Diarrhea Virus (BVDV) Type 1a and 2, Parainfluenza (PI3), Bovine Respiratory Syncytial Virus (BRSV), Mannehimia haemolytica and Pasteurella multocida.

Work together

Throughout this receiving process, take a team approach to achieve the best outcome. There is no one size fits all strategy. Work with your veterinarian to assess what the calves need. Communicate with others in the industry to learn from each other and better understand the management needs of calves from certain regions of the country. When we build these relationships and trust each other, the sharing and feedback allows the entire cattle industry to survive and thrive for the future.

Those who figure out how to manage high risk calves are the ones who realize the rewards those calves can produce.

Dr. Joe Roder is the Director of Cattle Technical Services at Huvepharma, Inc. Dr. Roder, a veterinarian board certified in veterinary toxicology, supports the direction of the Cattle Business Unit and heads Huvepharma's team of Technical Service Veterinarians and Nutritionists. This team leads the charge in prioritizing product field trials and introducing new, innovative products to the U.S. cattle market. To learn more about Huvepharma and its products, visit Huvepharma.us. FL

HUVEPHARMA®

TWO CHOICES
ONE EASY DECISION

Monovet® 90
(Monensin Type A Medicated Article)

There are only so many ways to manage rations that won't compromise quality. Monovet is the newest Monensin on the market that can improve feed efficiency, increase rate of weight gain, and prevent and control coccidiosis caused by *Eimeria bovis* and *Eimeria zuernii.*

Visit our website for more product information
at www.HUVEPHARMA.us

MON.AD.09.19B

Caution: Do not feed undiluted. Do not allow horses access to feeds, it can be fatal. Use in unapproved species may result in toxic reactions.

BY DR. KEITH BOLSEN AND JILL J. DUNKEL

SILAGE-MAKING PRIORITIES

While the spring forages have already been ensiled, alfalfa, corn, sorghum, and high moisture corn will be headed to the silage pits soon at many feedyards and cattle operations. Dr. Keith Bolsen, Professor Emeritus, Kansas State University, has been working with silage for 50 years and shares some important reminders about how to have a safe and efficient silage program in 2020.

The way we put up silage has really changed in the last several years, according to Dr. Bolsen. There are crop growers and multiple contractors who are responsible for the chopping, hauling, packing, and sealing, and each plays a specialized role, especially in the High Plains. Dr. Bolsen refers to the feedyard and this group of specialists as the "silage pentagon," a team of players all working together to put up the best possible silage. It is essential that each specialist knows the feedyard's expectations, gets their job done in an acceptable and timely manner, and follows safety guidelines.

Safety First

"There is a lot of extra vehicle traffic and people at most feedyards during these two- to three-week harvest windows. Truckers are delivering forage, someone is taking a forage sample, tractor operators are packing, a covering contractor's crew is sealing the silage surface, and it can all be happening at the same time," Bolsen said. Sending these employees home safe at the end of the day should be the number one goal in every silage program.

Feedyards and chopping, packing, and covering contractors should all schedule a mandatory meeting to discuss safety guidelines and expectations for the silage harvest with their employees. Everyone whose 'feet touch the ground' in the field or near the bunker silo, silage pile, scales, or any machinery or equipment must wear a high visibility safety vest.

Silage Priorities – A High Density, An Effective Seal & Apply an Inoculant

These three practices are crucial in a well-managed silage program, and achieving a high density leads the way. Why? Silage density and 'shrink loss,' measured as tons of dry matter (DM) ensiled versus tons of DM actually fed are inversely related. Because today's high capacity forage harvesters get the crop out of the field faster, Dr. Bolsen contends, "we have not kept up" with packing density. Often there are not enough tractors or enough tractor weight to properly pack every load to the desired density, which is typically 15 to 17 lbs. of DM per cubic foot. There must be good communication throughout the day among the feedyard, the chopping contractor, and the packing contractor. The crop delivery rate in tons per hour to the bunker or pile should be measured in real time throughout the day, and the packing contractor should be prepared to add another tractor. If we reach the silage density target, the reduced 'shrink loss' justifies an extra tractor, according to Bolsen.

A few guidelines and management practices that can increase density include:

- Only an experienced employee should operate a pack tractor.
- The arrival of trucks and forage to the bunker or pile should be evenly spaced during the day.
- The forage packing 'ramp' in bunkers and piles should not exceed

a 1 to 3 slope (i.e., 1 foot of vertical for each 3 feet of horizontal).

- Forage should be spread in uniform layers of 4 to 6 inches, and packing must be continuous throughout the entire filling process.
- Increase the number of pack tractor passes over each forage layer. Caution: This usually requires an additional pack tractor.
- A pack tractor's outside tires should be adjacent to the tire track of the previous tractor pass.
- When possible, drive up and back down the forage ramp. Avoid making 180 degrees turns on the ramp or floor of a bunker or front apron of a pile.
- When two or more pack tractors are used, establish a packing procedure to increase the efficiency of the tractors and avoid collisions.
- Packing for a longer time at the end of the day is of little value because it does not remove

air trapped in the forage that is more than 1.5 to 2 feet below the surface.

Dr. Bolsen believes effective sealing of bunkers and piles is the second most important practice in a feedyard's silage program today. Scheduling the covering contractor is critical. Any delay in sealing increases the shrink loss and the amount of visible surface-spoilage in the outer one to three feet of silage.

Bolsen referenced a Cal Poly study that looked at shrink loss in relation to when corn silage piles were sealed. A 24-hour delay in sealing a produced a 25 percent greater shrink loss in the outer 1.5 feet after 90 days compared to a pile that was sealed immediately after packing. "Every 24 hours you delay and leave the surface uncovered, you're experiencing substantial loss," he says.

Bolsen also recommends that a true oxygen barrier (OB) film be used under the sheet of standard white on black plastic. "We need a higher use rate of OB film in the ►

Silage... from previous page

silage industry. It's a "game changer" and dramatically reduces the shrink loss in the outer one to three feet of a bunker or pile. Losses can be cut by 50% or more."

A few guidelines and management practices that help minimize surface spoiled silage include:

- The forage surface should be sealed as soon as possible after filling is completed. Note: Fill bunkers and piles from back to front, which allows sealing to occur every 1 or 2 days.
- The OB film and plastic sheet should overlap on the forage surface by a minimum of 3 feet and should reach about 4 feet off the silage surface around the perimeter of piles.
- The OB film and plastic sheet should be placed so runoff water cannot come in contact with the silage.
- Uniform weight should be placed on the sealing material(s) over the entire surface of a bunker or pile, and the weight placed on the overlaps should be doubled or tripled.
  - Bias-ply truck sidewalls are the most common alternative to full-casing tires.
  - Gravel bags are an effective way to anchor the overlaps, and gravel bags provide a heavy, uniform weight at the interface of the sealing material(s) and bunker silo walls.
- Regular inspection and repair of the sealing material(s) is recommended, because if air and water penetrate the silage mass, surface spoilage can develop quickly.
- Use caution when removing the sealing material(s) near the edge of the feed-out face. Note: When working on the top of an overfilled bunker silo or silage pile, wear a safety harness tethered with a heavy rope or cable for fall protection.

Today, applying an effective lactic acid bacterial inoculant at the forage harvester is recognized as an important practice in every well-managed silage program. Why? Inoculants promote a rapid and efficient conversion of fermentable carbohydrates to lactic acid, which improves both preservation efficiency (i.e., reduced shrink loss) and utilization efficiency (i.e., better feed conversion). Inoculants that contain Lactobacillus buchneri also extend the 'bunklife' during feed-out, which is important for corn silage fed in the warm weather months or when face management is less than ideal.

Final Thoughts

Bolsen says there is a positive relationship between silage safety and shrink loss. "Almost everything we do to make a silage program safer also makes it more efficient. If I add an extra pack tractor, I reach a higher density and the silage will take up less space (volume). This will lower the feed-out face, and the bunker or pile will be safer."

A successful silage program at a feedyard takes planning, preparation, and commitment. It's also not a perfect world and details can and do 'fall through the cracks.' This can happen at any time from the first load of forage delivered to the bunker or pile to the last. Equipment breakdowns, weather delays, moving forage harvesters to a new location, a shorthanded crew … these things happen. Good communication between the feedyard and the other four points of the pentagon can help minimize the disruption and its effect on the silage program.

The Keith Bolsen Silage Safety Foundation is a non-profit corporation funded through donations and gifts and is dedicated to promoting safe silage management practices. The Foundation supplies education materials free of charge to anyone who requests them, including a "Silage Safety 101" handbook in English and Spanish, and offers on-site silage safety workshops and consultation. Contact the Foundation at: www.silagesafety.org FL

Deworming: An Important Piece to the Cattle Health Puzzle

Every factor impacting cattle health plays a role in determining profitability

When your goal is to produce more high-quality meat, it's pertinent to ensure your herd has every aspect of its health well-maintained. Something as simple as a consistent deworming protocol can be a small piece to your animal's health and wellness program, but can have a resounding impact on its performance.

Joe Gillespie, DVM, Boehringer Ingelheim, encourages producers to implement a consistent deworming protocol to help cattle maintain optimal health and produce a high-quality end product.

"If cattle are in a better place of health, they're going to have better feed conversion and better utilization of nutrition, which ultimately should have a positive impact on end-product quality," said Dr. Gillespie.

He also stresses that, though important, deworming is only a piece of the puzzle.

"There are many management factors that impact the potential market value of an animal, including genetics, nutrition, vaccinations and parasite control methods," he explained. "Maintaining a low parasitic load is important to an animal's ability to convert feed into pounds."

Protect your herd from productivity-limiting parasites

A heavy parasite load doesn't often manifest itself in obvious ways, which is one of the reasons an ongoing treatment program is so vital.

A heavy parasite burden in a cow's intestinal tract competes to ingest the nutrients the animal needs to thrive. This competition can suppress the cow's appetite and, in turn, take away its ability to gain optimal weight. Additionally, parasites can damage the animal's intestinal lining and decrease its ability to respond favorably to vaccinations.

Properly time your deworming protocol

If a producer hasn't given much thought to a deworming protocol in the past, it is never too late to put one in place.

"Deworming is an area of animal health where it's easy to lose focus," said Dr. Gillespie. "Start by discussing your goals and options with your veterinarian, who will likely have geographic-specific insights to help formulate the best approach for your herd.

As a general rule, Dr. Gillespie recommends implementing a deworming protocol twice a year.

For producers looking for added convenience and efficacy throughout the year, he recommends an extended-release injection. A recent study showed a significant increase in average daily gains for cattle receiving an eprinomectin extended-release injectable, compared to those that received a topical ivermectin. Further, an economic advantage of $5.86 per animal was observed in the extended-release group.

"One deworming myth that I want to correct is that 'all dewormers are the same,' because they aren't," stressed Dr. Gillespie. "There's a lot of technology that has gone into the production of the different types of dewormers that are available. And it's important for producers and veterinarians to find the antiparasitic that's going to best fit their situation." FL

BY JILL J. DUNKEL

Anaplasmosis Update

Contemporary strains of the disease are proving less sensitive to traditional therapies.

"Dad, I found eight dead cows. And another one just fell over dead in front of me."

That's a phone call that no one wants to receive, yet it was reality for Jason Lewis. Lewis and his family ranch near Strong City, Kansas, in the heart of the Flint Hills. Lewis had always taken pride on how well the family took care of their animals, and to hear those words from his son was a very humbling experience.

The number of dead continued to grow, and soon Lewis learned through the help of his veterinarian many of the cows in his herd had anaplasmosis. "Anaplas" as it's known is not a new disease, but the thoughts on prevention and treatment are changing in the last few years.

Before the Veterinary Feed Directive (VFD), producers often used a low dose of chlortetracycline (CTC) in blocks or free choice mineral to fend off anaplasmosis. However now producers must get a VFD from their veterinarian to feed CTC to control anaplasmosis in their herds. And there are hints on the horizon that some strains of anaplasmosis may be developing resistance to some typical therapies.

Kathryn Reif, Ph.D., has dedicated the last decade to researching anaplasmosis, first while working for the USDA and now as assistant professor in the Department of Diagnostic Medicine/Pathobiology at the College of Veterinary Medicine at Kansas State University.

She says anaplasmosis is a real problem for producers. In an extensive study of 925 Kansas herds, 47% were actively infected with the agent of anaplasmosis. On the eastern side of the state, that number was closer to 80%. Preliminary results from a working group in Arkansas found that almost 90% of their herds were infected at some level. Upon first infection with *Anaplasma marginale*, the bacterial pathogen that causes anaplasmosis, an animal will become anemic because the red blood cells that the pathogen infects are removed, and removal of infected red blood cells too fast can lead to sudden anemia. These anemic cattle can be difficult to spot in a herd. Once animals recover from this first phase of the disease, they become carriers of the disease because most cattle are unable to fully clear infection.

"The levels within a herd could be wide ranging," Reif said. "It tends to come in waves. Sometimes you see the loss of animals, or sometimes animals are stressed and get sick, or maybe new animals were introduced and exposed others in the herd."

Reif explained that producers often don't see clinical disease in cattle carrying the pathogen. As long as their cattle are healthy, animals with a good immune system effectively can repress the bacteria. But bacteria are always trying to escape the immune response. When an animal is immunosuppressed, under stress or maybe has underlying disease, the animal's immune system may no longer be able to control the pathogen. That's when clinical disease can occur again.

Reif's primary research is focused on evaluating the efficacy of antimicrobials, and she says some treatments don't appear to be working as effectively as in the past. Until very recently, tetracyclines were the only therapies ►

NEW OPTION FOR TREATMENT OF POTENTIALLY DEADLY ANAPLASMOSIS

Bovine anaplasmosis isn't a new disease but it can come as a surprise to producers who have not yet seen it in their herds. "It is the most humbling experience. You think you're doing your best to prevent illness in your cattle, then anaplasmosis hits," recalls Jason Lewis of Division Ranch near Strong City, Kan. "I thought I was doing everything I could for my herd, and it was like a slap in the face. In one week, everything changed."

September 2017 was when everything changed. Lewis received a call from his youngest son, Jaron, who was checking on their herd and reported eight cows were dead. "I was on the phone with my son when one cow dropped dead right in front of him." Lewis lost 14 head in that outbreak, and he's been vigilant ever since.

Dr. Kathryn Reif, assistant professor in the Department of Diagnostic Medicine/Pathobiology in the College of Veterinary Medicine at Kansas State University, has been studying anaplasmosis in cattle for nearly 10 years. "Anaplasmosis is a disease caused by a bacterial pathogen, *Anaplasma marginale*, the pathogen that lives inside red blood cells of cattle. It is the destruction of those red blood cells that ultimately causes the hallmark sign of anaplasmosis, which is anemia," Reif explained.

"Ticks are the natural vectors for disease transmission, and cattle of all ages are susceptible to becoming infected. However, adult animals about two years old or older are more susceptible to showing greater clinical signs of disease because they are slower to replace the destroyed infected red blood cells compared to calves," Reif added. "Once an animal is infected, those animals tend to remain infected for the duration of their life and serve as reservoirs for subsequent transmission events."

Anaplasmosis, like bovine respiratory disease, can be difficult to diagnose. Similar to Lewis, sometimes the first indication of a problem is the discovery of dead cattle.[1] Until now, tetracycline antimicrobials, oxytetracycline or chlortetracycline (CTC) medicated feed, were the only drugs used in the U.S. for treatment of anaplasmosis. In some areas, vaccines are available to increase resistance to animals developing clinical anaplasmosis.

In April, Bayer Animal Health received conditional approval from the FDA for Baytril® 100-CA1 (enrofloxacin) Injectable Solution for the treatment of clinical anaplasmosis associated with *Anaplasma marginale* in replacement dairy heifers under 20 months of age and all classes of beef cattle except beef calves less than 2 months of age and beef bulls of any age intended for breeding.

"Baytril 100-CA1 contains the proven molecule, enrofloxacin," said Dr. Jim Little, veterinary scientific liaison with Bayer Animal Health. "Because of the need for additional options for treatment of clinical anaplasmosis in cattle, the FDA granted Baytril 100-CA1 a Conditional Approval (CA) to make it available to cattle veterinarians and producers sooner, pending a full demonstration of effectiveness."

With positive cases of anaplasmosis in cattle found in almost every U.S. state[2,3], Lewis believes it isn't a case of if, but when producers will experience the disease in their herds.

Map indicates the greatest risk areas for anaplasmosis infections.

Source: Kansas State University

Little also reminded producers that tick control is an important part of an overall parasite management program. "There are a variety of effective parasiticides available in many convenient forms such as ear tags, pour-ons and sprays." However, when an anaplasmosis outbreak hits, he reminds producers to "always consult your veterinarian for treatment options."

See product label for complete product information, indications and application instructions.

Federal law restricts Baytril 100-CA1 to use by or on the order of a licensed veterinarian. Extra-label use of Baytril 100-CA1 in food-producing animals is prohibited.

[1] Whittier, D. Anaplasmosis in beef cattle. Drover's. https://www.drovers.com/article/anaplasmosis-beef-cattle Oct. 27, 2015. Accessed February 21, 2020.
[2] Kocan K, de la Fuente J, Blouin E, et al. (2010). The natural history of Anaplasma marginale. *Vet Parasitol*. 167(2-4):95-107.
[3] Iowa State University. VDL Anaplasmosis. Available at: https://vetmed.iastate.edu/story/vdl-anaplasmosis. Accessed: April 21, 2020.

Baytril® 100-CA1
(enrofloxacin)

Anaplasmosis Update... *from previous page*

approved to treat anaplasmosis. However, intensive use of tetracyclines in the cattle industry may have provided selection pressure leading to "contemporary strains" of the pathogen being less susceptible to tetracyclines.

After losing several cows to anaplasmosis, Lewis tested all of his animals. Very few of his home-raised cows were carriers. It was slightly more prevalent in cows he purchased, and he was surprised to find out that his herd had multiple strains of the pathogen.

"It's coming together as a potential new big issue," Reif said. "With historic strains of anaplasmosis, there are some inherit differences in susceptibility, but they are largely controlled. New strains appear less affected by chlortetracycline. We are working on several studies to help better define the susceptibility of contemporary strains to antimicrobials like chlortetracycline."

Low dose chlortetracycline can be fed year round with a VFD, however current doses may be having less of an effect this pathogen.

"The good news is a totally different class of antimicrobials (fluoroquinolones) has been approved for treatment of anaplasmosis. There is still a role for chlortetracycline, but this new class of antimicrobials provides another option for producers to treat animals clinically ill with the disease, especially if the disease is caused by strains of the pathogen less susceptible to tetracycline antimicrobials," Reif said.

Part of the difference is in how the antimicrobials work. Tetracyclines stop the bacteria in their tracks; they stop the bacteria from replicating, but they don't kill the bacteria. The animal's immune response kills the bacteria. Enrofloxacin (trade name of Baytril 100-CA1) kills the bacteria and was recently FDA approved for treatment of clinical anaplasmosis in cattle. This can be very important when trying to save an animal that's sick with anaplasmosis that also has a weakened immune response.

"Dad, I found eight dead cows. And another one just fell over dead in front of me."

"It's another tool in the tool box for producers," Reif said. "It's important to have options, and reduce selective pressure that promotes resistance." Effective treatments coupled with good vector control are important, as the disease is often spread by ticks.

Another tool is an anaplasmosis vaccine, which is currently only available through a veterinarian. The vaccine was developed by scientists at Louisiana State University and is only approved as an experimental vaccine; however, no data on the efficacy of this vaccine is available.

Lewis began using the vaccine in 2017, and has not treated an animal for anaplasmosis since. "Several neighboring ranches are doing the same thing. So far, so good," he said. He also continues to utilize a VFD to feed chlortetracycline. But he gives a strong warning to ranchers to be prepared.

"I don't care where you are, you're going to experience it. You need to be ready and on the lookout for it. When it went south, it went south fast. I thought I was doing everything right for my cows, and this was a slap in the face." FL

MULTIMIN® 90

An injectable aqueous supplemental source of zinc, manganese, selenium and copper

KEEP OUT OF REACH OF CHILDREN

CAUTION: FEDERAL LAW RESTRICTS THIS DRUG TO USE BY OR ON THE ORDER OF A LICENSED VETERINARIAN.

ACTIVE SUBSTANCES PER ML:

Zinc	60 mg/mL
Manganese	10 mg/mL
Selenium	5 mg/mL
Copper	15 mg/mL

OTHER SUBSTANCES:
Chlorocresol 0.1% w/v (as preservative).

DOSAGE RECOMMENDATIONS:

CALVES: Up to 1 year	1 mL/per 100 lbs. bodyweight
CATTLE: From 1-2 years	1 mL/per 150 lbs. bodyweight
CATTLE: Over 2 years	1 mL/per 200 lbs. bodyweight

PRECAUTION:
Selenium and copper are toxic if administered in excess.

Always follow recommended label dose.

Do not overdose.

It is recommended that accurate body weight is determined prior to treatment.

Do not use concurrently with other injectable selenium and copper products.

Do not use concurrently with selenium or copper boluses.

Do not use in emaciated cattle with a BCS of 1 in dairy or 1-3 in beef.

Consult your veterinarian.

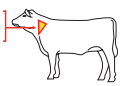
CAUTION:
Slight local reaction may occur for about 30 seconds after injection. A slight swelling may be observed at injection site for a few days after administration. Use standard aseptic procedures during administration of injections to reduce the risk of injection site abscesses or lesions.

DIRECTIONS:
This product is only for use in cattle.

MULTIMIN® 90 is to be given subcutaneously (under the skin) ONLY.

It is recommended to administer the product in accordance with Beef Quality Assurance (BQA) guidelines. Minimum distance between injection sites for the MULTIMIN® 90 product and other injection sites should be at least 4 inches.

Inject under the loose skin of the middle of the side of the neck. Max volume per injection site is 7 ml.



Store Between 15°C and 30°C (59°F and 86°F).

SUPPLEMENTATION PROGRAM	
BULLS	3 times per year
BEEF COWS	4 weeks before breeding 4 weeks before calving
DAIRY COWS	4 weeks before calving 4 weeks before insemination at dry-off
CALVES	at birth at 3 months and/or weaning
HEIFERS	every 3 months – especially 4 weeks before breeding
(program gives planned dates that can be varied to suit management programs)	

DOSAGE TABLE			
ANIMAL WEIGHT (lbs)	CALVES UP TO 1 YEAR 1 ml/100 lb BW	CATTLE 1 - 2 YEARS 1 ml/150 lb BW	CATTLE > 2 YEARS 1 ml/200 lb BW
50	0.5 ml	-	-
100	1 ml	-	-
150	1.5 ml	-	-
200	2 ml	-	-
300	3 ml	-	-
400	4 ml	-	-
500	5 ml	-	-
600	6 ml	-	-
700	7 ml	-	-
800	-	5.3 ml	-
900	-	6 ml	-
1000	-	6.6 ml	5 ml
1100	-	-	5.5 ml
1200	-	-	6 ml
1300	-	-	6.5 ml
1400	-	-	7 ml

Packaged in 100 mL & 500 mL size

NDC No. 49920-006-01 NDC No. 49920-006-05

TAKE TIME OBSERVE LABEL DIRECTIONS

MANUFACTURED FOR:
MULTIMIN NORTH AMERICA, INC.
Fort Collins, CO 80528

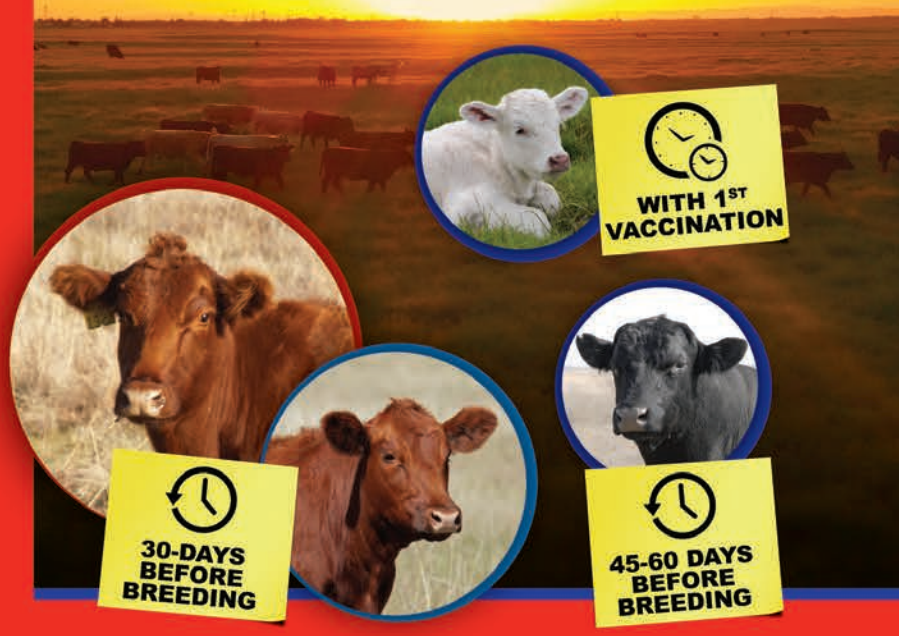
℞

10 YEARS MULTIMIN® 90

ARE YOUR CATTLE *Really* BREED-READY?

Timing is everything – With every cow/heifer you only have one breeding season a year. Wouldn't you want to have as many cows/heifers and bulls as breedy-ready as possible?

DON'T COMPROMISE YOUR CATTLE REPRODUCTION & HEALTH – INJECT MULTIMIN® 90



Learn More

℞ REQUIRED

www.cattlebreedready.com

1.866.269.6467

BY DRS. JASON WARNER AND KARL HARBORTH
GREAT PLAINS LIVESTOCK CONSULTING, INC

Ammoniation of Low Quality Forages: An Old Practice With New Relevance?

In 1964, Bob Dylan released his popular song and album "The Times They Are a-Changin." Although this song was recorded 56 years ago, it is regarded by many as one of the most highly influential songs in American history and it seems quite fitting to reference it here for this discussion. The underlying message of Dylan's work is one of continual, lasting change, and we would all agree that our lives and industry have certainly changed over the last few months.

Check the plastic covering the treated forage for leaks, and use soil to cover the edge of the plastic to hold it in place and prevent ammonia from escaping.

At the time of this writing (April 2020), ethanol production has sharply decreased for numerous reasons causing widespread shortages of corn milling by-products which have otherwise been a relatively abundant staple in rations for many years. How exactly this plays out in the coming months remains to be seen, but if this is the new "normal," then our approach to protein and energy nutrition in beef cattle diets will need to be re-thought as we move forward. Forage quality and the role it plays on energy and protein intake is paramount in forage-based diets. Treatment of low-quality forages with anhydrous ammonia is one technique that may have more applicability if by-products are limited, and the goal of this discussion is to review this method as a practical alternative for use in forage-based diets.

The process of chemical treatment of low-quality forages is well established with much of the original research in this area conducted in the 1970s and 80s. Our goal is that ammonia and water react to break the bonds of the fiber components, resulting in a forage that is more digestible and ultimately contributing to an increase in intake and energy available to the animal. Ammonia applied will remain attached to the forage so samples tested will also show an increase in crude protein content. If forage intake increases, then the result is an increase in total protein intake, although primarily from non-protein nitrogen.

This method works best on any

Table 1. Change in forage digestibility, crude protein, and intake by ammoniation[1,2]

	Digestibility (%)		Crude Protein (%)		Intake Increase (%)
Forage	Untreated	Treated	Untreated	Treated	
Wheat Straw	39	48	3.7	9.7	18
Corn Stover	48	56	6.2	11	22
Milo Stover	46	61	5.4	17	NA
Switchgrass	46	55	5.6	14.5	6
Big Bluestem	53	59	5.6	17	10
Soybean Straw	41	47	4.9	14	16

[1]Adapted from University of Nebraska-Lincoln Extension, EC 89-265
[2]Summary of studies from NE, KS, OK, IN, MO, IL, AR, and Canada.

forages that are ≤5-6% crude protein and ≤50% TDN. Forages with higher protein and lower fiber components will respond less to ammoniation, so there is little to gain nutritionally by ammoniating a forage that is already higher priced to begin with. There is also greater risk of toxicity and other associated symptoms (circling, incoordination, convulsions) with ammoniating higher quality forages, so we only recommend this method on poorer quality feedstuffs. Changes in forage digestibility, crude protein, and intake due to ammoniation across multiple study locations and forage types are summarized in Table 1.

Regarding cattle performance, most studies show an improvement due to ammoniation but the response will vary depending on the level of treated forage fed in the diet, inclusion of other protein and energy sources, and type and weight of cattle being fed. Researchers at the University of Florida (Brown et al., 1987) found that fiber (NDF and ADF) digestibility increased as the level of ammonia applied to low-quality tropical hay increased from 0 to 4% of dry matter. They also observed an increase in both intake and gain for steers fed ammoniated rice straw compared to feeding non-ammoniated straw plus urea.

When anhydrous ammonia was applied at 5% of dry matter to wheat straw, dry matter intake of steers increased in work done in Oregon (Herrera-Saldana et al., 1982). Data from Kansas State University (Fike et al., 1995), suggests that while ammoniated wheat straw by itself may be sufficient for maintaining weight and body condition of gestating cows, additional protein and/or energy supplementation may be necessary to result in significant positive changes in cow weight and condition. A more recent study in Nebraska (Conway et al., 2018, Table 2) showed that intake, gain, and feed conversion all improved due to ammoniation when 700 lb steers were fed corn stover at 65% of the diet with 30% wet distillers grains (dry matter basis).

While generally a simple task to complete, applying anhydrous ammonia to forages does require a little planning and forethought. Round bales should be stacked in a pyramid shape and large square bales stacked in a rectangular shape, ideally allowing some room between rows of bales because we want to maximize the surface area of the bale that is exposed to ammonia. We want to create an air-tight environment, so the stacks must be completely covered with plastic and sealed to contain the ammonia within the forage. Around the base of the stack, use soil to cover the edge of the plastic to hold it in place and prevent ►

ATTEND THE 2020 FEEDING QUALITY FORUM
August 25-26, 2020
Online regisration opens summer 2020
feedingqualityforum.com

Ammoniation... *from previous page*

ammonia from escaping. Most recommendations are to apply ammonia at a rate of 3% or 60 lb per ton of forage dry matter, so you need to know the total tonnage of forage you are working with and the moisture content. The moisture content of forage is important, not only to determine the amount of anhydrous to apply, but also because the process is moisture dependent and digestibility usually improves to a greater extent with forages carrying more inherent moisture. Ambient air temperature affects how long the ammoniation process takes to complete. Often done during summer after wheat harvest when new crop straw is available, ammoniation at that time of the year when temperatures are higher will require less time for the forage to be sealed. We can ammoniate forages such as corn stalks later in the fall when it is cooler, but we may need to keep the stack sealed for 30 days or longer for it to be effective.

Anhydrous ammonia is currently about $500/ton, so applying at 3% would result in an ammoniation cost of $15/ton of forage dry matter for just the anhydrous applied. You will need to add the cost of plastic, labor and any other costs to fairly determine the final cost to ammoniate. Please remember that anhydrous ammonia can cause irritation and burning to the skin, eyes, and mouth, not to mention that it is a highly explosive gas maintained under pressure. We cannot stress enough the importance of safety with this process and using common-sense and good judgment. Wear protective equipment, check hoses and valves, as well as the plastic covering the treated forage for leaks, be aware of wind direction, and make sure children don't play around treated stacks. If done properly and safely this method is effective and has been for many years. We hope this article finds everyone well and safe during these trying times, and please feel free to contact us for more details if you would like to discuss how this could fit into your current program.

Table 2. Performance of steers fed corn residue as affected by ammoniation[1,2]

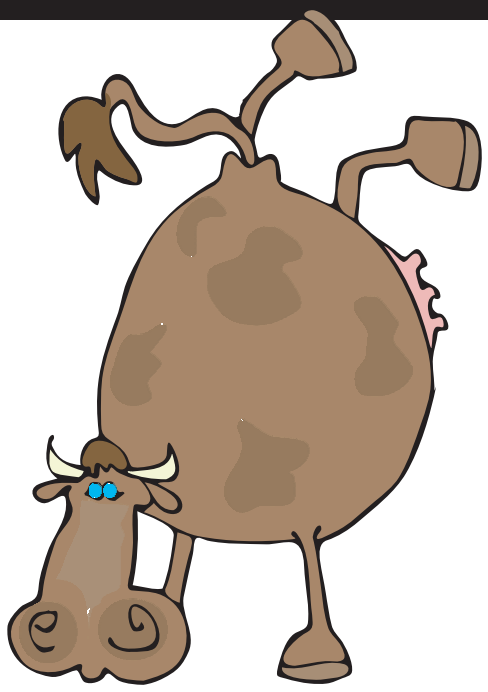
	Untreated	Ammoniated	P-value
DMI, lb/d	10.5	15.5	≤0.01
ADG, lb/d	1.66	2.77	≤0.01
F:G	6.52	5.66	≤0.01
DMI, % of BW	1.36	1.90	≤0.01

[1]Adapted from Conway et al., 2018
[2]Corn stover ammoniated at 3.7% D

For more information on this or other nutritional topics, visit www.gplc-inc.com. **FL**

BY DON TYLER

Crisis Leadership Strategies



"In desperate times, much more than anything else, folks need perspective. For perspective brings calm. Calm leads to clear thinking. Clear thinking yields new ideas. And ideas produce the bloom... of an answer. Keep your head and heart clear. Perspective can just as easily be lost as it can be found." This quote from author Andy Andrews reminds everyone—especially leaders in crisis situations—of the importance of clarity in our thinking.

As the long tail of the consequences of this pandemic continue to unfold, keeping the right perspective is one of the key elements of providing great leadership during a crisis.

Leaders Lead

What do leaders do in a crisis—they lead! It is their ability to keep calm, stay focused, provide clarity and instill confidence throughout the organization that sets the example and operational tone for everyone else. Ineffective leaders go into hiding, hunker down, focus on the negatives and unknowns, become professional fence riders who refuse to make decisions, or they overreact without thinking of the potential consequences.

Effective leadership requires a clear strategy that can be communicated very simply to everyone involved. If your strategy is hard to explain it's probably too complicated to succeed and needs to be revised.

Great leaders in crisis situations develop a 90-day plan and modify it every few days as new information becomes available and their current plan shows levels of success or inadequacy. Each day of a crisis we learn who has the most reliable information, the capabilities of our people and additional clarity on the wide range of inputs that

we need to improve and enhance our strategy.

Keep in mind that your success will not result from having a perfect plan, so quit trying to make one. There isn't one. The key to your success will be in your ability to adapt to all the rapidly changing inputs, disruptions and circumstances. Keep thinking 90 days ahead. Make the changes that need to be made today, based on today's information, and adjust as needed.

Your People

Your employees, and your family, need three key things from you—comfort, clarity and transparency of information.

You provide comfort by staying calm, being patient and level-headed, and seeing you fully engaged in potential solutions. Comfort is also gained by sincerely asking how your people and their families are doing, and if there is any way that you or the company can provide assistance. Expressing the actions you will take to keep them safe and healthy in the workplace adds to their comfort and is reassuring to their families.

Clarity is achieved through your clear communications, regular updates on your plans, how the plans affect them personally, what you need from them, and anything that they can do to help the company.

When it comes to transparency of information, it may seem hard to be transparent when you don't have all the answers and lack all the comprehensive information you prefer to communicate with clarity. It's okay. No one is expecting you to have all the answers. Drawing on the trust you've built with your people over the years, and building trust during these times, can be one of your main footholds.

You can build significant trust by being transparent about what you don't know, what you do know for certain, and the tough decisions that you must make to address crucial issues. Your people will be calmed by your clear facts and bold truth.

Be Exceedingly Human

Your people are watching you now more than ever. Be your best. Show sincere concern for the well-being of your employees and their family members. Think about and plan for how your strategies may affect them personally. Ask your key people to help you in this effort.

One of my friend's sage advice for crisis situations is, "Stay calm, be brave, do the right thing, and remember to fly the airplane. Never forget to fly the airplane!"

Regardless of the current stage of this crisis, the lessons learned will be useful for other situations that arise in the future whether they are minor disruptions or more major events.

For Management and Executive Coaching assistance on this and any topic of interest, a conference speaker or help with your employee and family business challenges, Don can be reached at don@dontyler.com, www.dontyler.com or by calling 765-490-0353. FL

Innovative Spraying Technology Developed for Cattle Fever Ticks

4Ry Inc., the U.S. Department of Agriculture's Agricultural Research Service and Texas A&M AgriLife Research have signed a collaborative research agreement to develop a means to more efficiently and effectively spray and kill cattle fever ticks, according to a 4Ry Inc. announcement.

Cattle fever ticks are vectors of pathogens causing bovine babesiosis, also known as cattle tick fever, and are the focus of the U.S. Cattle Fever Tick Eradication Program.

Pete Teel, Ph.D., AgriLife Research entomologist, will lead the project and provide administrative guidance. Field testing will be conducted by AgriLife Research and USDA-ARS at the USDA-ARS Cattle Fever Tick Research Laboratory in Edinburg.

The project will adapt 4Ry's Charge Injected Precision Spraying, ChIPS, for conductive fluids. Many cattle pesticides are water-based, which makes them conductive.

Arnold Kelly, Ph.D., 4Rry's chief technology officer and co-founder, will modify their 4Ry's patented

Spray Triode Atomizer, the heart of the ChIPS system.

Meeting all the project milestones will document that the ChIPS system allows for a more complete and targeted coverage of cattle with fewer environmental and operator health hazards. Charged spray droplets are attracted to the cow and thoroughly coat all areas with little aerosol drift or overspray. By reducing the amount of fluid sprayed and wasted, ChIPS more efficiently covers cattle, generates substantial cost savings, and reduces health and environmental risks.

"Successful development of our sprayer for conductive fluids will allow ranchers to integrate this technology for sustainable eradication of the invasive fever ticks that cost the cattle industry millions of dollars before they were eliminated from the U.S.," said David Bird, 4Ry's chief executive officer. "The tick problem is particularly bad in South Texas counties that border Mexico. Our modified sprayer will also improve the management of other livestock pests, so it will be welcomed wherever those pests are found in association with cattle production." FL

Greg Strong, *publisher*; Jill Dunkel, *editor*; Annita Lorimor, *general manager*; Amy Spillman, *digital/circulation manager*; Robert A. Strong, *editor emeritus*.

Audited by: BPA WORLDWIDE

FEED•LOT is published under ISSN 1083-5385

FEED•LOT (ISSN 1083-5385) is published eight times per year in February, March, April/May, June, August, September/October, November and December at no charge to qualified recipients, by FEED•LOT Magazine, Inc. 116 E. Long, Dighton, KS 67839. Periodicals postage paid at Dighton, KS 67839 and additional mailing offices. Non-qualifying subscription rates: $55 per year within USA. $80 per year for foreign, including Canada. Back issues $10, including postage and handling. Please call FEED•LOT Magazine, Inc. for reprint and copy authorization, 620-397-2838. POSTMASTER: Send address changes to FEED•LOT Magazine, Inc. PO Box 850, Dighton, KS 67839.

LAIRD MANUFACTURING

"We are the Exception not the Compromise."


Freestall Filler


Vertical Truckmount


Vertical Trailermount

Worldwide Leader in Cattle-Feeding Equipment


Delivery Box


Manure Spreader

Full Line of Stationary ← Mixers

CONTACT US FOR THE DEALER NEAREST YOU

209-722-4145

LAIRD MANUFACTURING, 531 S. HWY. 59, MERCED, CA 95341
SALES@LAIRDMFG.COM WWW.LAIRDMFG.COM

NEW FROM KUHN

BIGGER AND BETTER

FOR NEXT-GENERATION FEEDING

KUHN KNIGHT

RC 3120 HELIX® REEL COMMERCIAL MIXER

1,200 cu. ft. mixing capacity • Truck Mount

- **Larger capacity for improved feeding efficiency and a faster mix cycle**
- **Helix reel for faster, more consistent mixing and improved load leveling**
- **Split auger/reel gearbox drive - no chains and sprockets**
- **Increased automation to control loading and unloading sequencing for easy operation**

Ask about other KUHN Knight mixers and spreaders!

Visit our website www.kuhn.com to locate a Dealer near you!