

FARM REPORT



In This Issue:

What's Happening on the Farm	2
Frost Seeding	3
Quench the Burn	4
The Essentials of Water	5
And Now, Here's Your Host	6
Changes in Your Corn Silage; Bright Idea	7



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FROM THE PRESIDENT'S DESK: REVISITING FEED BUNK MANAGEMENT NORMS

We've recognized the key components of successful feed bunk management for so long that we sometimes now take the current recommendations for granted. But, what does the research tell us about what cows actually prefer in their feeding environment? And, could we benefit from a fresh look at some of our feed bunk management norms?



Competition for feed. Are 24 inches of bunk space per cow - the industry standard - sufficient from the cow's perspective? Researchers at the University of British Columbia addressed this question by providing subordinate cows with a choice: They could choose to eat a low palatability feed alone or they could choose a high palatability feed that came with a dominant cow located either 12, 18, 24, or 30 inches away. When feeding space was highly restrictive (i.e., 12 or 18 inches) most subordinate cows chose to eat the low palatability feed alone. But, even with 24 or 30 inches of feed space about 40% of subordinate cows still chose to eat alone. This research tells us that some cows will settle for less desirable feed to avoid competition - even when bunk space exceeds the current industry standard!

feed stimulates feeding behavior more than return from the parlor or feed push up. University of Guelph scientists found a benefit of twice over once daily feeding with dry matter intake increasing 3 lb/day while milk yield increased by 4.4 lb/day. With 2x feeding of a TMR, more feed was available throughout the day and there was less feed sorting. The positive response to greater feeding frequency is often more noticeable during heat stress conditions (which will be here before you know it).

However, some research indicates that the positive response to greater feed delivery may diminish at high frequencies, such as 4 or 5 times per day. In these cases, greater feeding frequency enhances eating time but also reduces resting time substantially.

Feeding frequency. Delivery of fresh See **FEED**, Page 3

WHAT'S HAPPENING ON THE FARM

We are already one month into the new year and I often think that the months of January and February will be quiet – plenty of time to catch up on things. Why?? Why do I think this? Year after year the winter months prove to be just as busy as the rest of the year. Sure, there is not the pressure of “making hay while the sun shines” but our days have certainly been full since January 1 came across the calendar.

For the next 8 months we will have students in the barn – our Advanced Dairy Management program runs through the winter/spring semester. The students have a full semester of coursework in dairy management and also work in the barn for hands-on experience. Then our summer internship begins in late May – 14 weeks of learning about the different parts of dairy farming. There’s still time to apply for this summer internship – it’s a great experience! Check it out at www.whminer.org and/or share the information with a college junior or senior that is looking for hands on experience in dairy management!

We are in the middle of planning two big projects for the springtime – an addition to our dairy barn and a second manure pit to handle the waste from the dry cow barn and this new addition. The barn will be added onto the south end of the current dry

cow barn. While still in the planning stages, we do know that there will be sand freestalls and it will be designed with gates and cross-alleys to be able to make small replicated pens for research studies. We are working with some equipment dealerships to design the manure handling system to handle sand-laden manure. New legislation in NY restricting winter manure spreading meant that we needed more storage to get through the winter. The manure pit to go in this spring will provide that storage and will also have a cement lining.

The crops guys, our farm manager, nutritionist and feeder have been meeting to discuss the 2019 crop year. Seed corn is ordered and they will be finalizing the crop rotations after looking over last year’s production numbers again. Even though the weather was dry last year, we were able to harvest some excellent quality forages and that is evident in our milk production over the last several months. We want to be ready again to work the land, to plant and harvest when spring-time arrives (which feels like never as the wind blows and we work outside in sub-zero temps!)

On the dairy side, we’ve been working with our veterinarian to change our vaccination program to address some health needs on the farm. We’re trying to better protect our calves against rotavirus. We also added the Klebsiella

vaccine to our protocol as we have had an ongoing issue with Klebsiella mastitis over the years. As I made new commands and lists in Dairy Comp for the vaccination schedule, we realized that these new tasks needed to be clear to everyone. So on the printed copy of the protocol (that already listed the dosage and route of administration for each vaccines), I added the day of the week that the vaccine is given and the command in Dairy Comp to retrieve that list. That sheet is now hanging on the refrigerator in the drug room. If someone is out for the day or the week, the person filling in can easily look at the protocol and know exactly when, where and what to vaccinate that day. This might seem simple, and maybe other people are ahead of us on this whole organization thing, but for us it was another step in the right direction. Slowly and surely we are making progress in the dairy and the crops department to organize our routine tasks so that things are done consistently and on time. It’s three steps forward and two steps backwards and sometimes we don’t communicate well on even the little things and we wonder how in the world we make any milk. But together we are moving ahead and are proud of the work we do and what we’ve able to accomplish in dairy education and research and in the performance of the herd.

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FROST SEEDING

March is usually the best time to make a frost seeding in this area, making February a good time to mention it in the Farm Report. While we'd like to believe that you read this newsletter the day it arrives, we realize that sometimes it may be a week or so before you get to it. Also, the tendency is for farmers to frost seed too late instead of too early.

The key with frost seeding (and with any seeding for that matter) is seed-to-soil contact. With conventional or no-till seedings you accomplish this by dropping the seed in front of press wheels or a cultipacker that shallowly incorporates the seed into the soil. With frost seeding there isn't any mechanical incorporation, so you must rely on the freeze-thaw cycle to work the seeds down into the soil. It's OK to frost-seed when the ground is still frozen; in fact that's preferable because you won't rut up fields and pastures with wheel traffic.

Legumes usually frost seed better than grasses because of seed shape and weight per seed, with red clover preferable to other legumes because of its quick germination and vigorous seedling. Don't try to thicken an alfalfa stand by frost seeding alfalfa; the established alfalfa plants emit an autotoxin that will kill alfalfa seedlings. The toxin won't kill clover seedlings, and if you're frost seeding an alfalfa field you're probably only trying to extend stand life by a year or two, so the relatively short life of red clover shouldn't be a drawback. You could also try frost seeding white or Ladino clover into established pastures, but often there's too much grass in the pasture to permit good seed-to-soil contact. Any pasture or hayfield that already has a good cover of grass is a poor candidate for frost seeding. Best results would be expected in thin fields with numerous thin or bare spots.

Don't expect miracles! Often a relatively small percentage of seeds in frost seedings will produce harvestable plants. Some seedlings that do germinate will die before they get big enough to compete with the established crop. Therefore, don't spend big bucks on seed; for red clover broadcast about 4 lbs./acre, and a couple inches of snow soon after seeding isn't the worst thing that could happen. In fact, the very worst weather for other early spring work is the very best weather for a frost seeding. If you want to seed grass, use 2-3 lbs/acre of tall or meadow fescue, or Italian ryegrass.

One March we frost-seeded red clover into a pasture next to the Miner Institute horse barn. Where the existing grass was thin we got a decent catch; where there was already a good cover of grass we got almost nothing.

— *Ev Thomas*
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FEED, Continued from Page 1

Enhancements in feeding time should never be at the expense of time spent resting!

Feed push-up. Effective feed push-up strategy is critical for ensuring that feed is within easy reach of the cow and is a function of the number of times per day and when the feed push-up occurs. A study conducted at the University of Arizona evaluated the effect of feed push-up each half-hour for the first two hours after feed delivery versus only once per hour. In that study, greater frequency of feed push-up during the two hours after feed delivery resulted in more milk and improved efficiency with no impact on stall resting time. The number of times that feed is pushed up throughout the day is important, but this research highlights

the critical importance of timing of feed push-up. When deciding a feed push-up strategy, we need to focus on ensuring that feed is easily within reach of the cow during the highly competitive two hours following feed delivery.

Feed refusals and availability. For competitive feeding situations, each 2%-unit increase in feed refusals is associated with a 1.3% increase in sorting. Likewise, milk/DMI decreases by 3% for each 1% increase in sorting. On farm experience suggests that a refusal target of approximately 3% works well for lactation pens, but fresh pens should be closer to 6 or 7% to ensure that feed availability is never limiting. Be careful that a 2 to 3% feed refusal target does not result in feed restriction on your farm – look at the

bunks as refusals are scraped out.

How long can the feed bunk be empty? The cow's motivation to eat increases markedly after only 3 h without feed. In addition, when feed access time is restricted overnight, feed intake is reduced by 3.5 lb/day coinciding with twice as many displacements at feeding – social turmoil at the feed bunk is never a good thing!

As new information is published we need to continually re-assess our feed bunk management recommendations. If we ask the cow for her opinion, using well-designed studies and field observations, we will design better feeding environments.

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QUENCH THE BURN

In summation of last month's Farm Report, "Feel the Burn", I discussed the metabolic disease subacute ruminal acidosis (SARA). I discussed what causes it to happen, how to identify it, and the negative consequences it has on the animal and on the farm. The question I left at the end was: how do you mitigate the frequency of SARA on your operation? There are several management strategies that can be implemented to help alleviate SARA through changes in diet composition and reducing environmental and management stressors on the animal.

It's a common practice to add highly fermentable nonstructural carbohydrates (NSC) to the diets of high-producing dairy cows to help meet their nutritional demands during lactation. This increase in NSC makes the animal more susceptible to SARA. When formulating diets, the ratio between the expected amount of structural carbohydrates and nonstructural carbohydrates is an important balancing act between giving the cow enough energy to meet her needs and ensuring that her rumen is healthy. Structural carbohydrates, or fiber, is an important component of ration formulation. There have been a variety of systems proposed to estimate the minimum amount of fiber necessary in rations for dairy cattle. Physically effective neutral detergent fiber (peNDF) is a system that takes into account the fraction of fiber that stimulates chewing and contributes to the floating mat of large particles in the rumen. This acts on the rumen by diluting the amount of readily fermentable NSC in the diet, increases chewing and rumination, which results in an elevated ruminal pH. The literature suggests that diets should contain around 22% peNDF

to maintain an average pH of around 6.0, effectively keeping the cow from experiencing SARA (defined when pH is <5.8). In diets with adequate peNDF, higher ruminal pH is observed with less fluctuations. Substituting fibrous by-product feeds like cottonseed hulls for higher starch ingredients is a way to increase peNDF in the ration that is high in NSC. Rations should be monitored and adjusted to target adequate peNDF in the diet to help mitigate environmental and management stressors on the cows that may influence SARA.

Environmental stressors alter cow behavior and feed intake patterns, which can ultimately cause a decrease in the pH of the rumen. Heat stress is an environmental stressor that has been known to affect the cows. Just like us, they don't eat normally when it's hot and therefore might have inconsistent meal patterns and intake. The ideal temperature for a cow is between 25°F and 65°F; above this cow's experience heat stress. Studies have shown that temperatures above this threshold has a significant effect on ruminal pH. An additive effect can be observed which decreases rumen pH when cows are fed a higher grain diet when heat stressed. A review by Stone (2004) suggests that ration peNDF levels should be increased and NSC levels decreased when animals are undergoing heat stress to help mitigate decreases in ruminal pH. Heat abatement systems, like fans and misters, are also suggested during times of heat stress.

Management related stressors have also been shown to change intake patterns and animal behavior. Free stall overcrowding, uncomfortable stalls, and excessive holding pen times

(anything over 2.8 hours) have all been shown to decrease pH in the rumen and cause a decrease in rumination. For example, research done here at Miner Institute by Campbell (2016) found that when a higher stocking density was implemented on the cows (142%), the time pH spent below 5.8 increased and also increased the severity of SARA. Producers should decrease these stressors on their operation as much as possible. As discussed with environmental stressors, dietary interactions have been observed with management stressors and can be monitored to mitigate effects observed on the rumen. For example, the review by Stone suggests increasing forage NDF and peNDF by 1-2% in herds with management-related cow behavior problems to help improve the risk of SARA. The earlier mentioned research on stocking density also observed that adding peNDF will help mitigate SARA. It showed that in both stocking densities used, 100% and 142%, increasing the peNDF content of the diet reduced the time spent below pH 5.8 as well as decreased the severity of SARA.

Ration formulation is a balancing act between physically effective fiber, its associated salivary flow, rumen fermentable carbohydrates, and microbial volatile fatty acids production. Different guidelines and variables should be accounted for when formulating rations to minimize SARA, especially under different environmental or management stressors. Quenching the burn from SARA on your operation has positive effects for you, as well as for your animals!

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THE ESSENTIALS OF WATER

Water is an important nutrient and must be consumed in large quantities relative to other nutrients. However, water may be one of the most overlooked nutrients in some dairy calf operations. Young calves require more water per unit of body size than do mature animals. This is because young cattle have a high proportion of water relative to their body weight (range of 65 to 75% of empty body weight) and water is deposited in the greatest amounts during growth. Calves normally consume water from a variety of sources including milk or milk replacer, other feeds, and water offered on its own. Water provided through milk or milk replacer alone isn't enough to meet the complete requirements of the calf.

Calves increase the amount of water they drink in the first 2 to 3 days after consuming colostrum. As a result, it's recommended to provide free access of water to calves soon after birth, in addition to the water consumed in milk or milk replacer. In a survey of operations in the U. S. the average age that water was first offered was 6.6 ± 1.3 days of age with a range of 4.1 to 10.6 days of age so there is some room for improvement within the first few days of life. Although calves might not consume a large amount of water, any water consumption should be encouraged.



Water consumption changes throughout the preweaning period into the weaning period. After the initial increase in water consumption after colostrum, water intake often decreases but should still be provided free choice. In general, reported values of water consumed averaged less than 4.4 lb/d for the first 3 weeks of age and then increase with starter intake and weaning as calves consume more solid feed. The current version of the NRC suggests water intake range from 2.2 lb/day in the 1st week of age to 5.5 lb/day by week 4.

Starter consumption develops the rumen and prepares calves for the weaning transition, so promotion of starter and water intake is very important in calf growth. A rule of thumb is that for every 1 lb. of starter consumption, calves will consume 4 lbs. of water. Both liveweight

gain and calf starter intake is positively correlated with water intake prior to weaning. Water is lost normally through feces, urine, sweat, and respiration. How much water is lost and the resulting water requirement depends on environmental temperature, age, and health status. Voluntary water intake has also been observed to increase after transport.

Below are some tips to increase water intake in your preweaning calves:

1. Provide clean, fresh water daily. Clean buckets regularly to prevent adverse smells or tastes which could hinder intake.
2. Do not limit water consumption. Check water several times daily so that more can be added if calves are drinking it.
3. In the first few days to the first week of life bucket train your calves to drink water as you would for milk or milk replacer. An example would be to encourage your youngest calves to drink some water between feedings. I've found this particularly helpful when temperatures are hot.
4. During winter when temperatures are below freezing, provide warm water after milk or milk replacer feeding in winter to provide an opportunity for water intake.

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NOBODY ASKED MY OPINION, BUT...

...I'm starting to think I'll never be old enough to know better.

...as a guy of a certain age I now know why they call them the "wee" hours.

...give a man a fish and you feed him for a day. Teach a man to fish and he has to buy graphite rods, reels, spinner bait, jigs, crank bait, jerk bait, flies, waders, a boat and a truck.

...The Bride thought I was rude for yawning while she was talking. I wasn't yawning, I was trying to say something.

— E.T.

AND NOW, HERE'S YOUR HOST...

As farms and their land-use needs continue to expand, so does the potential for increases in wildlife and environmental disease reservoirs from encroachment of grazing land into wildlife habitats. Recently, an article in the *American Journal of Veterinary Research* discussing *Mycobacterium bovis* (bovine tuberculosis) survival in ensiled forage caught my eye and flipped my public health brain switch. White-tailed deer are a known reservoir for *M. bovis*, and since they also graze in fields harvested for feed, there is a concern over transmission of bovine TB to herds via forage. This particular study, conducted in Northeast Michigan, involved inoculating forage samples with *M. bovis* to determine its viability while in storage. While the results showed that ensiled forage did not provide optimal conditions for survival of this particular pathogen, it calls to attention the increased need for vigilance and for a greater understanding of how disease hosts in wildlife can affect herd – and in some cases, human – health.

I'll admit it; I'm an infectious disease nerd. Maybe even more so than a beer nerd. Jury's still out. Epidemiology is a fascinating and ever-evolving puzzle; like if you were putting together a 1,000-piece jigsaw puzzle scene of a countryside and suddenly you fish a Cinderella piece out of the box. The piece fits, but you haven't the slightest idea how it got in there--yet. That's a bit how I view epidemiology with regard to evolution of new disease hosts. The Center for Disease Control states that 6 out of every 10 known infectious diseases in the world are spread from animals, and 3 out of every 4 new or emerging infectious diseases in people are transmitted from animals. A 2015 study by Loh and coworkers stated that land-use change is the top zoonoses

driver globally, which further expands disease-host relationship potential. Livestock and wildlife are capable of spreading diseases to one another, as evidenced by the presence of *M. bovis* in deer and the American badger, and Nipah virus spread from fruit bats to pigs to humans in Malaysia. *Cryptosporidium* has been noted in over 79 host species worldwide. While not all zoonotic diseases present clinically in humans, there are several that do have the potential to cause harm if spread, and there is a very imminent threat for the development of new reservoir hosts in the coming years.

Here's an example to show how intricate some of these disease pathways can be. Not to keep picking on the white-tailed deer, but these guys definitely drew the short straw with regard to disease avoidance. Not only are they a known reservoir of bovine TB, they're also one of the main host species of *Ixodes scapularis*- the black-legged or deer tick. Adult ticks carrying Lyme disease from feeding on infected white-footed mice (one of the principal reservoirs of the disease) then utilize deer as a host--but deer don't carry the disease. When grazing land expands into forested areas, livestock can become another source of food for the tick, who might like a taste of beef instead of venison for a change. Ticks can then be transferred from livestock to humans by direct contact, or from a domestic animal that the tick may have then latched onto. Immature tick larvae carried into barnyards or buildings by infected mice can drop off of mice into leaf or yard debris, hay, or tall grass, where they will survive until adulthood when they seek another host--which very well could be you.

A highly infectious pathogen that has one of the largest varieties of

wildlife reservoirs is Leptospirosis. These reservoirs can include rats (the carrier of the particular strain that infects humans), skunks, squirrels, moles, shrews, hedgehogs, deer, possums, rodents, buffaloes and marsupials. Most of these hosts are asymptomatic carriers, meaning that they are a reservoir for disease but do not show outward clinical symptoms. Leptospirosis can be easily spread to cattle, dogs, and humans. The bacteria reproduce in the kidneys and are then spread through contact with infected urine, so there is a clear disease pathway from wildlife to domestic animals to humans. Clinical signs of leptospirosis are similar to several other illnesses, so it can be difficult to diagnose.

With the amount of known disease reservoirs in wildlife and the number of diseases they carry that can also affect humans, it's wise to be vigilant if you have grazing land bordering or in wooded areas or crop land, or a high population of known reservoir hosts in your area. Not every animal is a carrier of disease, but it's wise to treat them as though they could be a risk. There is also financial repercussion involved with an illness outbreak. In addition to keeping you and your family healthy, being aware of possible threats can also cut down on costly treatments for your herd (and you!) if an outbreak of illness were to occur. While no disease is completely preventable, awareness is a key factor in staying ahead of the game. If you have concerns about possible disease pathways as they relate to your land or your herd, consult your herd veterinarian for recommendations on risk assessment and mitigation strategies.

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Is there something you would like to know more about?
Send Farm Report article suggestions to Rachel at dutil@whminer.com

CHANGES IN YOUR CORN SILAGE

The corn crop you ensiled last fall should be nearing its maximum in starch digestibility. That means if you started feeding it in December — hopefully not before then — your corn silage may have changed enough (for the better) to suggest a ration change. But you won't know this unless you analyze your corn silage. Lactic and acetic acid content should have increased while fiber digestibility will have changed little after fermentation was complete and the silage started cooling down. The biggest change is in starch digestibility: We know of one dairyman who about this time of year, after a forage analysis showed how much corn silage starch digestibility had increased, pulled a significant amount of corn meal out of his ration and his cows went up in milk production. This is particularly

important for farms feeding high rates of corn silage. It doesn't look as if milk prices will improve appreciably in 2019 so it's critical to reduce input costs whenever possible.

It's not as reliable as a forage analysis, but here's a quick and easy way to tell if your corn silage is at or nearing maximum starch digestibility: Take a double handful of corn silage and pick out the largest piece of corn kernel, or a whole kernel. Meal out the kernel contents between your thumb and forefinger; if at or near maximum starch digestibility you should be able to make a paste with no hard piece of starch remaining. Old-timers called this process "juicing up".

— E.T.

BRIGHT IDEA

A bright idea to start the new year: Replace the incandescent light bulbs in your barn, office and home with LED light bulbs. The price of LED lighting has come down considerably in the past year or two, and 100W equivalent LED bulbs are now widely available. You can buy a 6-pack of 100W-equivalent LED bulbs from Amazon for under \$3. per bulb. It uses only 14 watts of energy and has an expected life of 15,000 hours, so replacing incandescent light bulbs with LEDs can represent a significant savings. 60W equivalent LEDs are under \$2.00. The store brands of both 60W and 100W-equivalent LED bulbs are even cheaper at some discount department stores, and you might be able to find some great deals by buying in quantity on-line. LED floodlights are also available with similar advantages in expected life and power requirements.

— E.T.

THE *FARM* REPORT

The Miner Institute *Farm Report* began in 1981 as a two-person effort aimed at dairy farmers and the professionals working with them. Over the years as Miner Institute added professional staff the newsletter's content became more diversified, both in writing styles and the topics covered, but our focus continues to be dairy cows and forage crops. Albert Einstein reportedly said that "if you can't explain it simply, you don't understand it well enough". Our goal is to present information in such a way that our audience can "grok the concept" without having to consult an encyclopedia. (For readers under the age of 40, an encyclopedia is...oh, forget it.)

The variety of writing styles is a plus, but some of our younger contributors are used to writing in a form acceptable to refereed journals such as the *Journal of Dairy Science*, with a list of references at the end of the article. The *Farm Report* uses a more informal style, which is why a reference will occasionally be included within the body of the article but not a long list of references at the end. Contact the writer if you're interested in references (if any) or for more information. The degree of editing varies with the writer; Rick Grant's articles need almost none while others need a fair amount. Rick has missed the newsletter deadline only once due to his being away, so in a spirit of helpfulness (and with tongue firmly in cheek) I wrote the article for him. Rick says he will never miss another *Farm Report* deadline. (Mission accomplished.)

Periodically we conduct a readership survey to gauge how we've been doing, but more importantly looking for suggestions about article topics, preferred length, etc. You'll be getting one of these before long — when you do, please fill it out and return it.

— E.T.



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