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Volume XXVI Number 4

June 2018



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It's a BUGGY Time of Year.

It doesn't matter if you're at your son's soccer game with the aromatic scent of bug spray to keep the mosquitoes away, or if you're at the feed yard and roll down your window for a quick conversation only to discover a few hundred flies want to take a trip with you – they are pests!

As I write this, I have a herd of mosquitoes on my window screen. We've been blessed with moisture in my part of Texas, and as of this morning I would say the mosquitoes are out. No doubt, pests are a problem for humans and animals alike. So each year, we take one issue of *FEED•LOT Magazine* and dedicate it to fighting these pesky critters. Inside this issue, you'll find ideas on parasite resistance, getting the most out of your premise spray and tips for using feed-through fly control.

The economic impact of flies is quite astounding. Research shows horn flies cost producers \$1 billion – with a B – annually. These pesky suckers can feed 20 to 30 times a day with painful bites on a calf. Weaning weights have been proven 10 to 15 pounds higher when horn flies were controlled in the cow population, and the impact doesn't stop there. As yearlings, horn flies can reduce weights up to 18 percent.

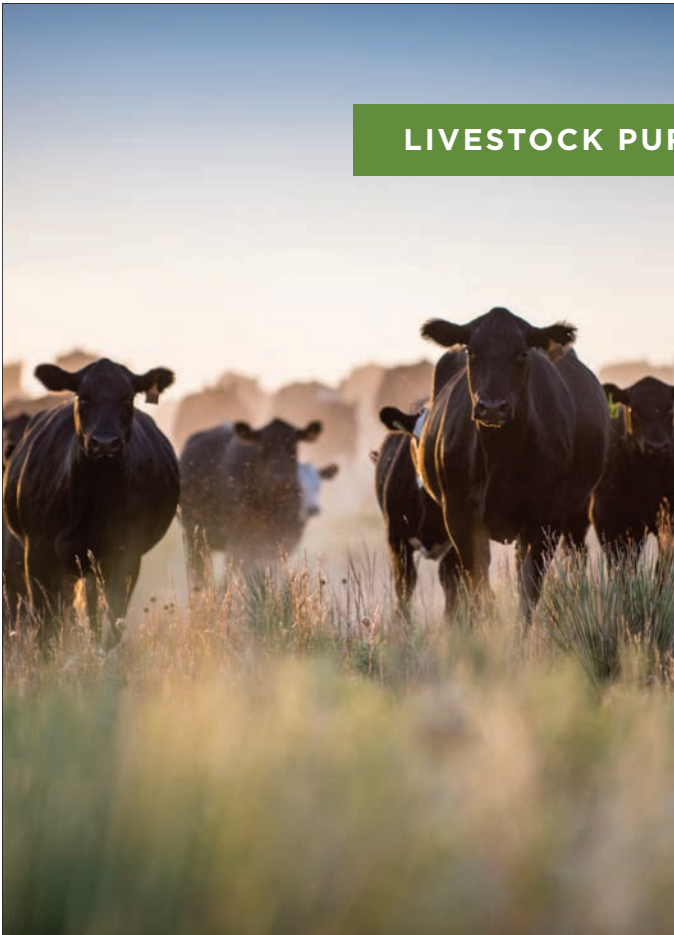
Stable flies also are a pain, literally. Estimated annual losses due to stable flies are \$2.2 million, with decreased milk production and up to .48 pounds per day in decreased weight gain. House flies transmit bacteria, and one of their biggest issues is annoying the neighbors! If you have a feed yard near your house or someone else's, you know



how bothersome they are.

Pest and parasite control costs money. And with some of "cattle country" struggling with drought conditions, it can be easy to let things slide for the sake of the bottom line. But considering the losses these critters can cause, and the importance of keeping your neighbors happy, it's worth figuring in control measures in your breakeven.

Here's to a reduced fly and mosquito season at your place. **FL**



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CATTLE: Over 2 years	1 mL/per 200 lbs. bodyweight

PRECAUTION:

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Do not use concurrently with selenium or copper boluses.

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(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

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5 TIPS TO FEEDYARD



Sprinkler or mister systems are used successfully in cattle operations to provide respite from extreme heat. Terry Mader, Ph.D, owner of Mader Consulting and a retired Beef Cattle Specialist from the University of Nebraska-Lincoln, said there is more to a successful sprinkler program than just turning on the water. It is important to consider the entire water system, the type of cattle,

how sprinklers/misters are used and their position in the pen.

Here are Dr. Mader's tips for utilizing sprinklers or misters as part of a heat mitigation strategy.

1 Understand the water availability, consumption and have back up plan.

Making sure you have enough capacity to run a sprinkler or mister system while dealing with increased water consumption on hot days. On those days, livestock may drink anywhere from 8 to 15 gallons, possibly up to 20 gallons/head a day. Adding a sprinkler system could double that consumption. Even a mister system, which does not use as much water, could add another three to six gallons per head per day. Be sensitive to your water supply and your back up supply. If something is compromised, what is your backup system to water cattle?

I've seen situations where it's problematic with sprinklers when you've used so much water, you compromise the water supply for livestock to drink. Or maybe a pump goes down and then cattle are out of water. That's where you could see a high death loss. Make sure you have a plan.

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BEST UTILIZE YOUR SPRINKLER SYSTEM



2 Sprinklers or Misters? Consider the type of cattle.

Are the cattle you are feeding northern cattle that still have some winter hair, or are they slick-hided? That can make a difference in how you cool those cattle. In the north central plains, in May, June and early July, some of those cattle will still have a hair coat. Water from misters might not penetrate the winter hair and reach the skin for evaporative cooling. The mist on their hair could even create a water vapor barrier, preventing water to reach the skin.

However, the further south you go there's a greater chance cattle have lost their winter hair coat. I've seen misters work quite well mid-July through August with a slick hair coat when the water is able to reach the skin.

Sprinklers, on the other hand, have larger droplets of water that penetrate the hair coat and reach the skin. Since most feedyards use underground water, it is cold and a cooling sensation is almost immediate for cattle. That said, sprinklers do use a lot more water, so you have to weigh several factors to determine what is best for your operation.

3 Schedule sprinklers/misters to run on a regular basis.

Timers that turn on sprinkler systems at set times help reduce the quantity of water used and ensure the heat mitigation strategy is utilized on a regular basis. Cattle adjust to heat abatement strategies, and if those strategies disappear, they may not be able to handle the increased heat load. One of the worst things you can do is get cattle adjusted to a sprinkler system, and then forget to turn it on one day. Systems that run about 10 minutes every hour or 15 minutes every 90 minutes will cool the cattle and the ground they stand

on. If you put more time between each use, the cattle can dry off and get hot.

4 Position sprinklers to cover a portion of the pen, not all.

Because sprinklers and misters can elevate the humidity in a pen, don't spray the entire pen with water. Instead sprinkle 1/4 to 1/3 of the pen. If it is a still day with little air flow, cattle can move to a dry portion of the pen if humidity is a problem.

5 Location, location, location.

Although it's convenient, don't install misters or sprinklers right above water troughs. Cattle will already be crowding the water and sprinkler areas. If those areas are one in the same, less aggressive cattle can't get to water to drink, so they are compromised. Instead, sprinkle an area away from the water trough so cattle have to move from the cooled area to the water trough. Consider how many animals can get to the water, and the area you sprinkle.

Keeping cattle cool can combat the typical 15 to 20% drop in feed consumption often seen during hot summer months. If your water supply can handle the increased load from both livestock drinking and a sprinkler or mister system, cooling cattle with water is a good heat management strategy.

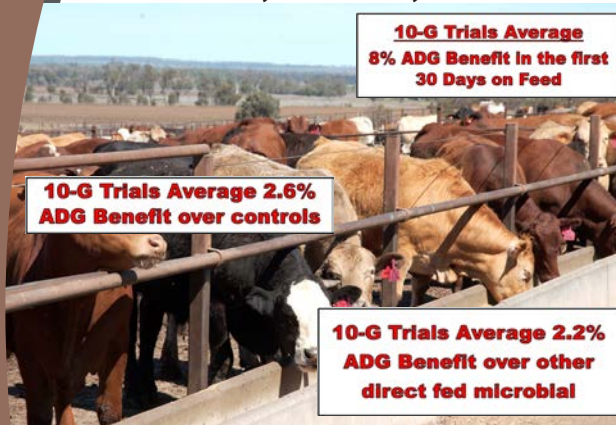
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Are Ewe Listening?

Take a lesson from sheep when it comes to resistant parasites.

Although cattlemen might not want to get a lecture from a sheep herder, there is one topic that ranchers better take note of from the sheep industry – parasite resistance. The issue is well documented. And with no new parasiticides for cattle in the pipeline, Doug Ensley, DVM, technical marketing manager for cattle, Boehringer Ingelheim, said it's time for cattlemen to change our way of thinking when it comes to deworming.

Years ago, it was standard practice to deworm all livestock every spring, and often again in the fall. But Ensley said instead of deworming by the calendar, deworm according to the needs of your herd.

“For the last 35-plus years, we’ve been deworming with many of the same general products. So we need to develop a plan to use those products in a way that will give us the benefits of deworming in the future,” he said.

By deworming all animals, we are exposing all parasites to the parasiticide, and if the parasites live, they will reproduce other parasites that are also resistant,

thus strengthening the number of resistant organisms.

“I recommend working with your vet to develop a program, and then monitor the program to see how well it is working,” Ensley said. Often cattlemen don’t consult their veterinarian on a deworming strategy, but a vet has some tools in his toolbox that can benefit a deworming program and limit parasite resistance.

Ensley suggested thinking about a different approach to deworming. One such strategy is not deworming the entire herd. Instead consider what animals are at greatest risk of parasites, like young animals and young breeding stock. “Those are the most susceptible to parasites, so maybe focus on those animals as you move forward. Older animals have had exposure to parasites and most likely have some resistance.”

Monitoring fecal egg counts can also help identify those animals with a parasite problem. “Typically 20% of the animals have 80% of the parasites. Those are the ones to target with a parasite control program,” he recommended.

By targeting certain animals in the herd not all parasites will be killed, so resistant parasites are diluted with susceptible ones, diluting the resistant gene pool. The concept is called refugia.

Another option to consider is using a combination of products, Ensley said. Pairing a white deworming drench with an injectable or pour on can drive up efficacy.

“If only 1% of parasites survive a combination deworming strategy, it is much easier to dilute that 1% of resistant organisms. You knock down the percentage of resistant parasites that way,” he explained.

Accurate dosing is another important consideration. Under dosing increases the chance of parasites not succumbing to the deworming product, thus strengthening their resistance.

Knowing the challenge the sheep industry faces with parasite resistance, Ensley said it’s time to look at deworming from a different perspective. “We need to think about the parasites themselves. Are we treating cattle in a way that is building resistance?” he asked. “Or are we using a plan that extends the life of the products we have.

“What used to be the best plan might not be so great, any more.” **FL**



GET THE MOST FROM YOUR PREMISE SPRAY

BY JILL J. DUNKEL

Premise sprays are often used in barns, on bunks and other areas where flies tend to concentrate. The effectiveness of any spray can be influenced by a variety of factors. The type of flies targeted, a residual versus quick kill approach, nozzle size, cleanliness and other environmental situations can all impact the success of a spraying program. Understanding these factors will help get the most benefits from a premise spray

CONFINED CATTLE						
		POTENTIAL IMPACT	REST ON	BREED IN	FEED ON	WHAT TO LOOK FOR
HOUSE FLY		Can cause aggravation, reduced feeding, pen avoidance	Manure, soil, fences, weeds, trees, buildings, etc.	Manure, moist/decaying materials	Manure, old feed, waste, sweat, tears	Flies on structures and animals, around feed Constant cattle movement Bunching, tail switching
STABLE FLY		Can cause blood loss, reduced weight gain or weight loss, reduced milk production	Barn walls, fences, weeds, etc.	Manure, moist/decaying materials	Blood (cattle)	Flies on lower legs of cattle Cattle stomping or bunching Constant cattle movement
						On Animal Ear Tag, Pour-On, Spray, Dust Facility Spray, Bait, Dust Environment Spray, Bait Feed-Through Oral
						On Animal Ear Tag, Pour-On, Spray, Dust Facility Spray, Bait, Dust Environment Spray, Bait Feed-Through Oral

IDENTIFY THE FLY

One of the first steps in effective fly control is identifying the type of fly, says Larry Hawkins, DVM, Senior Technical Service Veterinarian with Bayer Animal Health. “When you’re at a feed yard and get out of the truck to talk to someone, or maybe roll your window down for a few minutes, the next thing you know there are 100 flies in your truck. For the most part, those will be house flies, or possibly stable flies,” he said. Selecting a product for those types of flies is important.

The biggest issue with house flies is as a nuisance. No one – including neighbors – likes them, and they have been known to carry bacteria for 65 different diseases. If they get out of hand, the neighbors will let you know about it, Hawkins said.

House flies can transmit bacteria that causes mastitis in heifers, so if a feed yard is growing heifers for a rancher, the heifers can be exposed to the bacteria long before they have a calf – all as a result of flies.

Stable flies are biting flies that are slightly larger than a house fly, but not as big as a horse fly or deer fly.

“These are the flies that have a painful bite when you are working cattle,” Hawkins said. “They feed during the cooler times of the summer.” Their claim to fame – driving animals into the corner of pens while cattle stomp their feet. These flies attack the lower legs and animals huddle together hoping the animal next to them gets bit instead of them, he explained.

“When that happens, one animal will try to push into the middle of the group, getting deeper into the herd. When animals are crowded like that, their body heat goes up along with their stress level. That’s how animals get stressed by stable flies,” Hawkins said.

Stable flies are costly, reducing gain by up to .46 pound/head/day.



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PHOTO COURTESY OF A1 MIST SPRAYERS

Get The Most... from previous page

REMOVE BREEDING AND RESTING AREAS

It sounds simple, but cleaning and mowing go a long way, says Hawkins. Removing the breeding and resting areas for flies cuts down on the number at a facility and reduces the number of areas to spray.

House flies breed in any kind of filth, like manure, decaying feed under feed bunks, trash outside the break room, etc. Stable flies breed in decaying vegetation, like the slop off the bottom side of a round bale of hay, or old hay at the bottom of a hay ring. They can also breed in a pile of spoiled silage on the ground next to the pit or silage that was thrown off the top.

“Routinely cleaning up spilled feed and trash will make a significant impact on the fly population. Mowing weeds also reduces the areas flies have to rest,” Hawkins said.

Cleaning pens for both manure and spilled feed, including those hard-to-reach spaces like under feed bunks and beneath fence rails, will make the area less fly friendly. Hawkins said to pay attention to runoff if rain washes manure down a back alley. The residue is the

perfect breeding area for flies and is often overlooked.

QUICK KILL VS RESIDUAL SPRAY

Both residual and quick kill sprays have important roles in controlling flies. If the current fly population is bad, a quick kill spray will reduce the number of adult flies immediately. Spraying along the exterior of bunks and bunk rails, as well as along the backside of the pen and along the legs of bunched up cattle will help reduce the adult population. However, quick kill sprays do nothing for flies that will hatch in a few days.

Residual sprays can last a week or more and help target existing and newly hatched flies. Residuals are most effective if used in fly resting areas. “Stable flies take three or four blood meals and then rest somewhere nearby. They don’t fly far and aren’t very aerodynamic, so spraying areas close to cattle are key. Fence lines, eaves and overhangs of buildings are all important areas to spray,” Hawkins said.

NOZZLE SELECTION

General manager of A1 Mist Sprayers, Steve Nelson, suggested

adjusting the nozzle on the sprayer according to the type of spray (quick kill or residual). For a residual spray, a larger droplet size will offer longer lasting effects (you want the areas to be wet). A finer mist or fog is more appropriate for quick kill sprays.

Nelson also suggests watching the weather forecast before spraying. “If it rains, you automatically will have to spray again. But the most important aspect is start early. Waiting until you have a big problem is always a harder battle to fight.”

Some sprayers can be used for various other jobs at the feed yard, depending on the type and model of sprayer. “Our sprayer has a flush back system so you can clean it between applications, and use it to spray for weeds, too,” Nelson said.

Using premise sprays as part of a pest control management plan can make an impact in flies at your operation. Decide which type of flies are problems and target those accordingly. Coordinating sprays with other practices such as mowing and cleaning, as well as other pest management practices will deliver the best results.

FL



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Considering FEED-THROUGH FLY CONTROL This Year?

Feed-through fly control has without doubt become one of the most popular types of feed additives utilized in beef production systems. As a result, many floor-stocked free-choice mineral supplements and other feed products containing one of these technologies will soon become available for the upcoming grazing season. Feed-through fly control can be a valuable component of a comprehensive fly control program, however its misuse often results in lost opportunities and limited return on investment. Thus, it is important to understand the science behind these products and how they should be used in order to maximize their efficacy.

One thing that all feed-through fly control products have in common is that they have no direct effect on the animal – rather they have their effect in the animal's manure. While they are consumed by the animal, they move through

its digestive tract relatively unchanged, and are deposited in the animal's manure. This is where they wage their war against flies. Although they are delivered to the manure in a similar manner, their differences lie in mode of action. As such, these additives generally fall into one of two categories: insect growth regulators (IGR), or larvicides.

Insect growth regulators are compounds that typically interfere with the progression of normal fly development. In other words, these products work through inhibiting or delaying the progression of fly larvae from one stage of development to the next. Because of this, IGR products are generally species-specific, and thus target only a single fly species. Most commonly available IGR products are only effective on horn flies.

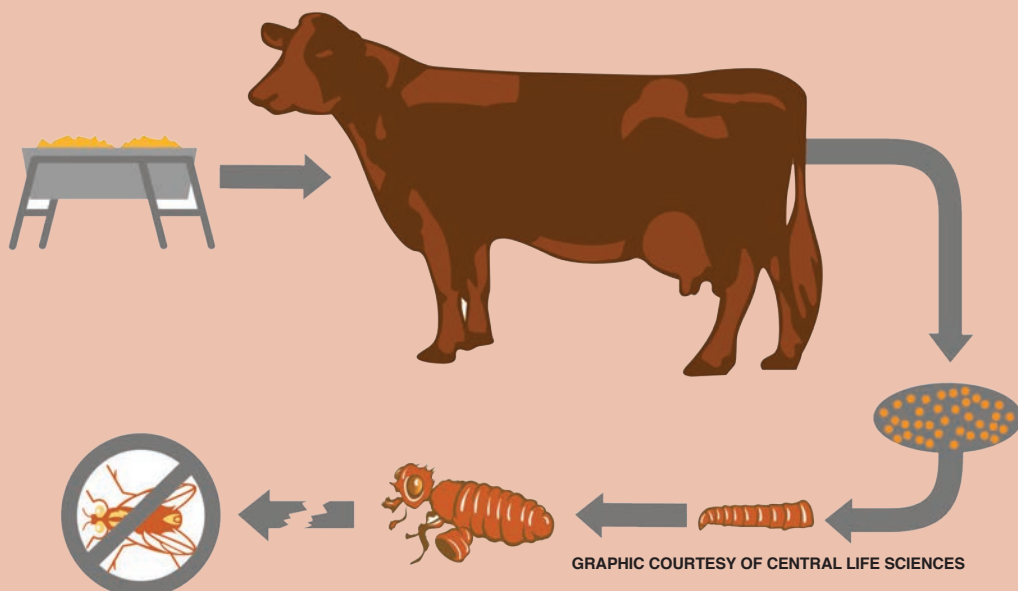
In contrast to IGR, larvicides elicit a structural change in the fly that leads to death before it is

able to reproduce. In other words, these products prevent flies from breeding. Because of this mode of action, larvicides generally are not species-specific, and thus target more than one species of fly. As a result, larvicides target not only horn flies, but also face flies and stable flies.

Because of their differences, it is important to make sure that you are using the correct product to achieve your goals for fly control – and similarly, meet your expectations. For example, occasional situations arise where an IGR is being used, but the producer does not believe it is working because they still see flies. Since that product is intended to control horn flies, do not expect it to reduce pressure from face flies or stable flies. This often results in mistakenly assuming that the product is not working, when in fact it is. In this or similar situations, the issue has been a lack of understanding in what the specific product is

Fly Life Cycle

A feed through works by interrupting the fly's life cycle rather than through direct toxicity. An IGR is ingested with the cattle's mineral or feed. As they graze, cattle disperse the IGR via their manure, where female flies lay their eggs. The eggs hatch into larvae, and after three to five days they molt into pupae. At this point, however, the active ingredient in the IGR disrupts the development of the fly by naturally mimicking the biochemicals that are responsible for insect development. The fly life cycle is effectively ended here.



GRAPHIC COURTESY OF CENTRAL LIFE SCIENCES

designed to do, rather than lack of efficacy. Similarly, larvicides may affect insects other than flies that also reproduce in manure.

In order to maximize efficacy of either a feed-through IGR or larvicide, it is important to ensure that they are used correctly. Since they elicit their effect on flies in manure, they must be present in the manure in order to do so. This means that you need to be ahead of the game, and begin feeding these products at least one month prior to fly emergence. If you don't begin feeding either of these products until flies are already a problem, you're going to limit their efficacy, as flies have been given the opportunity to breed and develop in manure that has not been exposed to the product. In these situations, flies have essentially been given a one-month head start. Similarly, product efficacy is dependent upon feeding these products throughout

the duration of the fly season. As a result, it is necessary to extend feeding through the second major killing frost.

Because these products work in a dose-dependent manner, it is imperative that cattle consume the necessary (labeled) amount of product. This means that cattle must consume the amount of feed required to deliver the necessary level of IGR or larvicide, and they must do so on a consistent basis. Take steps to ensure that these products are being consumed in a manner that will allow consistent delivery of the necessary amount of drug to manure. If using a free-choice mineral supplement as your vehicle of delivery, this requires tracking mineral consumption, and re-locating mineral feeders as necessary to achieve consistent intake of the necessary amount.

Another factor that limits the efficacy of feed-through products

is their use as the sole means of fly control. While they may still provide some benefit when used alone, feed-through pesticides are not a "silver bullet," and perform best when used as a component of a comprehensive fly control program. Thus, it is recommended that they be used in combination with other methods of control, such as insecticide-impregnated ear tags (fly tags), administration of topical insecticides (sprays, pour-ons, rubs, etc.), and proper manure management. The latter of these – proper manure management – is the area that is most commonly overlooked. In scenarios without manure management – and trust me, they exist – the efficacy of these products is substantially limited, as flies will almost always have access to manure that was not exposed to the product. Take the necessary steps to ensure that "old manure" doesn't limit product efficacy. **FL**



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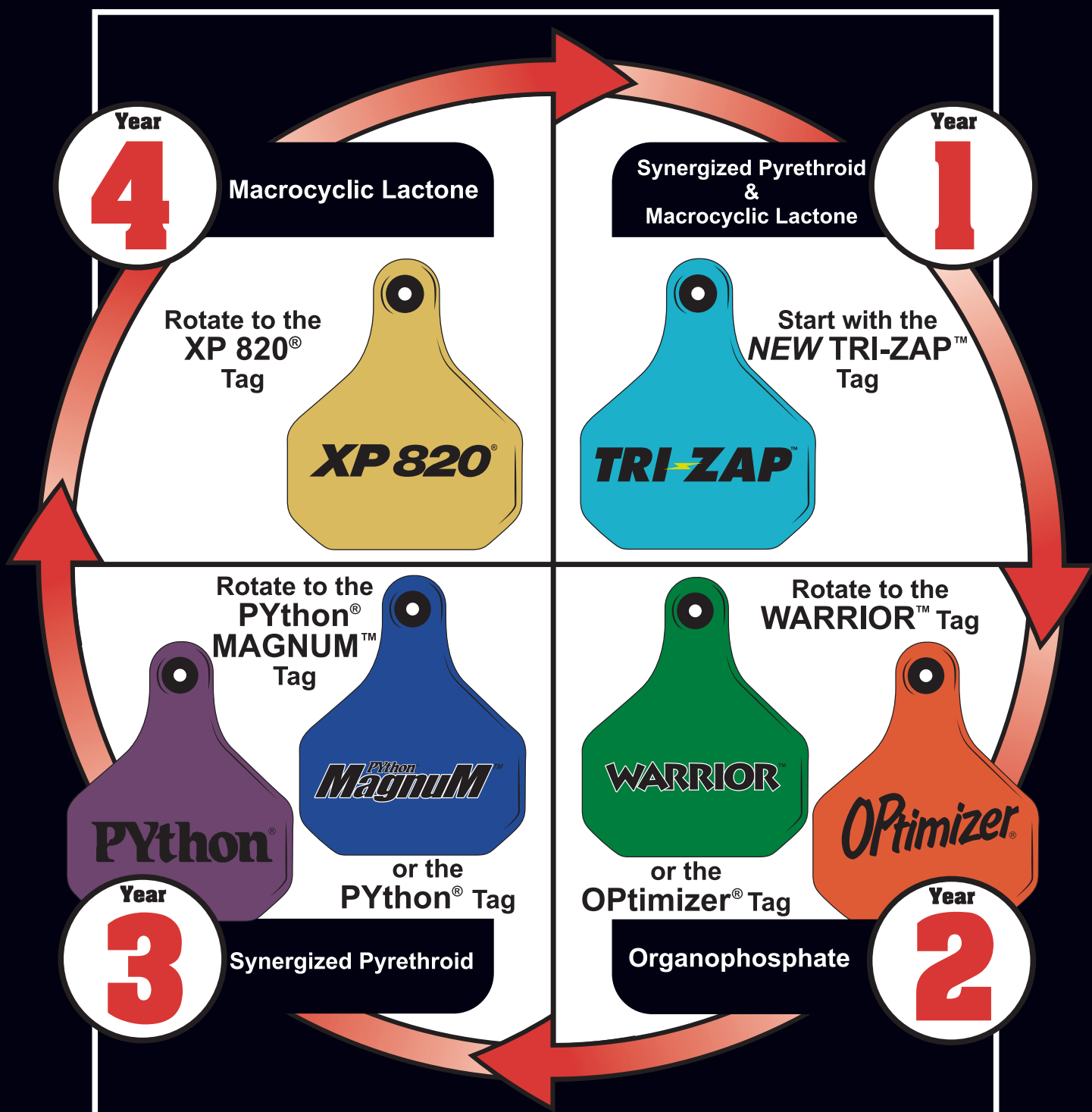
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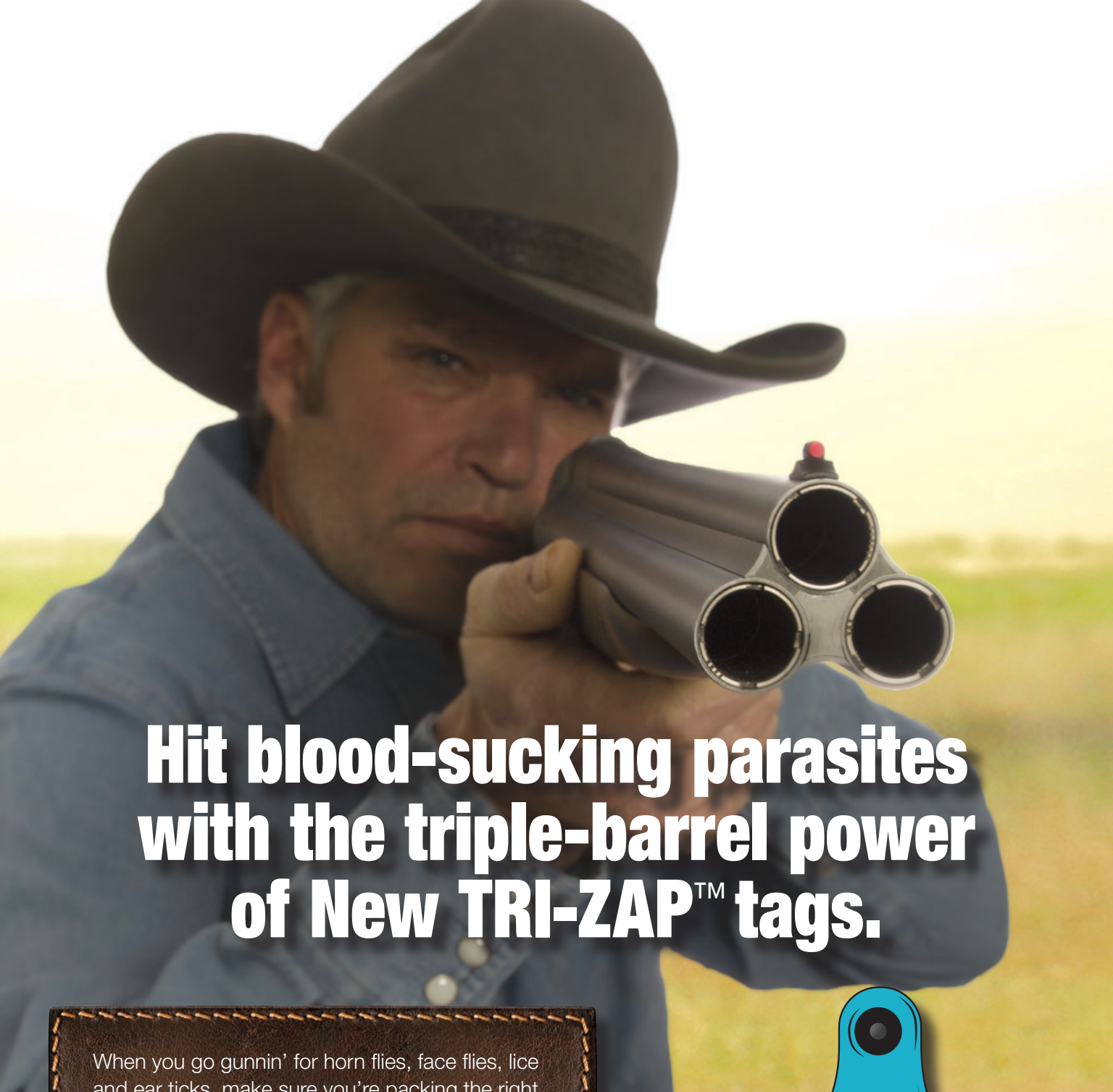
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KEYS TO SHADE SUCCESS

Offering properly designed and positioned shade structures can make a big difference in a feed yard setting.

It's no surprise that airflow and shade can help alleviate heat stress in livestock. Shade can decrease

the core body temperature and respiration rate of cattle by reducing solar radiation. And placed in areas where the airflow is adequate, shade can reduce heat stress significantly. Windbreaks are great in the winter but can hinder the airflow in the summer months. Thus placement and design of shades is important.

According to the USDA, orienting the longest axis of the shade in a north-to-south direction will maximize the

amount of shaded area, east to west, and will allow sunlight to dry the ground under the structure. A slight pitch will allow for runoff and anchoring the shade with materials of adequate size and strength for local wind conditions is important.

Smaller, multiple structures are encouraged so cattle don't bunch up under one shaded area. Portable structures are also a benefit so they can be moved as necessary, depending on conditions.

Dan Thomson, PhD, DVM and

Photos courtesy
Stroble Manufacturing



founder of the Beef Cattle Institute at Kansas State University said the most effective heat stress preventative for black-hided cattle is shade. “Shades can be sturdy, permanent structures, or mobile, portable structures,” he said. “The shade portion of the structure does not need to be solid.”

The benefits of shade for cattle are no different than providing shade for outdoor workers. When given the choice, University of California-Davis professor Dr. Frank Mitloehner reported that cattle with access to shade spent the majority of daylight hours under the shade.

Knowing shade is a preferred area for livestock, Larry Myers with Strobel Manufacturing conducted a ground temperature test under a shade product his company developed, the Strobel Super Shade. On a hot day in July, the ground temperature ranged from 137 degrees to 147 degrees in the sunlight. Under the shade, the temperature dropped to 103 degrees.

The temperature difference is not surprising, and Mitloehner’s research backed up the performance advantages shade offered. Shaded animals had higher dry matter intake, gained more weight, had better average daily gain and more efficient conversion.

Myers said cattlemen are investing in shades due to the number of livestock lost in extreme heat. “I was talking to a customer who lost 60 head of cattle one year,” he said. “After talking to his insurance adjuster, he has added shades in his pens. People are taking heat stress seriously.”

When considering purchasing or building a shade structure, Myers said to think about the structure throughout the year. A structure that limits sunlight during winter or wet months will slow the drying time in the pens. However a shade structure that can be moved and has a rollup tarp is a real advantage in that it will not limit sunlight

during certain times of year when it is needed.

In addition to the type of structure, USDA also recommends 20 to 40 square feet of shaded area per head so that improvements in animal comfort from shade are not offset by overcrowding.

If it’s not possible to offer shade in all pens, Thomson suggested prioritizing shade for pens affected

most by heat stress – those with large cattle.

“Those are the ones that need care and consideration first.”

Myers said although shade in every feed yard pen is not the “new normal” yet, it is catching on, and is definitely a way to protect the investment of livestock and maintain efficiency and gains in the hot winter months. **FL**



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1 Production Best Practices (PBP) to Aid in the Control of Foodborne Pathogens in Groups of Cattle. Beef Industry Food Safety Council Subcommittee on Pre-Harvest. Spring 2015. Accessed March 19, 2015.
2 Tabé ES, Oloya J, Doelkott 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.
3 Lallemand Animal Nutrition. Unpublished. United States. 1996.
4 Hutcheson D and Lallemand Animal Nutrition. Unpublished. United States. 1986.

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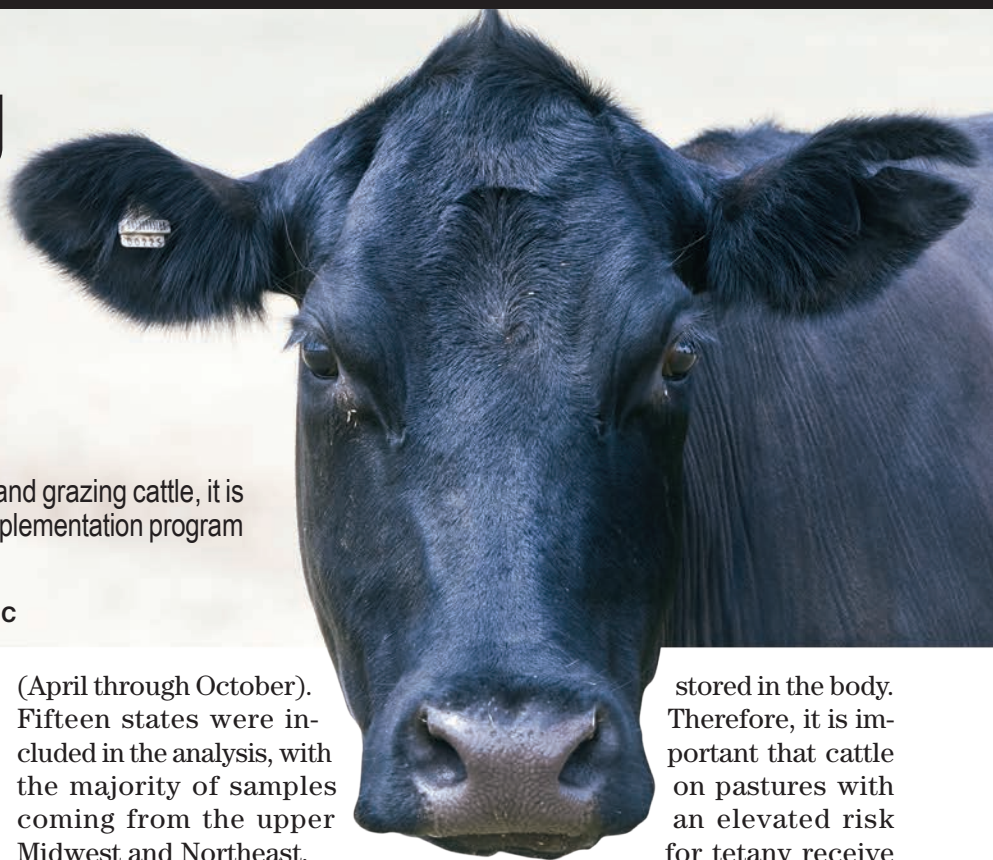
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Evaluating Your Mineral Program

As we begin to think about green grass and grazing cattle, it is a good time to evaluate your mineral supplementation program

BY DR. AIMEE N. HAFLA, PH.D., P.A.S.,
BEEF CATTLE NUTRITIONIST, AGRI-KING, INC



It takes more than just energy and protein to ensure optimal health and performance of beef cattle. Vitamins and minerals are required to maintain vital biological processes and even moderate deficiencies can have significant economic impacts.

It is well accepted that native rangeland is deficient in vitamins and minerals, and that supplementation under these circumstances is necessary. However, it is important to recognize that cattle grazing managed pastures, cereal grains, and hayfields, which often include high quality forages, also require mineral supplementation. It may be tempting to assume that cows or stocker calves grazing tall, lush forages are getting all the nutrients they need. While this might be true for protein and energy, it is unlikely that all mineral requirements are being met.

A frequency analysis was conducted on 2,631 pasture samples sent in by Agri-King clients, over a 5 year period, to evaluate the proportion of pastures which fail to meet minimum NRC requirements for macro and trace minerals. Pastures were composed of grasses, legumes, grass/legume mixes, cereal grains, and brassicas. All months of the year were represented, but 92% of the samples were taken during common grazing months

(April through October). Fifteen states were included in the analysis, with the majority of samples coming from the upper Midwest and Northeast.

Most pastures provided adequate concentrations of calcium (Ca), phosphorus (P), potassium (K), and sulfur (S) for mature cows. However, 30% of these pastures had Ca:P ratios that were outside of the recommended ratios.

Sodium had the greatest frequency of deficiency of any mineral in the pasture samples evaluated, where 70-87% of pastures were deficient. Due to its relationship with water balance in the body, a deficiency in sodium can result in decreased milk production in lactating cows. Salt should always be included as part of a mineral program, and is often used to encourage and control the consumption of free choice mineral products.

Magnesium (Mg) was deficient for lactating cows in 24% of the pastures tested. Pastures with low magnesium and sodium (Na), and high potassium (K) concentrations are where issues with grass tetany (hypomagnesemia) are most likely to occur. Cool season grasses grazed in early spring and wheat pasture in the fall pose the most risk. Cattle have a daily requirement for Mg, as it is not

stored in the body. Therefore, it is important that cattle on pastures with an elevated risk for tetany receive

a high Mg mineral and that producers ensure daily consumption of the mineral supplement.

Copper (Cu) is the most common trace mineral deficiency in grazing cattle. Indications of copper deficiency most often include reduced fertility, depressed immunity (for example, increases in cases of summer pneumonia or scouring calves), and dulling of hair coat. Not surprisingly, 52% of pasture samples were found to be deficient in copper. Even if dietary levels of Cu are adequate (10 ppm), secondary deficiencies are likely if elevated levels of Sulfur, zinc (Zn), Iron (Fe), or molybdenum (Mo) are present. These minerals affect Cu absorption.

Due to the complexities of mineral interactions, Cu should be supplemented in a form that is bioavailable. Copper oxide is commonly found in inexpensive mineral supplements, however this form of Cu is poorly absorbed and may not help to correct a primary or secondary deficiency. Sulfate and chloride forms have greater availability than oxides, but may still complex with other minerals

in the rumen, hindering absorption. Look for chelated or hydroxy sources when choosing a trace mineral supplement to ensure optimal bioavailability.

Zinc is critical to the function of the immune system, enzyme systems, and hoof health. Under stressful conditions, cattle that are deficient in Zn may have greater incidence of illness, lower responses to treatments, and longer recovery times compared to cattle with adequate Zn status. Like Cu, absorption of Zn can be negatively impacted by high levels of Fe. Only 6% of pastures evaluated were found to be deficient in Zn. However, research has indicated that even when calves are born with adequate Zn status, they may approach marginal to deficient Zn levels by weaning, due to rapid body growth and low Zn concentrations of milk. This can have major implications when it comes to the effectiveness of vaccines,

health, and productivity of calves as they enter backgrounding yards or feedlots.

Manganese (Mn) has a direct relationship with fertility, and deficiencies of this trace mineral can result in poor conception rates and a prolonged calving interval. Pregnant and lactating cows have a greater requirement for Mn compared to growing cattle, and 22% of the pastures tested were deficient in Mn (< 40 ppm).

The information reinforces the need for macro and trace mineral supplementation for growing cattle and mature cows grazing managed pastures, cereal grains, and hayfields. Marginal deficiencies can reduce growth, reproduction, and impact health, even if cattle show few clinical signs of deficiency. Finally, other minerals may be present at high enough levels to negatively impact absorption of Cu and Zn, therefore it is important

consider the bioavailability of the trace minerals in your program.

Tips for evaluating your mineral program:

- Calculate current mineral intake of animals to see if intake matches up to the instructions on the feed tag. Make sure your cattle are consuming the recommended amounts.

- Test forages, feeds, and water for mineral content, this is a cheap and easy starting point. If there are unresolved deficiencies talk to your vet about testing the animals for trace mineral status.

- Understand what types of trace minerals (oxides, sulfates, chelates, hydroxys) are in your current products and what the bioavailability of those minerals are.

- Work with a nutritionist to develop a mineral program that is right for you and your herd. There's no single solution for every operation.

FL

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ALTERNATIVE FEEDING OPTIONS FOR THE CATTLE INDUSTRY

Concerns of drought conditions going into the summer months coupled with dry weather conditions in 2017 and extended winter conditions in some areas, have caused producers to try and stretch their roughage supplies. With high hay prices and difficulty of procuring traditional roughage sources, it is important to have an economical alternative to grazing pasture or buying hay. Hot and dry weather conditions can shift very quickly, so being proactive and having a plan in place before drought conditions arise should be incorporated into a producer's risk management plan. It is important in times like these for producers to think outside of the box and be open minded to alternative feeds that they may not be accustomed to, if there is a financial incentive to do so.

Alternative feeds encompass a host of feed stuffs including forages, crop residues, weeds, grains, screenings, grain processing co-products, oilseeds, and liquid co-products, just to name a few. Alternative feeds vary widely in nutrient composition and need to be analyzed before deciding to implement them into a feeding program. When selecting what alternative feeds to incorporate into a feeding program there are several factors to consider. Most alternative feeds are available in localized areas and are not typically the primary output of a manufacturing process or

crop system; however, these less common alternative roughages typically provide a cost incentive in finishing rations. It is important to consider the consistency on a nutritional level, availability (year-round or seasonal supply), and shelf life of the product. Generally, producers can purchase large quantities of feed ingredients cheaper than spot loads. In the case of wet feeds, there is typically a shelf life associated with them. This is a limitation to keep in mind as additional management and resources may be required in handling and storing products that do have a shelf life to ensure product longevity. Consistency of the product is important to measure, if a product is coming from multiple plants it is important to test the product's nutrient analysis from each source.

Toxins and anti-nutritional factors associated with some alternative feeds are important to take into consideration when choosing which feed to incorporate into your feeding program. Many anti-nutritional factors can be tested inexpensively and in a timely manner. Nitrates are an example of anti-nutritional factors that can be tested for. Nitrates are typically a concern in forages that have been harvested following a freeze or in drought conditions. Ensiling

forages can reduce nitrate levels 40 to 60%. An important note to consider is even though a product

may have been through a manufacturing process does not mean that the product does not contain toxins. If the toxin is present at harvest, processing will not void the feed of toxins.

When including alternative forages into a ration, it is important to do so on an equal neutral detergent fiber (NDF) basis, which can be determined through a feed analysis. Forage intake of a ruminant is impacted by the quality, digestibility, palatability and chemical composition of the forage. Forage quality is highly variable from forage to forage making it difficult to estimate intake. Dry matter intake of cattle consuming low quality, or primarily roughage rations, is limited by physical distention of the rumen. Mertens (1987) suggests that NDF content of forages can serve as a proxy for the physical distention effect in the rumen. In high concentrate rations, cattle intake is controlled through chemostatic regulation; however, forage is still needed to maintain rumen function and reduce acidosis risk. Forage in a finishing ration maintains rumination and saliva production, thus providing ruminal buffering.

In a feedlot finishing ration there is typically not a large amount of roughage included; however, when exchanging sources, it is still important to take into consideration how that forage is going to mix in the ration to minimize sorting. Feedlot rations contain a large amount of concentrate feeds in



order to maximize cost per unit of energy; however, there is a fine line in how low we can push roughage inclusion while still minimizing the incidence of acidosis. The greatest driver in why roughage is needed in feedlot rations is the starch from the grain component of the ration. The minimal amount of forage needed is variable depending on the other ingredients included in the ration. An example would be processing method of the grain in the ration. Less roughage is needed in a ration containing whole corn as compared to a ration that has steam flaked corn. The optimal roughage level in a ration to maximize cost while maintaining rumen integrity is a balancing act between the ration composition (roughage source, grain type, rate of starch digestion, protein type, feed additives) and external factors (DMI, bunk management, weather, animal health, animal type). There are many factors to consider when determining the minimum NDF concentration needed in a finishing ration. Research helps producers and nutritionists bridge the gap and make science-based decisions.

Researchers showed that feeding steers a roughage source with a larger particle size at a lower

inclusion (5%) in the ration had similar results to feeding a roughage with a smaller particle size at a greater inclusion (10%), with no negative impacts on animal performance or digestibility (Gentry et al., 2016). In a study conducted at the University of Nebraska-Lincoln by Benton et al. (2015), steers were fed either alfalfa hay, corn silage, or corn stalks at two inclusion levels (4 or 6%). Corn silage and corn stalks inclusion in the ration was determined by NDF content of the forages. Corn silage and corn stalks matched the NDF content of the alfalfa at both 4 and 6% inclusion. Results suggest that, regardless of roughage source, cattle fed a greater roughage inclusion (6%) had greater ($P < 0.04$) DMI and ADG compared to steers fed the lower roughage inclusion (4%). Cattle fed no roughage tended to have the lowest ($P \leq 0.06$) final BW and ADG while having reduced ($P < 0.01$) DMI compared to steers fed 4 or 6% roughage likely due to acidosis.

Utilizing poor quality forages can be a viable option for feedlot producers. In the feedlot, alternative forages such as crop residues can be utilized at 20 to 30% inclusion in a growing ration and 5 to 7% in a finishing ration with no detriment to

performance. Often times, in years of drought many farmers have corn that does not produce a significant yield, making silage an economical option to salvage a low yielding crop. Drought damaged corn silage is variable in value warranting a feed analysis; however, typically it ranges 85-95% the energy value and slightly higher protein values (0.5 to 1.0%) of normal corn silage.

In times when feed and forage prices get high, producers often cut additives and supplements from their feed programs; however, this is typically when technology will give the highest return on your investment. Adding an ionophore to your mineral program can help to maximize feed efficiency (4-8% improvement) leading to substantial saving in times of high hay prices. Work with your nutritionist to get alternative feeds analyzed and help determine their value in your operation. The bottom line is that no matter which alternative feed is utilized, the ration must be balanced to meet the nutrient requirements of the animal and economic goals of the producer. **FL**

For more information on this topic or to visit with one of our nutritionists, visit www.gplc-inc.com.



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REDUCING TOTAL LABOR COSTS

ANY PRODUCER OF A COMMODITY knows that keeping costs low is essential to maximizing profits. Labor costs continue to climb and though we are always looking at ways to reduce Worker's Comp, health insurance and other costs, it is still essential to take a long-term look at ways to not only reduce costs per employee but also reduce the number of employees needed to get the job done.

The number of workers required for agricultural production has been cut in half in the last 50 years. Technological improvements are the main reason for these labor savings and this trend will continue.

Some ag industries are using, or will soon be using, new technologies that have significant long-term labor savings:

- Drones that will be launched in swarms to identify and kill individual weeds using the best

herbicide for that plant.

- Driverless feed trucks and manure spreaders.
- Robotic milking machines in dairies that can reduce labor by 10% to 29%.
- Drones that find, move and count cattle.
- Robotic truck washes.

Gaining the full benefit from the investment in new technology requires keen management. Some managers have made significant investments in labor-saving equipment, but then don't follow through by reducing their total hours of labor devoted to that task. Many software programs have saved on data collection, analysis and accuracy, but months and

years later the same number of people are devoted to those tasks. Larger equipment is purchased that can do the job faster and yet the hours that have been saved are not allocated to other duties.

To maximize your labor reduction strategies, look first at direct labor costs such as health insurance, company vehicle allocations, Worker's Compensation, the number of employees allocated to each area of the feed yard, individual employee efficiency, etc. Review every individual cost associated with your labor force.

Next, look in the areas where you have made investments in technology and confirm that you have reallocated that labor to more appropriate duties.

Finally, look at new technologies that can reduce your total labor needs. Can you do more with fewer employees in some areas by implementing some new technology or updating current technologies?

Every time that you reduce the number of employees, you reduce the expense in time and dollars of the following items and activities:

- Less time spent recruiting, interviewing, hiring and developing employees.



- Reduced benefit costs.
- Less cost to equip each employee with work clothing, safety equipment, transportation, etc.
- Reduced liability and worker's comp costs.
- Less time and frustration managing difficult employees who consume the majority of your employee management efforts and distract you from much more productive activities.

All these time savings provide more time for managers to analyze records, improve production, create new strategies and look for future potential in the business.

Keep in mind that if the current trends continue, labor prices will be going up, and technology prices will be going down. Each of these trends work together to accelerate your labor cost savings.

Finally, a note to current employees in feed yards. If it sounds like I am categorizing all employees in feed yards as being easily replaceable, I assure you that I am not. Over my many years of management coaching in agriculture I have had the privilege of working with hundreds of cowboys, pen riders, processors, mechanics, feed truck drivers, repair and maintenance people and anyone else employed in the feed lot business. They are great people and I have every respect for their dedication, hard work and passion for our industry. If these strategies give you a bit of concern for your future, here are a few personal strategies to utilize.

1. Show up on time and be ready to work.
2. Be coachable and take responsibility for your own development.
3. Accept and willingly learn the new skills needed to do your job.
4. Ride for the brand.
5. Be the best employee you can be.

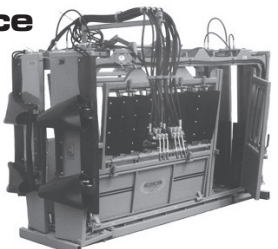
If you do these things, you will always have a job.

FL

Don Tyler is founder of Tyler & Associates Management Coaching. He can be reached at dhtyler@frontiernet.net or by calling 765-490-0353




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Research to Study Prenatal Stress Impacts in Cattle

BY ADAM RUSSELL

A \$382,800 federal grant will fund research to identify the impacts of prenatal stress on beef cattle DNA, white blood cells, other tissue and subsequent changes in genetics related to temperament, said a Texas A&M AgriLife Research scientist.

Dr. Ron Randel, AgriLife Research physiologist, said the three-year grant will finance research focused on the "effect of prenatal stress on DNA methylation and correspondence with gene expression in cattle" at the Texas A&M AgriLife Research and Extension Center in Overton. The research team includes Drs. Penny Riggs, David Riley and Thomas Welsh from the animal science department at Texas A&M University in College Station.

Funding was provided by the U.S. Department of Agriculture National Institute of Food and Agriculture.

Randel said the research will follow his and others' previous studies of Brahman cattle herds at the center, which found stresses pregnant cows experienced affected calves in utero, making them more aggressive than calves born to unstressed mothers.

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more difficult to manage, so producers look for genetic markers that indicate docility, Randel said.

"Stress causes changes in unborn fetuses and those changes are expressed after the animal is born," he said. "This is a big deal because it shows there are behavioral changes that affect the way DNA causes RNA to function."

Randel also studied stored white blood cells from 28-day-old calves to examine the methylation patterns of the animals' DNA. He found major differences in those patterns in a significant number of genes important for animal production and health.

Methylation is a process that adds methyl groups to DNA molecules and can change the activity of a DNA segment.

"The questions this grant will answer are, 'Are there differences that remain through maturity affecting the function of both DNA and RNA,

which is how the genetic code is expressed, and are they modified by more or less methylation of the DNA?'" Randel said.

Randel said this discovery is

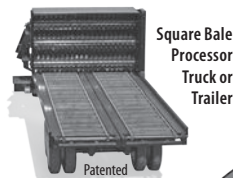
important because cattle breeders have a number of genetic markers that have been identified and are being used to make mating selections based on DNA sequences. **FL**

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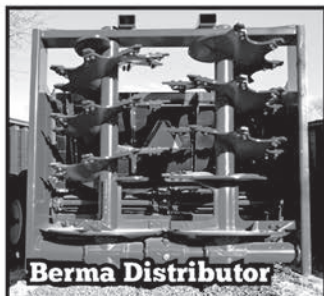


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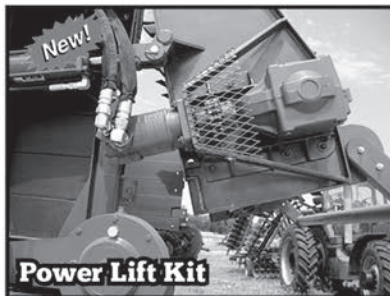
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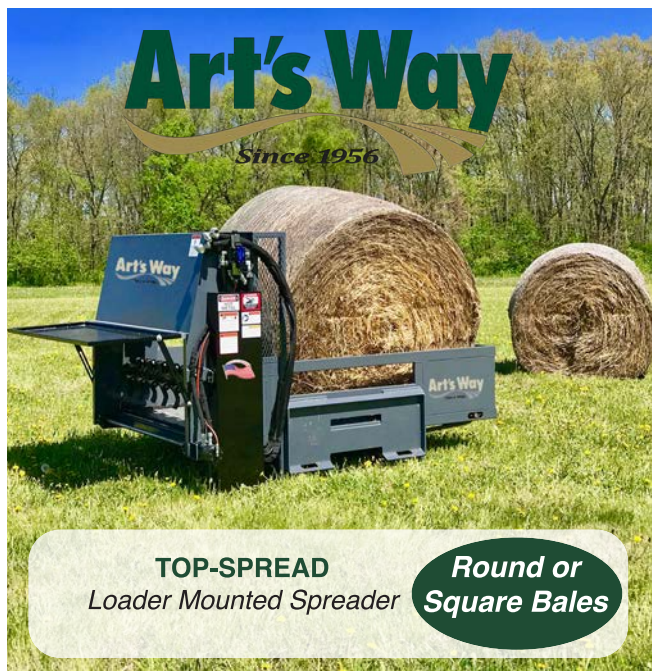


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