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1. Elanco Animal Health. Data on file.
2. Elanco Animal Health. Data on file.

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Volume XXVII Number 5
August 2019


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
bigguy@st-tel.net


Robert A. Strong
Editor Emeritus

FEATURES

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

FEEDLOT FOCUS

COW CALF CORNER

Cover photo by Amy Spillman

MARKETING & MANAGEMENT

BY JILL J. DUNKEL

The Waiting Game

The U.S.-Mexico-Canada Agreement (USMCA) is waiting on us. In June, the Mexican government ratified the agreement. The next day, Canada's Prime Minister Justin Trudeau reaffirmed his government's commitment to passing the USMCA as soon as possible.

As for the U.S., we are *"working on it."*

President Trump signed the agreement, but Congress has not approved the measure as of press time, which is a few days before the six-week Congressional recess. Most expect the agreement to be on the table when senators and representatives return in September.

The USMCA replaces NAFTA as the trade agreement between Mexico, Canada and the United States. It has several benefits for the agricultural sector.

"American cattle producers need to maintain our unrestricted, duty-free access to markets in Canada and Mexico, and that's exactly what USMCA would guarantee us," said NCBA President Jennifer Houston. "Jeopardizing that access by having Congress not take action on USMCA is simply not an option for us."

In June, 960 groups representing the U.S. food and agriculture value chain at the national, state and local sent letters to Congress asking for quick ratification. The letter stated, "Over the last 25 years, U.S. food and agricultural exports to Canada and Mexico have more than quadrupled under NAFTA – growing from $9 billion in 1993 to nearly $40 billion in 2018. NAFTA has significantly helped create a reliable, high-quality supply of food products for U.S. consumers, while supporting more than 900,000 American jobs in food and agriculture and related sectors of the economy. USMCA builds on the success of the NAFTA agreement, and will ultimately lead to freer markets and fairer trade. This modernized trade agreement makes improvements to further enhance U.S. food and agricultural exports to our neighbors and would deliver an additional $2.2 billion in U.S. economic activity."

The beef industry launched a campaign weeks ago to promote ratification of USMCA. According to the U.S. Meat Export Federation, U.S. beef exports account for $323 per head of fed cattle, with exports to Canada and Mexico alone accounting for $70 per head. Last year, $745 Million worth of U.S. beef was exported to Canada, and $1.06 Billion was exported to Mexico.

According to an Op-Ed in the Washington Post by Vice President Mike Pence, the USMCA it will help America's ranchers and farmers to continue feeding the world. By removing barriers and opening new markets, the USMCA will increase U.S. agricultural and food exports by more than $2 billion annually.

Now we wait. This is not a political battle. No matter which side of the aisle you support, this is something the beef industry – and all of agriculture – need. FL

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CoBank: Trade Talks, Record Rains Upend Agriculture

The world economy continues to slow amid the ongoing U.S.-China trade war. Hopes are for talks to resume soon between the U.S. and China, but confidence in the trade war ending in 2019 is dimming. Additionally, persistent rainfall across the U.S. has significantly disrupted the agriculture sector. Federal aid of $16 billion for additional trade relief and $3 billion for disaster relief, will help soften the blow for farmers, but not ag retailers.

The latest Quarterly Rural Economic Review from the CoBank Knowledge Exchange Division indicates that global economic development continues to slide as tariffs drag on global trade and manufacturing. Trade disputes still loom between the U.S. and China, the EU, Japan and Mexico, and progress has been slow, with no major trade victories yet.

The report states that the U.S. economy has been performing well, but there are warning signs despite impressive GDP growth in Q1 at 3.1 percent. Much of the growth was supported by an increase in inventories as companies braced for an escalation in the trade war with China. The pace of investment spending, manufacturing, and demand for capital goods have all eased in recent months, and the slowdown trend is widely expected to persist through the remainder of the year.

Financial stress for many in agriculture continues to build amid unprecedented uncertainty from trade disputes and weather disasters. Nearly all sectors of agriculture were affected last quarter by the inundation of spring rains that kept farmers out of fields throughout the U.S. The amount of acreage lost to prevented planting will remain the major unknown in the months ahead for ag commodities markets.

Grain, Biofuels and Farm Supply

Trade continues to create headwinds for U.S. grains and oilseeds. Domestic demand has not kept up with last year's large corn supplies, but soybean crush has remained robust, taking advantage of low soybean prices.

Wet weather in the Midwest has significantly reduced corn production expectations. Corn planting progress has been the slowest on record due to the soaking-wet spring. The weather is also worrying some ethanol producers and has created headaches for the farm supply sector. Ethanol producers, already enduring one of the longest low-margin periods in years, are now facing the prospect of limited corn availability and higher corn prices. Ag retailers will continue to contend with the weak farm economy following a difficult fall agronomy season.

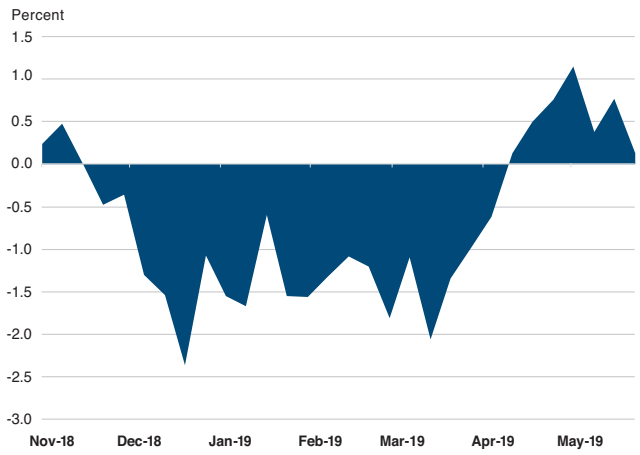
Beef

The U.S. cattle and beef sector have experienced very unusual weather thus far in 2019. Difficult winter weather pressured feed performance and steer and heifer weights and delayed corn and soybean planting, driving corn prices to multi-year highs. As a result, U.S. beef production declined by 0.8% in the last quarter. Now that weather is more typical in much of the cattle feeding region, weights have normalized. Exports have also been sluggish, declining almost 5% in the first quarter despite the slow supply growth at the start of the year. Shipments to Mexico remain strong but this has been more than offset by weaker volumes to Japan, Canada, and Hong Kong. In Japan, the tariff levels of the CPTPP have gone into effect, putting U.S. beef shipments to Japan at a disadvantage to Australian and Canadian beef. Exports to Hong Kong are also down more than 40% so far this year on a volume basis.

While this isn't directly a tariff, it reflects the challenges Hong Kong importers have with purchasing beef from the U.S. as long as mainland China and the U.S. are at odds.

Weather will be the major question for U.S. beef for the remainder of 2019 and into 2020. Will the rain on the plains lead to improved forage conditions for cow-calf

EXHIBIT 6: Heifer Dressed Weights
Year-over-year Change



Source: Livestock Marketing Information Center

producers through the fall? What will be the impact of the delayed corn planting, which is the latest on record? Many producers through the Corn Belt are asking whether corn is even an option to plant this late in the season. This uncertainty has pushed December 2019 corn futures over $4 per bushel – greatly impacting current margins for cattle feeders and cow-calf producers. These elevated corn prices may very well bring any modest growth in 2020 into question.

Chicken and Pork

The U.S. animal protein sector continues to be affected by factors largely outside of the control of producers and processors. Weather, African Swine Fever, and trade threats have disrupted the U.S. animal protein sector. In particular, the outbreak of African Swine Fever will impact not just pork but the overall animal protein trade for years to come.

An expected decline in Chinese pork production will spur a surge of beef, pork, and chicken imports into China as it tries to fill a shortfall in animal protein supply that no single pork-producing country will be able to fill. Hog prices and feed costs indicate healthy margins for producers through 2020, but that could change quickly if pork exports do not pick up.

Through the first four months of the year, chicken exports were down approximately 1 percent but leg quarter prices have increased from 28 cents per pound at the beginning of the year to near 50 cents per pound. With more normal weather expected for the rest of the summer and this fall, and with new poultry plants ramping up production, signs point to protein supply growth to pick up in the second half of 2019. The most significant development for U.S. chicken exports would be the reopening of China, which banned U.S. poultry four years ago over avian flu, but is expected to reopen if a trade deal between the U.S. and China is announced. FL

BY DR. HAROLD NEWCOMB, D.V.M.,
TECHNICAL SERVICES VETERINARIAN, MERCK ANIMAL HEALTH

TETANUS

Easier to Prevent Than Treat

The age-old saying that "an ounce of prevention is worth a pound of cure" is true for many animal health protocols, especially with some diseases being more difficult to treat than others. Tetanus is one such disease. Treatment is not dependably successful – fatality rates can approach 50 percent. While tetanus vaccination isn't always part of a herd health protocol, it deserves attention especially during wet spring weather when it is often more prevalent.

Clostridium tetani, the bacterium that causes tetanus, can survive in the environment for years. If an open wound is contaminated with soil or manure, the spores of C. tetani can enter the wound and grow rapidly, producing tetanus neurotoxin. The toxin binds irreversibly to the animal's nerve endings and travels back to the spinal cord, causing spastic paralysis.

The signs of tetanus are subtle and often missed until it's too late for an animal to have a good chance for a successful recovery. Therefore it's important to identify those most at risk of falling victim to this often deadly disease.

It starts in the soil

Technically, any animal with an open wound or has tissue with little or no exposure to oxygen is vulnerable, but two instances when cattle are at a heightened risk of tetanus are at calving and when bull calves are castrated. The most common infection sites are deep wounds, infected areas of the vulva or vagina following a difficult birth and severe uterus infections.

Watch for cows that lay in the soil to give birth, as an oxygen-deprived uterus, if exposed to the soil, can result in tetanus and illness due to infection. But at a higher risk for tetanus are older calves castrated with the elastrator or banding method.

Younger calves are at lower tetanus risk because their testicles are smaller and the scrotal sac falls off more quickly than heavier calves. The clostridium organisms do not have enough time to grow. This is one of the reasons why the American Veterinary Medical Association recommends that calves should be castrated before 90 days of age.

Because banding shuts off the blood supply to the testicles and causes the scrotum to fall off, banded calves are at risk of infections and tetanus. This is especially true if more tissue than needed is entrapped in the band.

Open castration, if not done properly, is also risky. When the scrotum is cut for castration, it is important not to allow it to pull back and seal up – it needs to drain. Either use a Newberry castrating knife or cut the scrotal sack at a 45-degree angle, which allows for drainage.

If possible, allow calves to go back on pasture after castration. Calves going into a dry lot are more likely to have tetanus because there is more dust and dirt in that environment.

Prevention works

Once you encounter tetanus in your operation, you will likely have to practice regular prevention. The good news is if you vaccinate ►

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Young calves are at risk after castration.

Tetanus... from previous page

properly, tetanus will not usually be an issue.

Talk with your veterinarian to develop a management protocol. He or she may recommend a vaccination program that includes a vaccine, such as Covexin 8® or Calvary 9,® that contains a tetanus toxoid. Protective antibody levels should develop in two weeks following the booster injection. It is important that two doses are given, with the last dose two weeks before castration to achieve solid protection.

Cleanliness is another important management practice, especially during castration. Keep instruments clean in a bucket with water and disinfectant, such as betadine or iodine solution. Always wash your hands in the disinfectant before beginning and between calves. Avoid touching the chute or the calf's body. If the scrotum is dirty, wash it with disinfectant. Replace water and disinfectant regularly so it remains effective.

It is also important to practice cleanliness during calving. If a cow has dystocia, make sure all instruments are clean and that you are clean when working with her. Administering an antibiotic also is a good practice to temper infection until the cow can build up more immunity. Using an antibiotic with efficacy against tetanus is important as some don't work on tetanus. Work with your veterinarian on this issue.

Involve your veterinarian

The key is to work with your veterinarian to design a total herd health program that takes your cows' environment and tetanus risk into consideration.

The same is true for calves. Castration is a necessary management practice. Your veterinarian can establish protocols, such as early castration, that can reduce the risk of tetanus.

Ask your veterinarian if your protocols need to be modified, as this professional knows your operation and your needs. FL

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[1] Wiebusch, 2015. JAM.
[2] Caramalac et al., 2017. J. Anim. Sci. 95:1739-1750.
[3] Micronutrients trial #2017BC106USCZM.

BY HEATHER SMITH THOMAS

Toe-Tip Necrosis in Feedlot Cattle

Several things can cause foot soreness and lameness (foot rot, puncture wounds, sole bruises, abscesses, white line disease, etc.) but one of the most serious is infection of the inner parts of the foot, a condition known as toe-tip necrosis. Dr. Murray Jelinski, Western College of Veterinary Medicine, University of Saskatchewan, has done several research studies looking at this problem.

"In dairy cattle we see white line disease but it develops more in the lateral or side wall of the claws rather than at the toe. Toe-tip necrosis starts at the tip. Although the two diseases have several features in common, location of the lesion suggests that risk factors or causes may be different," he says.

Jelinski asked feedlot practitioners in Alberta to submit feet from animals that developed toe-tip necrosis and was overwhelmed with the response; the disease was much more prevalent than he realized.

"A veterinarian in the Midwestern U.S. published a paper in the 1970's describing toe abscesses in feedlot cattle. These cattle typically come off pasture into the feedlot and within a few days to a month develop hind limb lameness. We rarely see this in front feet. It usually starts in the lateral claw on a hind foot," says Jelinski.

There is wear at the tip of the toe and separation along the white line. "Depending on when you catch it, you might see the start of an abscess or just separation. In bad cases the infection has already penetrated the hoof wall and is going up into P3 (coffin bone) in that claw. The infection can then travel straight up through the tendons and on up the leg and into the bloodstream," he explains.

Those cattle become septicemic; pathogens travel to internal organs and seed into the lungs--as classic embolic pneumonia. "When veterinarians see that type of pneumonia they usually associate it with liver abscesses; the last place they generally think of is the feet. People rarely check to see if there's a foot infection to explain the pneumonia," he says.

There are several risk factors associated with toe-tip necrosis. "Dr. Miskimins, a pathologist in South Dakota, described outbreaks in several feedlots in the midwestern U.S. in the 1980's. He saw cases occurring in clusters, in groups of cattle coming in. Some veterinarians began to wonder if there might be a temperament factor, and if high-strung cattle might be more at risk for this disease," says Jelinski.

"Dr. Karen Schwartzkopf-Genswein at the Lethbridge Research Center and Dr. Eugene Janzen and myself investigated a number of outbreaks and it became clear that high-strung animals are more likely to get this disease."

Flighty animals are more apt to injure the hind feet, pushing forward in the chute or scrambling on rough surfaces. "Cattle have so much muscle and strength in the hind legs that they put tremendous forces on their toes. If they slip and lose their purchase on the concrete, and slide the foot along it, the concrete is like a rasp and scrapes the toe off," he says.

"In animals that die with toe-tip necrosis, the white line is thinner than in animals that die of all other causes. The white line is 4 to 5 millimeters in depth and if the foot suddenly wears off a couple millimeters, fissures develop. Bacteria enter the soft white line and produce enzymes that break it down even more," he explains.

As the animal walks, repetitive loading and unloading of the foot leads to further breakdown of the white line. "When they load a foot that is already damaged, the white line opens up more, allowing bacteria to enter," he says.

"I've probably sectioned 300 of these feet, over the years, slicing with a band saw. In some cases we find organic material (manure, ►

Toe-Tip Necrosis... *from previous page*

straw, etc.) impacted up into the foot. The white line is closed when not under a load, but as the animal takes a step and loads the foot, the white line gapes open. Then when the foot is lifted and it closes again, it has closed on whatever material got jammed in there. Bacteria get into the foot, and some are anaerobes that thrive in a low-oxygen environment. They start an abscess, and then the infection may extend to P3 and surrounding tissues," says Jelinski.

"We are doing a study looking at flooring/footing at feedlots and auction markets, and on trucks and trailers. Cattle coming into a feedlot after a wet summer seem more prone to this disease; their feet are softer and more vulnerable to wearing away on abrasive surfaces."

Some feedlot chutes have rebar welded together in a cross pattern, or rough concrete. "You need adequate traction so cattle won't slip and fall when coming out of the chute, but you don't want it so abrasive that it damages the feet," he says.

Fractious cattle must be handled quietly, so they aren't trying to get away and are not shoving and pushing. "We've seen outbreaks where 40 to 50% of the cattle end up with toe-tip necrosis. In other instances it's just one odd animal here and there. I don't think they are always fractious; other things also play a role. Most diseases are the result of several factors that all come together at just the right time. With toe-tip necrosis it may be fractious animals, soft hooves, rough flooring, poor handling practices, etc. and it ends up in disaster. Once the infection gets past the corium (the inner soft tissue beneath the hoof horn), it gets into the bone and is difficult to treat."

Animals developing hind limb lameness soon after entering the feedlot should be thoroughly checked. "If there's no other obvious cause of lameness, toe-tip necrosis is a possibility. To diagnose we use hoof nippers and nip the end of the toe. You will see a purulent bloody black-brown discharge, or a black crusty necrosis of the horn tissue," says Jelinski.

"We never hear about this problem in cow-calf operations. It doesn't happen in pastured cattle. We think the damage/trauma occurs when cattle are loaded or unloaded on trucks, or at the auction yard. There is lots of concrete where they are sorting. Some cases develop within 24 hours of arrival at the feed yard which means the trauma occurs before arrival—perhaps in transit or at the auctions. We rarely see it later in the feeding period; it is a disease associated with handling, perhaps on arrival," he explains.

Treatment

Long-acting antibiotics are generally successful if you catch it early. "What often happens, however, is separation at the white line before we realize there's a problem. After the infection gets to the corium (the 'quick') where the nerves and blood are, it becomes painful and the animal is lame. If you treat early, there's good blood supply there, so the antibiotic would be in high concentration and treatment would be successful," says Jelinski.

"Once it gets deeper and into P3, it's more difficult. We have sectioned feet from animals that recovered, and see the bone has remodeled. If you treat aggressively enough they can recover from a minor P3 infection, but once it gets advanced we are probably looking at amputating that toe. However, it is not uncommon to find toe-tip necrosis in more than one of the hind claws. I remind veterinarians that if they're going to amputate a toe, they'd better check the other toes as well. Euthanasia may be the best option on some animals because this is a very painful condition; you don't want to leave them 3-legged lame in a pen with little hope for recovery." FL

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1. Hellwig D, Kegley E, Johnson Z, Hunsaker B. 2000. Flunixin meglumine as adjunct therapy for bovine respiratory disease in stocker cattle. Arkansas Animal Science Report. AAES Research Series 478.

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MERCK
Animal Health

BY JANA GRAMKOW, PH.D.
GREAT PLAINS LIVESTOCK CONSULTING,INC.

FEED MIXING 101

Mixing feed is a key quality control point in cattle feeding operations, with the goal being to deliver a consistent ration across the entire bunk every time. Improperly mixed feeds can cause variable cattle performance and intake patterns. Common mixing errors that occur are overloaded mixers, improper mixing times and incorrect loading sequence of ingredients. The order in which you load your ingredients is dependent upon the type of mixer used.

There are two basic types of mixers: vertical and horizontal. Vertical mixers have a large screw in the middle and are designed to handle high forage rations commonly fed by cow/calf producers. Vertical mixers have the ability to process hay bales prior to mixing feed; however, processing hay in a vertical mixer takes a significant amount of time and fuel, making it very inefficient. Since well-balanced rations are not formulated around full bales, the correct amount of hay needs to be added to the mixer initially for the batch being made, or the hay needs to be processed and the extra removed prior to adding other ingredients. Forages need to be processed to a particle size ranging from 0.5 to 2.0 inches long to prevent sorting. Wet feeds should be added next to hold the dry forage down (Table 1). The final ingredients that should be added are grains and balancer, followed by liquids. The weight of the vertical mixer is one of it's biggest drawbacks. It can be nearly impossible to pull into wet pastures during the spring. Most vertical mixers can be retrofitted for truck tires which gives you more clearance.

Horizontal mixers consist of two to four blending augers and are designed to handle higher grain rations. Grains should be the first ingredients loaded into a horizontal mixer, followed by the balancer (Table 2). This allows for a premixing of the balancer and grain prior to the addition of dry forages and wet feeds.

In all cases mixers should be allowed to mix for 5 minutes after the last ingredient has been added and prior to feeding. This can be done on the way to the first pen. Watch the time to make sure you are allowing for a full 5 minutes. Additionally, it is important not to overload your mixer beyond its capabilities, no more than 80% full. Overloading a mixer can cause dead spots which prevents the feed from mixing.

Servicing of the feeding equipment should be done regularly to maintain good mixability, accurate weighing, and good appearances. Scales should be calibrated monthly and the interior of the mixer box should also be inspected and cleaned monthly.

Safety should always be considered when working with any piece of equipment. Never attempt to dislodge feed jams while the mixer is still running. Safety shields (i.e. PTO shields) should always remain in place to prevent entanglements.

The loading sequences given in this article are general recommendations, they may not suit every operation. If you would like assistance setting up a mixer study to verify the accuracy of your mix or information on which brand of mixer would best suit your needs, please contact one of our consultants. FL

TABLE 1: Vertical Mixer Load Order

Dry Hay
Water (if necessary)
Wet Feeds
Silage
Dry grains/Premixes
Liquids

TABLE 2: Horizontal Mixer Load Order

Dry Grains/Dry Premixes
Dry Hay
Silage
Wet Feeds
Liquids

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[1] J.C. Williams, A.F. Loyacano, A. DeRosa, J. Gurie, B.C. Clymer and F. Guerino (v0.1) p. 1. A comparison of persistent anthelmintic efficacy of topical formulations of doramectin, ivermectin, eprinomectin and moxidectin against naturally acquired nematode infections of beef calves. *Vet Parasitol.* 85(4):277-288.
[2,3] Data on file. Bayer, Shawnee Mission, KS.

Controlling Feed Yard DUST

As the afternoon sun begins to wane, the particulate matter in the air is apparent. A cloud of dust particles hangs over the pens of cattle, from the ground to about 20 feet in the air. The air is stagnant. And the dust is thick. Cattle cough and their eyes water. It's a time known as EDP, or evening dust peak.

Hot and dry summer conditions at feedlots can often lead to periods of increased dust. According to the University of Nebraska, some of the worst time for dust to develop is during the late afternoon and at dusk, when temperatures begin to drop and wind speed decreases. Cattle that have mostly been resting during the hottest part of the day become more active. The day's sun has dried out the earth, and the increased activity in the pen creates dust that hangs in the evening air.

Excessive dust can cause problems with animal health, worker conditions and annoyed neighbors. A dust abatement plan can feature several methods of integrated management.

Manure Harvesting

Manure harvesting is critical to controlling dust. Studies confirm that dust potential grows with the increasing depth of uncompacted manure. "The fundamental reason appears to be that cattle characteristically drag their rear hooves across the corral surface," according to a 2012 AgriLife publication. "Dragging the rear hoof accounts for most of the mechanical shearing that resuspends the manure as particulate matter." The article goes on to recommend cleaning pens regularly to maintain a 1- to 2-inch surface layer of well-compacted manure and soil.

Although pens are commonly cleaned when cattle are shipped, the article recommends monitoring pen conditions and removing the uncompacted surface layer of manure before it gets too deep, even if animals occupy the pens.

Moisture Content

Optimizing moisture content of the surface manure is very important for dust abatement. This can be done with sprinkler systems, water trucks or wagons or traveling sprinkler systems. The goal is to maintain moisture content of the surface manure to 25 to 35 percent. Studies found that sprinkler systems reduce downwind particulate matter from 55 to 80 percent.

Water treatment should begin before dust becomes a problem, according to retired agricultural engineer John Sweeten's publication Feedlot Dust Control. "The moisture can be raised to the desired level initially by a heavy water application or by animal crowding," he states, "followed by a daily water sprinkled treatment program."

Sweeten recommends adjusting water application rates according to weather conditions, animal size and manure depth. His recommended initial application rate is 1 gallon per square yard per day (approximately .18" per day) until a 25 to 35 percent moisture is reached. Then water can be applied at ½ to ¾ gallon per square yard per day (about 0.09 to 0.13 inches per day) during dry weather.

California research showed dust levels rose more than 850 percent when water treatment was discontinued for seven days, so consistency is key. In fact, the research determined daily watering provided significantly better dust control than alternate day watering.

The unmistakenable "wet" feedlot odor is always a concern, but Sweeten says the key is the amount of water applied to the surface. "A moisture content of between 25 and 40 percent is required for rapid aerobic bacterial activity, which produces little unpleasant odor."

However, overwatering leads to excessively wet spots that support anaerobic decomposition, the primary source of feedlot odor.

Sweeten also recommends applying water treatments during the early evening hours to coincide with the heaviest dust activity.

Feeding Strategies

Changing the time of day cattle are fed and changing the fat content in cattle diets is also an option, according to the AgriLife article.

"Delaying the last feeding of the day until late afternoon may reduce animal activity during the critical dust-peak conditions near sunset." An increase in the fat in cattle diets can result in a cohesive effect on manure, making it more resistant to being pulverized by hooves.

Controlling dust in alleys and on roads is also important. Regular watering of unpaved surfaces is helpful, as is applying resins or oil to dirt or gravel. Encouraging drivers to slow their speed also helps with road dust. FL

How to Take Control of Pinkeye

Consider these management practices to keep your herd protected.

Pinkeye is more than an inconvenience in cattle herds. It's a highly contagious disease that's painful for animals, can significantly reduce calf growth rates, and can even lead to blindness, if left untreated.

The good news is there are several management practices most cattlemen can implement to reduce the occurrence and minimize the impact of this common disease.

Prevent injury and infection

"Pinkeye is the general term for inflammation or infection of the eye, and its primary cause is the pathogen Moraxella bovis (M. bovis). The disease may result from conditions that irritate the eye, and is often spread by face flies," explained Dr. Step, DVM, Boehringer Ingelheim. "Protecting cattle from the most common causes of eye irritations and injuries is the best way to minimize the chance of infection."

To do that, Dr. Step suggests implementing these management practices:

- Control weeds and/or tall grasses. Brushing against tall, rough grass or prickly weeds in pastures is a common source of eye irritation or injury in cattle. Mowing or spraying weeds and brush before they get too tall eliminates the threat.
- Provide shade for animals. Being in constant bright sunlight can cause eyes to tear up, which often attracts flies that can carry bacteria.
- Minimize dusty conditions, where possible. Airborne dirt and dust can cause eye irritation. When pen or pasture conditions are extremely dry, spraying water reduces the dirt and dust animals can kick up.

Reduce spreading risk

"When pinkeye does develop, it's important to detect it early to administer appropriate treatment and limit disease spread," noted Dr. Step. "It's good to check for pinkeye daily, or at least every other day during fly season. Look for cattle exhibiting clinical signs including excessive eye tearing, drainage, blinking or squinting."

Dr. Step pointed to the following practices to help reduce the risk of spread:

- Separate and treat infected animals. Remove infected animals from the rest of the herd, and treat them as soon as possible in order to interrupt the disease cycle. One face fly could spread pinkeye to several animals in a day. Work with your veterinarian and follow label instructions to provide efficient and effective treatment. Applying a patch over the infected eye can aid healing and prevent disease spread in some instances.
- Control flies. Whether you use fly tags, pour-ons, sprays, dust bags or back rubbers, it's important to implement some form of fly control.
- Vaccinate early. "The ideal time to vaccinate for pinkeye is 30 days prior to the beginning of fly season in order to allow a good level of immunity to develop," asserted Dr. Step. "A single-dose pinkeye vaccine offers convenience and efficacy."

Dr. Step said that M. bovis is not the only pathogen that can cause pinkeye, but it is the most common one. "That's why vaccination is not guaranteed to work 100 percent of the time; however, it can significantly reduce the clinical signs and severity of the disease if an outbreak occurs." FL

[1] Sifferman RL, Wolff WA, Holste JE, et al. Field efficacy evaluation of gamithromycin for treatment of bovine respiratory disease in cattle at feedlots. Intern J Appl Res Vet Med. 2011;9(2):171-180.
[2] ZACTRAN product label.

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Know the score.

BY TERRI QUECK-MATZIE

Trace Minerals Help Beef Per

Just 7 grams of performance trace minerals each day across the lifecycle can improve cattle performance, according to new research reported by Dr. Chris Ashworth from research released by Zinpro Performance Minerals®.

Ashworth directs research and technical nutritional services for the Zinpro RNS beef team worldwide. Performance trace minerals are defined as minerals bound to an amino acid ligand as opposed to organic and in-organic varieties.

Breeding, growth, carcass quality, the ability to fight off disease and overall general health are all affected by nutrition, and Ashworth says trace minerals are often overlooked, especially in the reproduction phases of cattle production. Producers all too often rely on the misperception that forages meet animals' needs and salt is the only needed supplement.

Trace minerals are required by all living things to survive, and cattle need them to thrive and reach their full genetic potential. Simply put: the healthier the animal, the better the performance.

Getting a good start

The profitability chain for cattle production begins before conception by getting cows to breed early and with shorter calving intervals. The research shows a performance trace mineral regimen can result in a 15-17% higher conception rate and a 16-day shorter calving interval.

Getting first-calf heifers bred back early in the breeding season is crucial to an operation's profitability. Calves born early in the calving season can have an advantage of up to 2 pounds per day at weaning over those born at 21 days or after.

The effects on both the calf and dam are long lasting.

Ashworth cites research from Bruce Carpenter and L.R. Sprot with the Texas A&M University System Extension that shows heifers that calve in the first 21 days of the calving season tend to remain early calvers throughout their breeding life.

Trace minerals help the breeding cow prepare for the next season in four ways:

- Zinc helps repair a cow's reproductive tract after she goes through the inflammatory processes that occurs around parturition.

rformance

- Manganese helps to mitigate inflammation.
- Copper plays a role in creating a shorter calving interval and is critical for early embryonic survival.
- Cobalt is utilized in the rumen to increase forage fiber digestibility.

And don't forget the bull. Trace minerals can increase sperm motility by 9% and help young bulls reach puberty faster.

A cow will utilize nutrients for her own maintenance needs first, followed by growth and immunity. Reproduction is her last priority. This is especially true for first calf heifers that are still growing while they are nursing.

Adequate trace mineral nutrition during gestation means a healthier calf and an increased weaning weight of up to 53 pounds.

During the weaning phase, the data show performance trace mineral supplementation can increase average daily gain by 9-13% and reduce morbidity by 45% by having a more robust immune system and better response to vaccines.

Long-term, the calf can expect an up to 42-pound increase in carcass weight.

In the feedlot

Transitioning to the feedlot can be stressful for calves, and again, adequate nutrition with performance trace mineral supplementation can help to meet those challenges. Transport stress and a change in environment, acclimation to a high-energy diet and health challenges such as respirator disease and foot rot take their toll.

One of the greatest challenges to calf health is BRD. More than 50-70% of feedlot deaths are related to BRD.

A study published in 2013 found net return to be up to $30.37 per head for cattle never treated ►

Story Title Here... *from previous page*

for BRD compared with -$45.52 per head for cattle receiving more than three treatments, or a difference of $75.89 per head.

The new research shows mineral supplementation can reduce the incidence of BRD 20-30%.

"This is a good example of how having a good, solid mineral program in place can help reduce bacterial and viral infections," says Ashworth.

A healthier calf with a robust immune system is more resilient in fighting disease is likely to be a more profitable calf. Performance trace minerals can improve ADG by 6%, with a 4% improvement in feed-to-gain ratio by enhancing the immune system and altering the bacteria content of the rumen.

Ashworth says a trace mineral program can also help with feedlot foot problems. He cites studies conducted by the University of Nebraska of five western feedlots that showed 13.1 percent of 1.8 million animals were treated for health problems, and lameness accounted for 16 percent of those health problems and 5 percent of deaths of feedlot animals.

In 1999, Bovine Veterinarian reported lame cattle accounted for 70% of all non-performing cattle with the price received for salvaged lame cattle only 53 percent of the original purchase price. The average daily gain of lame beef cattle was reduced by 5.5 percent when compared to similarly sound cattle.

In addition, lameness diagnosed in the finishing phase (121 days on feed until harvest) adds an average of 14.3 additional days on feed for infected animals.

Digital dermatitis, or hairy heel wart, is a growing concern throughout the U.S., and steers with the lesion can show a significant body weight loss of approximately 23.2 pounds and a mean reduction in hot carcass weight of 12.1 pounds.

Performance trace minerals create better skin integrity and keep the animal on its feet and at the feed bunk with a 28% decrease in the incidence of digital dermatitis and a 30-57% decrease of foot rot.

"There's a lot that goes into a healthy, profitable beef operation: great genetics, ideal nutrition, a well-controlled facility, the latest technology," Ashworth says. "Performance trace minerals can help beef cattle producers maximize each phase of their operation and get the most from their investment in each animal." FL

Knock out BRD and take down the fever that usually comes with it when you use **Resflor Gold**® (florfenicol and flunixin meglumine). The only major antibiotic to combine the BRD-treating action of florfenicol with the symptom-fighting action of flunixin. With one shot, **Resflor Gold** makes your animals feel better within six hours.[1,2] So they aren't just back on their feet eating and drinking, they're back on the gaining track. Talk to your Merck Animal Health rep or visit resflorgold.com to learn more.

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[1] Exhibits bactericidal activity against some strains of *Mannheimia haemolytica* and *Histophilus somni*.
[2] The correlation between *in vitro* susceptibility data and clinical effectiveness is unknown.

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MERCK Animal Health

BY HEATHER SMITH THOMAS

Proper dosage is critical for efficacy, economics and cattle health

When treating cattle with antibiotics, dewormers and other medications, it is important to administer proper dosage—which is generally determined by weight of the animal. You need to know the weight, rather than guessing. Under-dosing may not give desired results, and overdosing in some instances can be harmful. With dewormers, under-dosing won't kill the parasites and may lead to drug resistance.

Dr. Steve Hendrick runs a feedlot, dairy and cow-calf veterinary practice in Coaldale, Alberta, and says vaccines are not an issue. These are usually dosed at 2 milliliters or 5 milliliters per head, depending on product; the purpose is to provide antigen to stimulate an immune response; it's not weight-specific and will be the same for a calf or a cow.

Antibiotics and dewormers are a different story regarding size of the animal, but for any injection each animal needs to be given the dose specified on the label, administered at the proper site and by proper route, listed on the label.

Dr. Doug Hilbig, Senior Technical Service Veterinarian, Zoetis, says it's important to read the label to find the dose. "If you have a 550-pound calf, multiply the dosage, such as 1.1cc per hundred pounds: 550 x 1.1 = 6 cc of product."

Even a slight estimation in the dosage or weight of the calf could make a difference in the correct amount given.

"If you guess 500 pounds, and estimate the dose at 1cc, a 500 pound calf would get

5cc of product. But if the calf actually weighs 530, and the dosage is supposed to be 1.1cc, that calf should have 6cc, and that's 20% under-dosed," he says.

When giving antibiotics there are several important considerations, including withdrawal times, says Dr. Nathan Erickson, Assistant Professor, Large Animal Clinical Sciences, Western College of Veterinary Medicine, University of Saskatchewan. The withdrawal time established for that antibiotic is based on giving the correct dose, for the correct duration and by the correct method. If you over-dose or give a certain antibiotic more days than recommended, or by incorrect route, it may take longer for residues to be eliminated from the animal's body.

Under or overdosing can also affect how the antibiotic works. Hilbig says that when you under-dose, the antibiotic isn't going to work properly.

"Treating a calf will usually cost $12 to $20 per head, so it doesn't take very many cattle to justify a set of scales. Often people are treating according what these cattle are averaging, but may be treating the lower end of the average, or sometimes the bigger end of the average. We're wasting money by over-dosing, and if we under-dose we might get upset because the antibiotic doesn't seem to be working. If I under-dose 20%, then I might have to retreat. So that 20% could cost me another treatment," says Hilbig.

Not only does under-dosing run the risk of not being effective, it also provides a chance for some of the more resistant parasites or pathogens to survive. "There is a push today to avoid development of resistant microbes or ►

Proper Dosage... *from previous page*

parasites," says Hendrick. Producers perpetuate this problem if they continuously under-dose.

"That doesn't mean we should err on the side of overdosing. We have to be smart about it because there are also disadvantages when overdosing." Not only will it be expensive, but there may be adverse side effects for the animal if you give too much of a certain drug. Overuse of antibiotics in some situations may kill off the "good bugs" in the digestive tract and lead to other problems.

When treating sick calves that might be dehydrated, overdosing with certain antibiotics and anti-inflammatories can be dangerous. "If the calf is severely dehydrated (from scours) some drugs are very hard on the kidneys and other organs," says Hendrick.

"A calf's body generally contains a higher water content (percentage of weight) than an adult and they also dehydrate more readily," he says. They would be more likely to suffer kidney damage with overdose of certain drugs. It is always wise to try to use proper dosage.

Dosing cows and bulls are another issue.

"Producers may think their cows

weigh about 1200 pounds, when in reality they have some that weigh 1600 to 1800 pounds. When trying to estimate weight, people can easily be off by 200 pounds or more," says Hendrick.

Some people are good at estimating weight, but it can be deceptive comparing animals that are short and stocky versus tall and leggy, or long-bodied versus short-backed and thick. The herd average is what producers go by, for delousing/deworming treatments, setting the dose gun for a certain dose. "The problem is that there's often a swing of 100 to 200 pounds either way in a group. You will be overdosing some and under-dosing others. You need a scale at your squeeze chute, so you could dose each animal correctly," he says.

Some people think they can't afford a scale, but a plain set of scales is not very expensive, according to Hilbig. "When you think about the cost of cattle, cost of the chute, and the cost of medicine, if you buy $1,000 worth of medicine and overdose 20%, that's $200 you wasted. If you are treating many cattle, it quickly pays to own scales.

"It's also nice to know when treating cattle if they are gaining weight or losing weight, and know where your cattle are on weight. This can determine what you want to do with those cattle regarding marketing," says Hilbig.

Hendrick says proper restraint is important when medicating. This enables you to use proper technique, whether giving oral medication or an injection. When giving a subcutaneous injection you want the animal restrained so you can make sure the entire dose gets deposited under the skin and doesn't leak out. You might think you are giving proper dose, but if it doesn't get there, you are under-dosing.

Erickson sums it up simply: Correct dosage is important for multiple reasons that include economics, food safety, minimizing development of resistant pathogens and parasites, and efficacy—for health of the animal. FL


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[1] Data on file, Study Report No. MC013-06-AULA13 (Colorado study), Zoetis Inc.
[2] Data on file, Study Report No. MC014-06-AULA13 (South Dakota study), Zoetis Inc.
[3] Data on file, Study Report No. MC015-06-AULA13 (Oklahoma study), Zoetis Inc.
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zoetis

BY JILL J. DUNKEL

Processing Safety: Working With Cattle

How many times have you or a coworker been lucky when it comes to not getting hurt in a dangerous situation? Maybe a calf jumped in the chute and you narrowly missed getting your arm trapped or broken? Or perhaps the head gate operator opened it a little too soon and you just missed getting walloped in the head? Processing cattle offers several opportunities for injury if workers aren't careful. Facility design, training and safety practices can go a long way toward injury prevention.

Gordon Moore is a safety consultant for Texas Cattle Feeders Association. He travels across the state to feed yards offering training on several aspects of safety related to beef cattle production, and he says some simple changes can make big differences in an operation.

First and foremost, teaching someone to handle cattle is very important, he says. "Typically, we take an 18-year-old kid and put them in the back with instructions to put cattle in the tub. We always put the guy with the least experience pushing cattle because we don't want him at the chute," he says. "We send him to the back with a hot shot and tell him to keep cattle moving our way."

But pushing cattle is the worst place to put an unexperienced employee.

"He's probably going to get run over at least once, or stomped or kicked. We think it's a way of life when you're pushing cattle, but it's really not. I've seen some very serious injuries from that," Moore says.

"We tell them to keep the snake full, so the worker will push as many as he can in there. Then you have cattle jumping over the side, or what if the gate breaks or the latch fails?" he asks.

He recommends telling the employee how many cattle the snake holds, and not to crowd any more that it holds.

"The way we handle cattle is huge in the safety of people."

Jon Mollhagen of Moly Manufacturing agrees.

"Feedlots are working with a different set of cattle every day. They don't know the cattle. It's different than working with cows that are gentle and you know something about," Mollhagen says.

"Be aware of high pressure locations. Anytime where we start with big pens and reduce down to a 30" alley, whether we are loading cattle or moving into a processing alley, that's your highest pressure point," he explains.

Facility design that uses safety and convenience features helps with worker safety. Small walk-through gates that close automatically provide a way for an employee to get in and get out of a pressure area quickly.

Flow is also key, and flow depends if you are shipping or processing cattle. "Loading cattle, if you can get cattle to follow cattle, once you get this flow started, a lot of the time you can sit back and they will follow each other in. However, when processing, you're starting and stopping every animal. It's hard to establish a good flow."

Mollhagen says to educate workers not to put pressure on cattle if they can't move forward. "Wait until it is that animal's turn to move," he said.

He also recommends finding a way to push cattle without being in the high pressure area. Theoretically behind a gate is a safe way to do that, but behind a gate is also a dangerous place to be, he says.

"An animal kicks or bumps it, and a gate comes back at a high rate of speed. You can also get pinched behind a gate if you are near the hinge. There's no place to go."

"A hydraulic swing gate, or TurretGate™, allows workers to keep cattle moving in the right direction without being behind a gate in the tub." It eliminates the need to swing the gate back open into the waiting animals and virtually eliminates the need for humans to be in with the cattle, reducing the chance workers could be injured.

Once cattle are in the chute, Moore says to be aware of the head gate.

"The guy working the head gate may not be able to see the guy on the other side who is implanting. The man with the controls may not know when the other worker is clear of the gate before he opens it," Moore explains. "You run the risk of hitting him in the head with the head gate."

There are several ways an operation can address the issue.

Install a mirror so the operator can see the other side of the chute, or develop a dialog where one worker says 'done' so the operator knows he is clear, recommends Moore. On some units, controls can be relocated so the operator has a view of the front of the chute. Or simply equip the person on the other side of the head gate with a whistle to blow each time his job is done and he is clear.

Injuries are expensive, and no operation wants to be a focus of an OSHA investigation. Training, work flow and facility changes can make a big impact on worker safety.

In a future issue, *Feed•Lot* will look at processing safety in relation to items around the chute, such as needles and implant guns. FL

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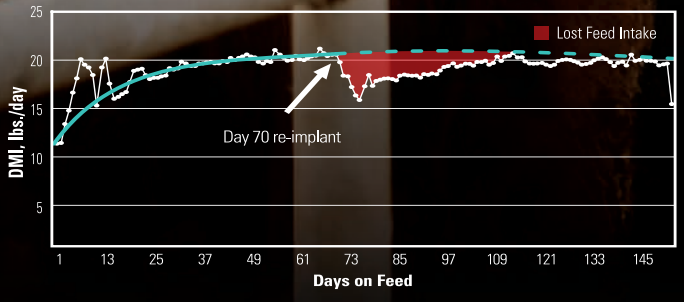

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1. Study Number HR-2S: Evaluation of Implants Containing Reduced-Dose Combinations of Trenbolone Acetate and Estradiol on Performance and Carcass Merit of Finishing Steers.

MERCK Animal Health

BY: ANDREA PAYAN-PHIPPS, MS,
CARGILL ANIMAL NUTRITION

The Value of Consistent Timing

Have you been to an air show or seen videos of the Blue Angels or Air Force Thunderbirds? I'm always amazed at their precision, flying just inches away from each other in perfect formation. Every pilot knows their role and route, and has to execute with perfect timing and form each and every time.

I bring up a precision flight team because I think we can apply the idea of that precision to how we operate a feedyard, especially to the topic of on time feed delivery. Think about the average day at the feedyard and the feeding operation. The various departments need to operate with precision in order to get the feed delivered to the cattle at the same time each day. Timing really is of the essence. When the timing of the feed delivery is off, it can create vast negative impacts to the animals and the success of the yard.

Impacts to Health, Productivity and Profitability

A primary objective of every feedyard is to convert pounds of feed to pounds of gain in the most efficient way possible. What we can overlook is the importance of timing in that equation. The rumen is a very sensitive organ and even a small change in the time of feed delivery can impact feed intake. Cattle can get digestive disorders, which can then result in a decrease in dry matter intake. That change can affect the stability of the rumen, which could impact the animal's health and certainly impacts its feed efficiency. The key to controlling digestive upset is controlling variability.

When an animal gets a digestive disorder, they likely aren't going to eat as much, leaving excess feed in the bunks. With 55 to 75% of the total costs associated with beef cattle production coming from feed costs, excess feed in the bunk is farm profitability being wasted. In addition, if cattle aren't eating as much, that means they are likely gaining less and spending more days on feed. As you can see, a small change in the time of feed delivery can snowball very quickly.

Tips to Improve Feed Delivery Timing

Ensuring feed gets delivered on time each day isn't something that can be fixed overnight. With the right process and practices, you can make a positive impact on the precision of the feeding operation and overall business success.

- Conduct an audit of your feeding operation. This is probably the hardest but most important step. Before putting an action plan together, you need to observe. Walk through all the steps in the process and determine what can impact timely feeding, that includes cattle movement, equipment, and feed preparation. Take note of bottle necks and consistent problems.
- As part of the audit, identify key metrics and monitor them over a period of time. Some examples of those metrics are: what time is the first pen fed, what is the average delivery tonnage per hour, and what time is the feeding process ending.
- Write SOPs and train your staff accordingly. After conducting your assessment, it's important to document standard operating procedures (SOPs) of how things should flow to keep feed deliveries on time. Take the time to train the staff on the protocols and conduct re-trainings as needed. As part of that training, be sure to include information about how each role affects another. Explaining why each step is important is just as important as sharing what the step is.
- Set expectations and communicate them. When you look at

those key metrics that you assessed during the audit, think about which ones you could track and report daily. For example, when I was a feedyard manager, the truck drivers had a goal to deliver 30 tons of feed per hour. That expectation was communicated to the drivers, and each day, we could assess if they met that goal or not. If they didn't, we could inquire why and take action to correct the problem so we could get back on time the next day.

➤ Have regular team meetings. I found it very helpful to have a quick meeting each day with leaders of the different departments involved in feeding. We would review the previous day's results of what went well — or what didn't — and set action plans for anything needing to be addressed. The team leaders would do this with their teams as well. Communication is key to keeping feed delivery on time.

➤ Use technology to your advantage. Having quick meetings to review the day are great, but being able to see information real time is even better. There are systems and tools available to monitor feed output and track trucks as they are moving. Once you get a feel for the normal data output, you can see when there is a problem immediately. That makes it possible to jump in and correct the problem with less of an impact on the overall timing.

➤ Finish the shift by getting ready for the next one. I think about this like putting car keys in the same place at home. If the keys are in the same spot, you don't have to waste time looking for them. Taking time at the end of a shift to get everything ready for the next feeding can save time. It also helps spot any issues that might need to be addressed in order to keep the next feeding on time.

➤ Have a back up plan. Equipment will break, people will call in sick and cattle won't be moved on time; these things happen. When they do, having a back up plan will help the team get back on time quicker. Have spare parts on hand for critical equipment, and cross train your employees on different roles so they can jump in if you are shorthanded so delivery time impacts are minimized.

With commitment to improving the delivery time of feed, you can help your teams operate with better precision, like the Blue Angels, and bring more productivity and profitability to your feedyard. FL

BY DON TYLER

Eliminating Gossip

Your first thought in reading the word "eliminate" in this headline might have caused a sneer of derision or a muttering of "Yeah right! How can you eliminate gossip!" It can be eliminated, but we first must realize the devastating effect it can have on our business culture.

Gossip is when anyone says something about another person, especially something negative, without that person being a part of the conversation. Positive comments are not gossip. These compliments should be encouraged and shared with everyone for maximum benefit.

There are basically two kinds of people that don't see anything wrong with gossip. The first are those who feel they have never been harmed by gossip. The others are the actual gossipers. Of these gossipers, the worst are often the ones who openly say, "If you can't take a little gossip, you're not mature, don't have the backbone for the workplace or aren't up to working in this atmosphere."

Studies on gossip show that when a negative comment is made about someone not present, the comments continue to get more and more negative unless a person intervenes and comes to the defense of the individual. It was also confirmed that workplace gossip tends to be more subtle than the gossip of teenagers, but much more harmful. Subtle gossip in the workplace takes the form of sarcasm, passive-aggressive behavior, side comments made with a smile and adjectives that seem mild on the surface. But in context, everyone knows it's a direct criticism of the targeted individual.

One of the best lines to use to end gossip is, "Don't we have some work to do around here?" or simply making a positive comment about that person.

Some feel that gossip builds camaraderie within the small group of regular participants, but in reality is a form of warfare that can bring down an entire company's morale, culture and job satisfaction. Entire departments in feed yards have turned over because of one person's gossip.

For clarity, gossip isn't the general banter heard among cowboys, the teasing that a truck driver gets for not closing a gate, or the razzing a new head-gate operator gets for letting a steer slip by. These comments, when done with a tone of camaraderie and jovialness, can actually build teamwork and like-minded appreciation for the difficulty of the job. There is no damage done when the teasing is evenly shared among the group, isn't personal, and no individuals are considered immune from the friendly banter.

Your Strategy

- Realize this will take time. Talk to your key people to emphasize your reasoning for this policy and get their buy-in.
- Create a clear definition for gossip in your operation.
- Make certain that you and your key people set a good example.
- Communicate your policy on gossip and allow the staff to get accustomed to this aspect of developing your desired culture.
- Encourage employees to talk positively about coworkers and to walk away if others start to gossip.
- Help gossipers realize that others in the company who they think are their "friends" are probably using them to spread negative information about the people they don't like in the company. They achieve their objectives at the expense of others.
- Reduce any covert, veiled sarcasm. If you hear these remarks, ask the person to clarify what they said and what they really meant by it.
- When a pattern of gossip is identified, use coaching rather than discipline to modify their behavior and reinforce your positive culture.

In most operations when you make a clear change in policy concerning attitudes and behaviors, expect a bit of turnover. Some can't or won't change, and you won't miss them. You will also realize an improvement in employee satisfaction and an increase in people who want to work for you. Emotionally mature, positive-minded employees will like this policy. It will eventually become one of the best parts of your "Brand" in your neighborhood and the industry.

Remember this quote from Eleanor Roosevelt: "Great minds discuss ideas; average minds discuss events; small minds discuss people."

For Management and Executive Coaching assistance, 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

BY AARON BERGER & TROY WALZ,
NEBRASKA EXTENSION EDUCATORS

Planning For a Potentially Short Hay Inventory

The abundant spring and early summer moisture we have received in Nebraska has been record setting in many areas and has resulted in hay meadows and fields being inundated with water. Even if the rain stops, for many producers, these flooded hay meadows and fields will produce significantly less this year, due to the damage caused to forage stands by the standing water. This sets up a scenario where many producers may find themselves short on hay for the upcoming winter of 2019-2020. In addition, the quality of feed that is harvested may be less than "normal" as delayed cutting in waiting for fields to dry may mean forage is more mature, reducing energy and protein content of the hay. Now is the time to plan for management options with reduced forage production from perennial hay fields.

1. Reduce forage demand for the upcoming fall and winter. It is hard to believe that hay may be short with an abundant precipitation year in Nebraska, but for many cow-calf producers, this may be the case. Consider weaning calves as well as pregnancy testing yearling heifers and cows early as a method to reduce forage demand. Early shipping of calves off the ranch as well as culling non-pregnant heifers and cows can help to significantly reduce forage demands. Visit with your tax accountant about deferral of income from livestock sales if you normally would market these cattle after the first of the year, but due to weather conditions are being forced to sell in 2019.

2. Plant annual forages to provide additional feed. Summer annuals can be planted until late July and still be very productive assuming adequate soil moisture and fertility is present. After late July, spring annual forages such as oats, spring triticale and barley as well as brassicas can be a better option for forage production as they will continue to grow on into the fall as long as temperatures are above the mid-20s Fahrenheit. Planting annual forages into wheat stubble may be a good option this year to produce additional forage.

3. Find and secure other forage resources. Evaluate whether it may be best to bring the feed to the cattle, or the cattle to the feed. In many places in Nebraska county roads will require significant work before trucks can haul feed in. Cornstalks for grazing, cover crops, and annual forages can be used to replace hay. Ammoniating wheat straw or cornstalks can significantly improve the quality of both of these residues. Use caution when bringing hay onto the ranch from outside sources that may contain weed seed.

4. Compare feed options and contract protein and energy supplements early to lock in supplies. It is likely that protein and energy dense feeds such as distillers grains will be in demand to be used with low quality forage. Consider purchasing these feeds early to guarantee supplies. Utilize tools such as the Feed Cost Cow-Q-lator to effectively compare feed options to one another. Include all costs, such as hauling, storage, waste and feeding expense to fairly compare feeds to one another. ►

Planning for a... from previous page

5. Utilize perennial hay fields and meadows that were too wet to hay with grazing during the fall and winter. Once the ground is firm or frozen enough for cattle to get out on it, consider grazing these areas through the fall and winter. The use of an electric fence for strip grazing and/or windrow grazing can help increase harvest efficiency and minimize waste. Areas that are too wet to harvest this summer, may be able to be grazed later this year.

6. Minimize waste during storing and feeding. With uncovered storage, store your hay using methods that will minimize nutrient and dry matter losses from weathering. Make a dense bale, as a dense bale will sag less and have less surface area in contact with the ground. Store hay on an elevated, well-drained site so it will not soak up moisture from wet soils or standing water. Store bales end-to-end with the line oriented north to south to allow prevailing winds to blow snow past the bales. If more than one line of bales is needed, space adjacent lines at least 3 feet apart to increase airflow and allow sunlight to penetrate the bales. When feeding, research has shown that certain types of bale feeders along with time limiting access of cattle to hay feeders can reduce waste. For cattle being fed in a dry-lot, the use of these tools can be helpful to efficiently utilize hay.

7. Consider the use of an ionophore to stretch feed resources. Where cattle are being fed a supplement daily, consider the use of the ionophore monensin for cows to stretch feed resources. Research has shown that when cows are fed an ionophore the amount of hay needed can be reduced by 7-10 percent.

8. Consider limit feeding cows. Limit feeding is when cows are fed a diet containing ingredients that are energy and protein dense which meet the cow's nutrient requirements but the cow is restricted in how much she eats. Energy and protein dense feeds can be fed with low quality forage to stretch limited forage supplies.

9. Test your hay/forage. Knowing the nutrient content of your hay/forage will help with ration formulaion to ensure that you are meeting your cattle's nutrient requirements. Having an accurate analysis is important in developing a cost effective feeding strategy.

10. Partner with farmers who have planted cover crops on prevent plant acres. In some areas that were too wet to plant this spring, farmers have planted or will be planting cover crops on acres that they were not able plant to corn or soybeans. These crops can be grazed after September 1.

By beginning to plan now for a potentially short hay supply, producers will be in a better position to fully utilize the options available to them. Resources on options discussed in this article can be found at the beef.unl.edu website. Nebraska Extension Beef Specialists and Educators are also available to provide additional assistance and information on these topics. FL

Beware of Armyworms After Tropical Storm Barry

Fall armyworms could follow rainfall delivered by Tropical Storm Barry, warns a Texas A&M AgriLife Extension Service expert.

Texas A&M AgriLife Extension Service agents in a few Central and East Texas counties have reported armyworm activity in hayfields and pastures over the past few weeks. Dr. Vanessa Corriher-Olson, AgriLife Extension forage specialist in Overton, said producers should expect an increase in armyworm numbers, especially in areas where Tropical Storm Barry delivers rainfall and cooler temperatures.

The best time to check for armyworms is in the morning while dew is still on the ground. Take several steps into the pasture with boots on and they will be on the boots if present. The treatment threshold is three armyworms per square foot. (Texas A&M AgriLife Extension Service graphic by Dr. Allen Knutson)

"I've seen a few reports about armyworms, and this expected rain could mean an explosion in their populations," she said. "Armyworms can devastate grazing and forage production pastures quickly. Producers need to be mindful to watch their pastures for the pest. It is shaping up to be a good hay production year following such a poor season, and it would be a shame to lose a cutting or valuable grazing to armyworms."

Armyworm moths can lay up to 2,000 eggs that hatch in two to three days, according to a 2015 report by AgriLife Extension entomologist Dr. Allen Knutson. There are typically four to five generations per year.

Corriher-Olson said armyworm caterpillars are picky eaters that prefer high-quality, fertilized forage typically found on fields maintained for hay production. They are a common pest of Bermuda grass, sorghum, corn, wheat, ryegrass and many other crops in northern and central Texas.

Producers should scout each morning for armyworms, she said. Armyworms are night feeders that try to avoid daytime temperatures. They are green, brown or black in color and can be identified by the white inverted Y on their head. Armyworms, which can grow up to 1 inch in length when mature, got their name because they appear to march across hay fields, consuming the grass in their path.

The threshold for insecticide spray treating a pasture is three or more armyworms per square foot, Corriher-Olson said. Armyworms in those numbers should be treated immediately. Armyworms in the last two or three days of their larvae stage consume 85% of their diet.

Corriher-Olson recommends insecticides labeled for armyworm control in pastures and hayfields. She said applicators should always follow all label instructions on pesticide use and restrictions.

"You don't need to wait a day if their numbers are at threshold," she said. "They are going to do a lot of damage quickly. If you find them in the morning, spray that day." FL

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

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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.

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A Comparison of Three Vaccination Programs in High-Risk Feedlot Heifers[1]

Study overview

A study was conducted in a commercial feedlot to compare the relative efficacy of three vaccination programs designed to protect against *Mannheimia haemolytica* and respiratory viruses in 2,575 high-risk heifers sourced from auction markets. The study followed the heifers through harvest and evaluated the effects of the vaccine programs on health, growth performance and carcass characteristics.

Key findings

- Vaccination programs implementing Titanium® 5 and NUPLURA PH had similar effects on BRD-related health outcomes, growth performance and carcass characteristics in feedlot heifers as an arrival vaccination program that utilized Pyramid® 5 and Presponse® SQ
- Delaying Titanium 5 until 28 days on feed did not affect the health or growth-performance outcomes measured in this study
- There were fewer mortalities attributable to acute interstitial pneumonia in the heifers that received Titanium 5 and NUPLURA PH at arrival (0) compared to the heifers that received Pyramid 5 and Presponse SQ at arrival (9)
- The recombinant technology and purification processes used to manufacture NUPLURA PH resulted in significantly lower endotoxin concentrations compared to Presponse SQ, whose toxoid component is a supernatant derived from whole-cell *Mannheimia haemolytica* culture

Trial design

Heifers were assigned to one of three vaccination programs that differed by either vaccine products or timing of administration of the pentavalent viral vaccine:

TNA: Titanium 5 and NUPLURA PH during arrival processing

TND: NUPLURA PH during arrival processing with Titanium 5 delayed until 28 days on feed

PRE: Pyramid 5 and Presponse SQ during arrival processing

Materials and methods

Study population — 2,575 high-risk heifers (568 +/- 28.1 lbs) placed in May and June of 2017 that received metaphylactic treatment during arrival processing.

- The three pens within a block were located adjacently, so that health observations were performed by the same pen rider within a day
- Necropsies were performed by a veterinarian or trained feedlot personnel who determined the probable cause of death

TABLE 1. Model-adjusted least squares means of health outcomes by vaccine program

VARIABLE	PRE	TNA	TND	SEM[a]	*P*-VALUE
BRD[b] 1st treatment, %	14.27	13.24	15.77	2.11	0.31
BRD 2nd treatment, %	6.64	6.24	7.53	1.26	0.54
BRD 3rd treatment, %	2.87	3.10	3.62	0.80	0.64
BRD case fatality risk, %	18.67	21.91	13.61	4.62	0.18
Overall mortalities, %	4.00	3.82	3.06	0.94	0.50
Overall removals, %	0.20	0.31	0.20	0.22	0.86

a. Largest SEM in the analysis.
b. BRD = bovine respiratory disease

TABLE 2. Bayesian latent class model used to estimate disease risk and 95% probability interval of mortality outcomes of feedlot heifers at closeout by vaccine program

ETIOLOGY	PRE		TNA		TND		PROBABILITY OF DIFFERENCE[a]		
	Mean	95% PI	Mean	95% PI	Mean	95% PI	PRE VS TNA	PRE VS TND	TNA VS TND
BRD[b]	2.60	(1.37; 4.94)	3.30	(1.75; 6.11)	2.23	(1.16; 4.24)	0.30	0.19	0.48
Digestive	0.11	(0.03; 0.57)	0.15	(0.03; 0.58)	0.28	(0.06; 0.69)	0.67	0.60	0.66
AIP[b]	1.01	(0.37; 1.81)	0.00	(0.00; 0.01)	0.05	(0.01; 0.44)	1.00	0.79	0.99
Other	0.05	(0.00; 0.33)	0.34	(0.08; 1.12)	0.07	(0.00; 0.60)	0.70	0.23	0.55

a. Probability of difference between vaccine programs based upon Bayesian posterior distributions.
b. BRD = bovine respiratory disease; AIP = acute interstitial pneumonia.

TABLE 3. Model-adjusted least squares means of growth performance and economic outcomes by vaccine program

VARIABLE	PRE	TNA	TND	SEM[a]	*P*-VALUE
Final body weight,[b] lbs	1,248.7	1,248.8	1,248.3	8.75	0.99
ADG, lb[c]	2.87	2.86	2.91	0.08	0.73
F:G[c]	6.41	6.36	6.24	0.11	0.34
Dry matter intake, lbs	18.31	18.17	18.14	0.28	0.65
Cost of gain,[c] $/100 lbs	80.39	79.78	78.64	1.38	0.46
Profit, $/heifer sold[c]	79.30	87.51	99.60	13.69	0.35

a. Largest SEM in the analysis.
b. Adjusted for 4% shrink.
c. Dead animals included in analysis.

TABLE 4. Model-adjusted least squares means for carcass characteristics by vaccine program

VARIABLE	PRE	TNA	TND	SEM[a]	*P*-VALUE
Hot carcass weight, lbs	796.3	793.9	795.7	4.29	0.81
Dressing percent, %	63.44	63.46	63.49	0.34	0.98
Carcass adjusted ADG,[b] lb	3.14	3.11	3.12	0.04	0.60
Prime, %	2.03	1.40	1.63	0.58	0.61
Choice, %	66.93	70.16	65.45	2.97	0.15
Select, %	29.65	27.23	30.89	3.30	0.30
Standard/no roll, %	0.74	0.73	1.34	0.47	0.35
Yield grade 1, %	6.67	6.22	6.80	1.45	0.88
Yield grade 2, %	37.96	37.06	34.46	3.66	0.36
Yield grade 3, %	46.15	44.87	44.26	3.76	0.76
Yield grade 4, %	6.71[c]	9.09[cd]	10.68[d]	1.79	0.02
Yield grade 5, %	0.38	0.64	1.27	0.46	0.14

a. Largest SEM in analysis.
b. ADG estimates based upon common dressing percentage of 63.46% in the 9 blocks in which carcass outcomes were captured.
cd. Means without common superscripts differ ($P < 0.05$).

TABLE 5. Model-adjusted least squares mean (95% confidence interval) and standard deviation of the endotoxin concentrations in the *Mannheimia haemolytica* vaccines

VACCINE	ENDOTOXIN CONCENTRATION (EU/ML)	95% CI	SD	*P*-VALUE
NUPLURA PH	1,587.6	(679; 3,710)	1,069.9	< 0.01
Presponse SQ	56,120.3	(24,012; 131,160)	11,951.2	

For all vaccine products: The label contains complete use information, including cautions and warnings. Always read, understand and follow the label and use directions. **For NUPLURA PH:** Do not vaccinate within 60 days of slaughter. **For Titanium:** Do not vaccinate within 21 days of slaughter.

1. Elanco Animal Health. Data on file.

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