



# FARM REPORT



## FROM THE PRESIDENT'S DESK — NEW RESEARCH ON CORN SILAGE DIGESTIBILITY

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It's likely that many dairy farmers in the northeastern U.S. will be dealing with the consequences of poor corn silage fiber digestibility this winter. There has almost literally been a ton of useful information published over the past few months on how to best feed this less-than-optimal corn silage. So this month I wanted to share the results of some new research on corn silage digestibility and what might be coming down the road in the future.

We've known for a long while that lignin reduces forage fiber digestibility. But it's also clear that when forages are harvested at a similar stage of maturity, such as corn silage is, then the negative relationship between lignin and fiber digestibility weakens considerably. For instance, several years ago Cornell researchers evaluated a number of corn hybrids and found as much as a 20 percentage unit range in fiber digestibility for hybrids of similar NDF and lignin content. The potential feeding implications are substantial given the relationship that a 1 percentage unit increase in NDF digestibility correlates with a 0.4 pound per day increase in dry matter intake and a 0.5 pound per day increase in milk yield.

What explains this variability in fiber digestion for forages with similar lignin content? Recent research has suggested that lignin composition and the type and



degree of cross-linking of lignin with hemicellulose are the answer. More particularly, Minnesota researchers have found that lignin composition itself likely does not affect fiber digestibility, but the linkages certainly do.

In grasses (which corn silage is) lignin is cross-linked to hemicellulose by ferulate molecules. The ferulates are esterified to arabinose side chains of the hemicellulose and then may be ether bonded to lignin. Some ferulate esters combine to form diferulates that cross-link hemicellulose chains. These cross-linkages reduce fiber digestibility because they bring the indigestible lignin into very close contact with the otherwise digestible carbohydrate. In fact, research has shown that higher concentrations of ferulate ethers and cross-linking are negatively associated with fiber digestibility.

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# PARTICLE PREPARATION FOR DIGESTION: CHEWING, SALIVA & MICROBIAL ADHESION

A small group of “fiber minded” researchers has been meeting at the Cornell Nutrition Conference (CNC) the past two years to discuss rumen fermentation of fiber relative to peNDF, NDFD and indigestible NDF. The intent is to better understand the dynamics of fiber digestion and the limitations of rumen fill in order to improve our nutrition models; in this case, CNCPS. The discussion is very open and encourages the free thinking of the entire digestive process. This article will highlight some of our discussion relative to the beginning of the digestive process, chewing at eating and rumination and the role of saliva.



First concept: What happens to a feed particle during eating? The cow grabs a mouthful and chews. She chews just enough to form a bolus and swallows. Feed particles are reduced in size and wetted with saliva to ball up into a bolus for ease of swallowing. This process is then repeated for the duration of the meal. Stopping there, what has happened to the feed particle? Particle size has been initially reduced through the circular jaw motion of chewing, which is actually a shearing, and crushing of particles not a chopping, knife-like cutting. This shearing action, certainly more intense during rumination than eating, I believe is similar to that of a cyclone mill or UDY mill that is the standard grinding equipment of commercial forage labs rather than the knife cutting action of the Wiley mill, which is the standard grinding method of research labs. (Does this matter, does it better simulate surface area exposure to analysis as occurs in the cow? I wonder what Dr Mertens would have to say about that?). What is the role of saliva in this process? During eating, saliva aids in swallowing.

During rumination, saliva aids in buffering the rumen, as we have long been taught. Is there more to saliva than swallowing and buffering?

Years ago when I was working with Dr. Alice Pell at UVM we were studying the attachment mechanisms of rumen bacteria to cellulose particles. Under ideal conditions, favorable pH, bacteria will extend their adhesion “appendages” to make contact with the particle in order to adhere. Once adhered, the bacteria then secrete digestive enzymes that breakdown cellulose, allowing them to grow, multiply and colonize the feed particle. The trouble is that both bacteria and feed particles tend to be negatively charged. And we know that like charges repel. So how do the bacteria overcome the ionic repulsion in order to attach? Saliva plays an important role here. Not only does saliva help to hydrate the particle, but also it is of positive ionic charge, coating the particle allowing the negatively charged bacteria to attach. This is important as it explains how bacteria can still attach and digest fiber

under seemingly adverse conditions of low rumen pH. As long as the bacteria are provided a saliva buffered particle they can attach to the particle. When rumen pH becomes “too” acidic, the bacteria go into survival mode forming a protective coating that does not allow for extension of their adhesion appendages. Once attached, bacteria can still digest the fiber even under the adverse conditions of low rumen pH.

As we discuss bunk space and time budgets for adequate eating and ruminating, this is where it becomes critical to allow for adequate chewing for not only particle reduction or rather exposure of cellulose, but also the coating of particles with saliva to allow for optimal microbial attachment and digestion of fiber. It is not simply a matter of lowering total rumen pH that affects rumen digestion. Chewing and saliva play an important role in fiber digestion, beyond simply lowering total rumen pH.

— Kurt Cotanch  
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# MORE ON MAMMALIAN INTERACTIONS WITH BENEFICIAL BUGS ...

A few months ago I discussed the use of probiotic supplementation in dairy calves to improve microbial balance and promote digestion. But numerous studies with calves and humans also evidence that general immune function, beyond the gut, may be significantly improved by supplementation with probiotics.

In one study veal calves receiving probiotic supplementation of six strains of lactic acid bacteria (LAB) had a lower incidence and duration of respiratory, as well as diarrheal, diseases than non-supplemented calves. The same researchers also reported significantly improved general health scores among calves supplemented with probiotics. Though clinical trials in humans have been limited, some similar results have been reported. One study reported that school children supplemented with probiotics (a combination of LAB and bifidobacteria) during winter months displayed decreased incidence of respiratory infection and gastrointestinal upsets, (and subsequently, fewer school absences!) than non-supplemented children. Probiotics are known to act locally within the gut to improve digestive health by producing compounds that

inhibit pathogenic growth, and by competing with pathogenic bacteria for a food source. But the mechanisms of probiotic action on respiratory health are less obvious.

The effect of LAB on immune function, with a specific focus on pneumonia, is the topic of a recent review. Because of the large mass of lymphoid tissue associated with the mammalian gut, the digestive tract plays a critical role in modulating immune response. In the article the authors explain that immune cells associated with the intestinal wall interact with the LAB, resulting in the local production of immunomodulatory proteins, called cytokines. Cytokine production is the first step in a cascade of events that can elicit a systemic immune response. These proteins aid in the development of white blood cells (lymphocytes) into mature forms capable of orchestrating an immune response through the blood. By aiding in this maturation process, LAB promotes more effective recruitment and activation of distant immune cells that can ingest and destroy harmful bacteria, such as those causing pneumonia in the lung. This type of immune response is mediated at the cellular level, so it is

termed cell-mediated immunity. LAB also stimulate immune responses at the humoral level, which relies on antibodies to identify pathogens. The interaction of immune cells within the gut and LAB can stimulate the development of Immunoglobulin A, an antibody effective at preventing the colonization of mucosal tissues (including airways and the gastrointestinal tract). This may help to explain not just the decreased frequency, but also decreased severity, of respiratory infections observed in some LAB-supplemented mammals.

The effects of orally administered probiotics are currently being evaluated on a host of diseases and conditions such as allergies and asthma, urinary tract and uterine infections, enterocolitis, and even the recurrences of certain cancers. Although there are more questions than answers, probiotic research is demonstrating that mammalian interactions with our gut bugs serve to modulate much more than just digestion.

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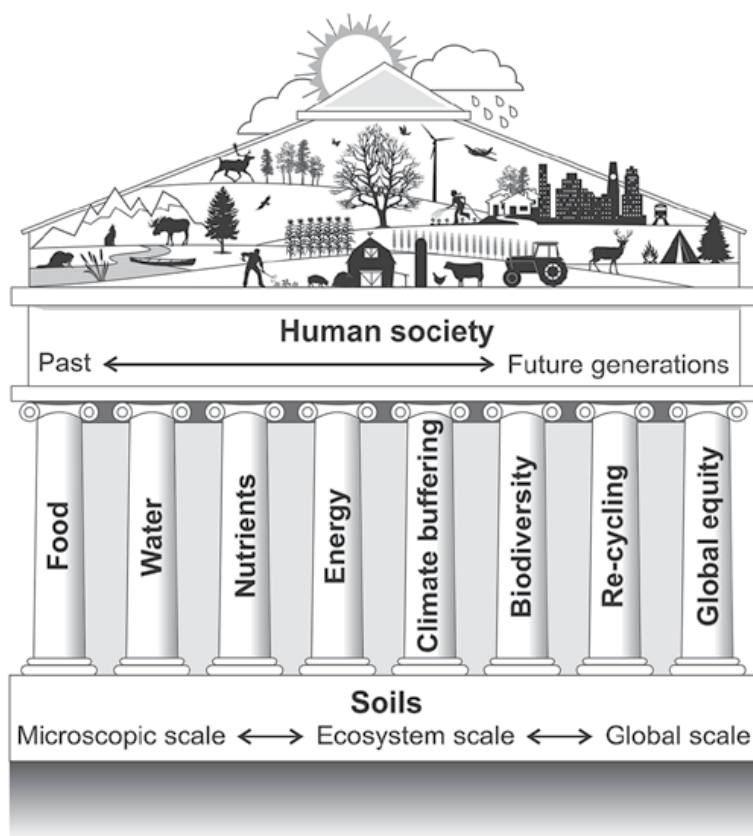
\* *References available upon request.*

## CRITTER NEWS

- A computer dating service has been set up by the American Zoo and Aquarium Association to find appropriate mates for male orangutans. The service will also attempt to find the males some casual female company since female orangs usually leave their partners after they've borne their young. Recently a male orangutan left the Miami Metrozoo to meet his arranged bride at the Audubon Zoo in New Orleans. The hope is that this will increase the orangutan population and help prevent their extinction.
- A Wichita, Kansas turkey hunter was crouched down making very real-sounding turkey calls as a flock of turkeys was getting closer. That's when he was attacked by a bobcat that apparently mistook him for a gobbler. He shot the bobcat and then noticed some warm liquid running down his face, the result of four puncture wounds by the bobcat's fangs. Subsequent tests showed that the critter wasn't rabid — just hungry for some turkey.

# THE GLOBAL IMPORTANCE OF SOILS

Over the next several decades the world's agricultural soils will have increasing demands placed on them. Global population is expected to reach 9 billion by 2050 and a 50% increase in global food demand is possible. Where will all the food come from? What soil management practices will best meet current and future needs for food, fuel, fiber, and feed? While advances in crop genetics, biotechnology, and crop management continue to fuel yield increases, economic and environmental factors will require that each acre farmed be more productive and efficient.



<https://www.crops.org/files/publications/csa-news/eight-issues.pdf>

A recent article published by the SSSA discussed eight critical issues currently facing humanity (food, water, soil fertility, energy, global climate change, biodiversity, recycling, and global equity) and their inextricable link to soil science. To meet global food demands, new cropland must be brought into production and greater demands will be placed on existing cropland. Determining where and how land should be brought into production is a key question. Managing soils to maintain surface and ground water quality is also important as population continues to increase and more cropland is brought into production. Since achieving greater crop yields removes more nutrients from soil, soil organic matter management (e.g. crop rotation, manure/compost application, reduced tillage) will be critical for maintaining long-term fertility. Capturing the full economic value

of manure and other waste products will continue to be a key component of sustainable agriculture in the future, as will the need to utilize the latest technology to predict nutrient availability from soils and organic amendments to better synchronize nutrient release with crop uptake.

Soils play an important potential role in mitigating global climate change because they can serve as a sink for carbon dioxide in the form of soil organic matter. Maintaining or increasing organic matter is the backbone of healthy soil and promotes carbon sequestration. Models suggest that agricultural practices could sequester up to 20% of carbon emissions annually.

Soils are havens for biodiversity. While much of the biodiversity

under our feet is yet unexplored, we know that invertebrate and microbial communities are the foundation of productive and resilient soil. Some consider soils one of 'the last great frontiers' for biodiversity research.

One would think the myriad of benefits offered by soils would help with their proverbial 'image problem' (It's just dirt, right?). As the planet's demand for food, clean air, and water continue to grow, so too will our knowledge and appreciation of soils. "Essentially, all life depends upon the soil ... There can be no life without soil and no soil without life; they have evolved together." (Charles E. Kellogg, USDA Yearbook of Agriculture, 1938).

— Eric Young, [young@whminer.com](mailto:young@whminer.com)

\* *References:* Janzen, H.H., P.E. Fixen, A.J. Franzluebbbers, J. Hattey, R.C. Izaurralde, Q.M. Ketterings, D.A. Lobb, and W.H. Schlesinger. 2011. Global prospects rooted in soil science. *Soil Science Society of America Journal* 75:1-8.

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# USE OF A FRESH COW PEN

Many dairies in the U.S. house fresh cows separately from other cows to facilitate monitoring of health problems, minimize social stress, and provide a diet specifically formulated for fresh cows. The use of the objective Transition Cow Index (TCI) has allowed the practice of separating fresh cow to be justified based on the findings that TCI scores of freestall herds are higher when there is an effective screening program for cows needing attention, pen moves and social stress are minimized, bunk space is at least 30 inches, and cow comfort is provided (Nordlund, 2009). In one of the few studies available on management practices for early lactation cows (Heuwieser et al., 2010), 97% of herds in Germany had a fresh cow exam based on subjective criteria such as general appearance and appetite and objective criteria such as milk yield. On average, only 22% of herds had a designated fresh cow pen. However, the use of a designated fresh cow pen increased with herd size. A fresh cow pen was used on 81% of herds with  $\geq 200$  cows. The addition of fresh cows to small groups of cows compared to large groups of cows at 100% freestall stocking density resulted in less social stress as indicated by fewer agonistic (aggressive) and non-agonistic interactions within

the 3 hours after mixing (Burow et al., 2009). Introducing fresh heifers as pairs rather than individuals to a group containing older cows promoted lying behavior in the period immediately after mixing (O'Connell et al., 2008). Cows housed as a separate group for one month after calving with a stocking density of  $\leq 100\%$  resulted in improved production and health in primiparous but not multiparous cows (Østergaard et al., 2010). Typically primiparous cows have a lower social status than multiparous cows. Interestingly, a fresh cow diet was not used in the separate group. An additional benefit of separate grouping may be observed if an appropriate fresh cow diet is used.

During the one week before and the two weeks after calving, competition at the feed bunk increased the number of displacements and feeding rate of cows, potentially increasing the risk of health problems (Proudfoot et al., 2009). In fresh cows during the first 21 days after calving, feed bunk stocking density did not affect dry matter intake, water intake, or standing behavior in the absence of freestall overcrowding (Krawczel et al., 2009). However, there was a trend for increased feeding rate suggesting

that overstocking feed bunks may alter feeding behavior and increase the risk for problems associated with slug-feeding. The incidence and severity of ruminal acidosis increases immediately after calving, emphasizing the need to develop and implement feeding strategies and management practices that reduce the risk (Penner et al., 2007). The severity and duration of negative energy balance may be greater with early lactation ruminal acidosis because of the negative effects on ruminal digestion and nutrient supply to the cow.

Based on field observations and limited research, fresh cows should be housed in small, separate groups to minimize social stress, maximize comfort of the physical resting space, properly size the feeding area to minimize slug feeding and other undesirable feeding behaviors, and provide a diet that promotes DMI and prevents health problems. The optimal duration of stay in fresh group pens is unknown and it most likely varies among farms and cows within farm.

— Heather Dann  
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\* *References available upon request.*

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## SOUTHERN EXPOSURE

By the time you read this newsletter The Bride and I will be in winter quarters in Chester, VA, just south of Richmond. We've discovered that moving south in November and then back north in late March means that we experience spring and fall twice each year. The leaves on the oak trees surrounding our place in Chester are just starting to turn red, while each spring we wait until the petals fall from the cherry trees and magnolias and then head back north in plenty of time for the arrival of spring in the

North Country — and those \$&@% black flies.

Maintaining two homes also is good for my small business, Oak Point Agronomics. The Cooperative Extension and agribusiness folks in Virginia and Pennsylvania have discovered where I spend winters, so I wind up doing several meetings in the region each winter including at least one in Lancaster County — Pennsylvania Dutch country. I've had enough meetings and rib-sticking

meals at Shady Maple Smorgasbord that I almost feel like a local!

There's not much dairy farming in this part of the country — much more in the western half of Virginia — but there's a fair amount of cash crops, mainly corn with some fall-planted small grains. Notill is very popular, not surprising considering the light soils and hot, dry summers. (Often dry, always hot.)

— Ev Thomas

# WHAT'S HAPPENING ON THE FARM

We breathe a sigh of relief in the fall when the corn crop is in and the bunks are covered. But the work is never done on a farm; we have moved onto the other things that need to get done – hauling manure, getting the barns ready for winter, and catching up on things in the barn that got set aside for a couple weeks while we focused on corn.

If the rainy weather pattern ever breaks we're going to finish the remaining 100 acres of third cutting. The third cutting was later than usual this year first because of no rain and then too much rain from Hurricane Irene and the muddy fields that followed. In late September our corn was ready to be chopped and we decided to get the corn harvested on time and finish up the grass afterwards. In the middle of the cropping season we have to make decisions that will impact the forage quality on the farm for the rest of the year – we're still not sure if we made all the right decisions but we will have to live with them/feed them. Early on in the season we booked some western grass hay in case we couldn't harvest enough "milk cow quality" haylage. As it turns out we have plenty of heifer quality feed and this grass hay will help stretch our forages for the lactating groups.

Dry matter of the corn was variable this year, some of the corn was pretty dry by



the time we chopped it. The kernels were especially hard and we cranked down the kernel processor to 1 mm to really break up the kernels and get the maximum energy out of the starch. We are guessing that the value of this year's corn silage is going to be in the starch... with the crazy growing season we had, forage quality is yet to be determined... the cows will tell us next year when we start feeding it out! We set the chopper for the maximum TLC although this wasn't our main concern during harvest. We have plenty of peNDF from this year's haylage and also some grass hay and straw that we can add to the diet if necessary.

All the truck weights are not yet totaled to calculate yields for the BMR and

conventional corn but the yields seem to be decent based on the height of the corn in the field and the size of our pile and bunk (relative to last year). With a very rainy spring and fall we dealt with a lot of wet fields. In one field, the puddle that was there during planting was still there when Jake chopped the field! The field in front of the farm was especially wet even though it is tile drained (installed by Mr. Miner in the early 1900s though). We have had the backhoe in the field, digging around to find the clay drainage pipes so we can fix them or replace sections. Hopefully next year better drainage will allow us to get onto the field earlier and improve our yields.

— Anna Pape, [pape@whminer.com](mailto:pape@whminer.com)

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## AG FACTS AND FIGURES

We found the following to be interesting even if they're not useful:

- Australia and New Zealand account for about 40% of world dairy product trade.
- 50% of the world's pork supply is produced by China.
- Many people eat oat products when they're hungry, but they don't eat oats in Hungary.
- There are more tractors per acre of cropland in Iceland than in any other nation.

Learn more about Miner Institute's Morgan horse herd by signing up for our quarterly equine newsletter, the *Stable Sheet*. Email [dutil@whminer.com](mailto:dutil@whminer.com)



# FEEDING THE 2011 CORN SILAGE CROP

If you think the challenges of the 2011 corn silage crop ended as the last of forage disappeared up the blower chute or was tucked under a layer of silo plastic, think again. A lot of corn was planted later than normal because of very wet spring conditions, and then a dry summer in many parts of the Northeast resulted in poor ear development. (Miner Institute had only two inches of rain between June 1st and Aug. 8th, about 25% of the long-term average.) Late planting resulted in many farmers delaying fall harvest. Then frost hit, in some frost pockets as early as mid-September. Frost on corn with a decent ear doesn't dry the plant very fast because frost has little effect on the ear, but on immature and drought-stricken corn where the grain-to-stalk ratio is poor, whole plant dry matter

% can increase quickly following a killing frost.

The result: A lot of corn ensiled at high dry matter contents, in many cases well over 40% DM. This included a fair amount of corn silage at the Institute. I don't get too concerned at corn that's chopped at 40% DM as long as it's processed, but much dryer than that is a concern. Use of a silage inoculant is recommended, but these work best when there's adequate moisture to permit good packing and the resulting air exclusion. Even the best inoculant probably won't save a fluffy, over-50% DM crop that doesn't pack well. (I say "probably" only because I just know that someone out there will ensile this type of corn and get

good fermentation—and will be delighted to inform me of the error of my ways.)

If you run into moldy silage, DO NOT attempt to "feed your way out of the problem." Discarding silage is expensive, but not nearly as expensive as sick or dead cattle. Get a yeast and mold analysis, a mycotoxin screen too, so you'll know what you're dealing with. Work closely with your dairy nutrition consultant. Farming is a matter of doing the best you can with what you've got, even though it's far from perfect. (The Bride sometimes says this, but I'm not sure she's talking about farming.)

— *Ev Thomas*  
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## WOOLY BEAR CATERPILLARS

Can the relative widths of the brown and black bands on a woolly bear caterpillar (actually the larva of the Isabella tiger moth) predict what kind of winter it will be? Nope; the width of the brown and black bands is influenced not by the severity of the upcoming winter but by how close the caterpillar is to full growth before it seeks winter shelter. (I found a woolly bear in late October during one of my walks around Oak Point. It had about equal parts of brown and black, suggesting a "normal" winter.) The "woolly bear as weather predictor" stuff got started in 1947 when Dr. C.H. Curran, curator of the insect collection at the Museum of Natural History in N.Y. City, drove 40 miles north to Bear Mountain State Park and collected as many woolly bears as he could find that day. He counted the number of



Woolly bear caterpillars can't really predict the severity of the upcoming winter. The relative proportions of brown and black on their bodies are weather-related, but in a way you probably didn't know.

brown and black segments—there are actually 13 brown/black segments on each caterpillar—and forecasted the coming winter's weather, publicizing it via a reporter friend at the N.Y. Herald Tribune. He did this for eight years.

However, Curran had no illusions about the accuracy of woolly bears as a forecasting tool; it was mostly an excuse for him, his wife and a bunch of friends to get out of the city for a day. They called their little group "The Original Society of the Friends of the Woolly Bear."

While scientists discount woolly bear folklore, there may actually be a relationship between woolly bear bands and the severity of the winter. The fall coloration of woolly bears is related to their age — how early or late they hatched that spring. So the bands do say something about the severity of the winter, only it's about the previous winter, not the coming one!

— *E.T.*

# FALL TILLAGE

Things mechanical have never been among the Crop Dude's strong points, assuming there are any in the first place; I'm always impressed (amazed is perhaps a better word) when an internal combustion engine fails to start and I can get it running again after cleaning a spark plug or making some other minor adjustment. My attitude is closer to that of some Japanese soldiers during World War II, who when an engine wouldn't start would blame it on the "engine gods" and beat it with sticks. It didn't work but apparently made the soldiers feel better, an emotion I can well understand. (He who has never slammed the hood or otherwise abused a piece of equipment containing an internal combustion engine, stand up and be counted.) That said, when it comes to tillage I have some strongly held opinions, based on several decades of field experience including a couple of rather spectacular failures.

- The more clay in the soil the more important it is to do primary tillage in the fall, either moldboard or chisel plowing. Spring plowing a heavy clay loam often results in the formation of large clods that don't break up easily. Tandem disking results in more clods of smaller size, but far from a proper seed bed. By the time enough disking is done to produce the semblance of a seed bed, the disks have done so much compaction that you now have a "disk pan," which is shallower than a "plow pan" but can inhibit root growth. Spring tillage of clay loams requires considerable patience, waiting for not only the surface but the plow layer to dry enough to avoid clods. Many farmers do not have this much patience. Fall tillage will also produce clods but winter will

break them down (the proper term is "granulation"); Mother Nature is far more effective at granulation than is any piece of tillage implement.

- Much of the farming U.S. has abandoned the moldboard plow, but in the Northeast there's still a place for it. No other tillage implement is as effective at burying the sins of the past including disease-infected crop debris and weed seeds. Reduced tillage is great, something we've long used at Miner Institute, but I still prefer moldboard plowing coming into and out of a hay crop. Plowing after the last cutting, especially if manure had been applied, will bury that highly fertile top inch or two of soil and will result in more uniform fertility throughout the plow layer.

- The use of notill (also called zero tillage) has increased in the Northeast but is still an underused practice. It's a no-go for poorly drained clay loams, partly because the plasticity of the soil makes it difficult to get the seed furrow closed. Notill results in better moisture retention, a plus for sandy loams but not for many clay loams. It can also result in at least 95% less stone picking (some may still be necessary if notill coulters tip stones out of the ground). Notill works better where soil fertility is already good since incorporation of P and K (other than the starter fertilizer) isn't possible. And notill doesn't have to be an all-or-nothing practice: Moldboard plow a field coming out of hay crop, then notill for corn production years two through four (or five?), then moldboard plow following the last year of corn, incorporating crop debris, weed seeds, manure residues, etc.

—E.T.

# BEWARE OF DUSTY HAY

For several weeks after the ravages of Irene the weather was so pleasant that some farmers were actually able to make dry hay. Making hay in the Northeastern U.S. anytime after Labor Day is almost like stealing, but if the land producing this crop was flooded be very careful when handling it. Any silt clinging to the hay can be hazardous to your health, posing particular dangers to lung function. We know of one farmer who inhaled silt during crop harvest following flooding and suffered permanent lung impairment. If you notice any dust when handling this type of hay, use a good face mask to prevent inhalation of this material. By a "good" mask we mean one that fits tightly over nose and mouth. Most of the dust masks that you buy a dozen to a box aren't effective enough; invest in your health and in the health of any others working around this type of hay and buy a face mask with replaceable filters.

Please let us know what you think about the *Farm Report*.

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# INSULIN RESISTANCE DURING THE TRANSITION PERIOD

The transition period, typically defined as 3 weeks before to 3 weeks after calving, is the toughest time during the lactation cycle for dairy cows, especially for the ones with high production. During this period, feed intake is usually lower than other times during the cycle while fetal growth and milk production requires a tremendous amount of nutrients and energy. The nutrients and energy are provided by an orchestrated series of programmed physiological and metabolic adaptations. Many of the adaptations relate to insulin. A better understanding of the role of insulin during this time period may help us to better manage our transition cows.

One of the typical metabolic changes during the transition period is a compromised or decreased response to insulin by muscle and adipose tissue... the peripheral tissues. This is called transitional insulin resistance (TIR). Under normal metabolic conditions, insulin results in lipid synthesis and inhibits lipid mobilization in the adipose tissue. However, during TIR the adipose tissue doesn't respond in the same way to insulin and results in lipid mobilization (body condition loss) and an increase in blood nonesterified fatty acids (NEFA), while other peripheral tissue spares glucose for gestation and lactation. This is a normal response during early lactation to support milk production. However, it is important for feed intake to increase rapidly after calving to prevent excessive body condition loss and minimize the duration and severity of negative energy balance. These factors affect the effectiveness or duration of TIR. Severe or prolonged TIR will result in pathological consequences due to uncontrolled adipose mobilization. Prolonged or extremely elevated blood NEFA increases the risk of ketosis, suppresses insulin secretion through toxic effects on the pancreatic cells,

has a detrimental effect on follicle cell growth, and ultimately negatively affects lactational and reproductive performance.

Despite similar symptoms, TIR in dairy cows should not be confused with type II diabetes that in humans is prevalently induced by obesity. Cows with a range in body condition scores (BCS) can experience TIR. It is not just a fat cow (BCS  $\geq 3.75$ ) issue. Also, TIR could be more severe in higher producing cows managed similarly to lower producing cows and is therefore the "by-product" of long-term genetic selection in pursuit of high milk production.

Nutritional management factors that contribute to the recovery of peripheral insulin sensitivity will be the focus of my next article. Until then, I encourage you to determine if your cows are experiencing severe TIR. If you answer yes to several of the questions below, you may have a TIR problem and need to consider improving nutrition and management for your dry cows and/or fresh cows.

- Do close-up cows decrease intake several days before calving?
- Do fresh cows have low feed intake or slow rates of increase of feed intake?
- Do fresh cows mobilize excessive body condition (loss  $>1$  BCS in the first two months of lactation)?
- Do fresh cows have extended stays in the fresh or sick cow pens?
- Do you treat several fresh cows for ketosis? You should be concerned if 10% or more of the fresh cows have a blood beta-hydroxybutyrate (BHBA)  $> 14.4$  mg/dL

— Peng Ji, [ji@whminer.com](mailto:ji@whminer.com)

## SILAGE, Continued from Page 1

In the most recent issue of the Journal of Dairy Science, researchers from USDA-ARS evaluated a new genetic mutation in corn that results in lower content of ferulate esters and ether cross-links at typical silage maturity stages (abbreviated as sfe). This is a different mutation than brown midrib (bmr), which lowers the content of lignin in the corn plant. Dairy cows fed this sfe corn silage had greater dry matter intake and milk production compared with a near isogenic control silage which reflected its greater NDF digestibility. In fact, the relative increase in milk yield for cows fed this new corn silage was similar to the bmr response in the ARS-USDA study.

The researchers also wondered whether the reduction in cross-linking might increase the silage fragility and how rapidly it would break down during processing and chewing. In fact, they found that lambs fed this lower cross-linked corn silage spent less time chewing per unit of NDF consumed. We have also found that cows spend less time chewing bmr versus conventional corn silage. So, there may be a real biological effect here.

In the future it would be interesting to see what might happen if these two mutations could be combined within the same corn line. BMR exerts its effect primarily through less lignin while this new mutation reduces ferulate cross-linking. It might be possible to have a corn silage with much improved feed intake, digestibility, and milk yield characteristics. I know that this information will not make it any easier to feed this year's corn crop, but we can always look forward to tomorrow's innovations!

— Rick Grant  
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# FALL-HARVESTED ALFALFA SILAGE

Though most farmers in the Northeast grow alfalfa-grass, the last harvest in the fall is usually almost all alfalfa, and ensiled since it's the foolhardy farmer who thinks he can make dry hay in October.

There was a lot more alfalfa harvested this October than normal, and assuming "last in, first out," many farmers will soon be getting into this silage. Fall-harvested alfalfa has never been a favorite at Miner Institute, in part because of the difference between what the forage analysis indicates (rocket fuel!) and what the cows think of the silage (often, not much). We're not completely sure why this forage doesn't feed nearly as well as it tests, but part of it may be inadequate (or abnormal)

fermentation. It would be a good idea to get a fermentation analysis on the silage. Fall days are short, potentially reducing the sugar content of forages, and sugars are the food of fermentation bacteria. Cool fall weather also depletes naturally-occurring fermentation bacteria. Therefore, fewer bacteria with less to eat, which is why we recommend the use of silage inoculants on fall-harvested forages. If the silage tests out OK but your cows aren't doing well on super-lush fall-harvested alfalfa silage, try blending it with some high-fiber silage, a commodity in plentiful supply this fall given this past spring's crummy weather.

It's probably occurred to regular readers of this newsletter that one of

our most frequent recommendations when dealing with forage quality issues, almost regardless of the malady or shortcoming, is "Get a forage analysis." Or in the case of crop problems, "Get a soil analysis." The reasoning behind this is much like what you encounter during a visit to your doctor's office. Regardless of your complaint — headache, heartburn, or hernia, even no complaint at all — what does your doctor (or nurse) do? He/she takes your temperature and blood pressure and listens to your heart. Why? Because these establish baselines and eliminate a number of possible problems. In both instances, knowledge is power!

— E.T.

## BUY SPRING FERTILIZER NOW?

In previous years I've commented on whether farmers should buy fertilizers in the fall or wait until the following spring. ("Buying" refers to ordering and paying for the fertilizer in the fall but not taking delivery until spring.) There are two risks in waiting, one obvious and the other not so much so. The obvious one is that prices will soar between now and spring. The second reason is the fertilizer supply itself: Will there be a shortage that will prevent your getting fertilizer when you need it? Let's deal with both of these risks, fertilizer supplies first:

**Supplies** — If next spring a farmer calls his dealer and is told there isn't any fertilizer available, all supplies on hand are already spoken for, that will be a first in my experience. Fertilizer industry experts sometimes fret about supply

problems but to my knowledge there hasn't ever been one in the Northeastern U.S. Any supply problems, in the exceedingly rare instances when they may occur, are not actual shortages of fertilizer but are due to transportation problems that temporarily delay deliveries. All signs point to there being enough fertilizer in 2012 to meet the needs of North American farmers.

**Prices** — The crystal ball is pretty foggy these days. I've read what several fertilizer industry authorities have been saying about fall vs. spring prices, and predictions differ widely. One says "Buy now, greater corn acreage will increase fertilizer prices," while another says that fertilizer prices are already very high and have no place to go but down. History may not be a good guide, but consider this fact: In the past

10 years only once have fertilizer prices been lower in the spring than they were the previous fall. That was when the price of muriate of potash soared to about \$1000 per ton in January 2009. Farmers voted with their wallets, and prices fell to less than they were in late fall 2008. Can that happen in 2012? Sure, but don't bet on it. The 2011 U.S. corn crop came in with lower yields than early expectations, suggesting fencerow-to-fencerow planting of corn in 2012. Anything that favors corn over soybeans is bullish for fertilizer prices, since corn uses a lot more fertilizer than does soybeans. I no longer order fertilizer for Miner Institute's crop operation, but if I did I'd have most of its spring fertilizer needs ordered and paid for this fall.

— E.T.

# DAIRY DAY AT MINER INSTITUTE

## Wednesday, Dec. 7, 2011



10 a.m. — Visit with vendors  
11 a.m. — Speakers program begins  
Hot lunch available for \$5

### **Speakers and topics for Dairy Day at Miner Institute include:**

- Dan McFarland, Penn State Extension  
“Building stalls cows want to use, not stalls cows have to use”
- Dan McFarland, Penn State Extension  
“If it smells like a barn you probably need to improve your ventilation”
- Dr. Rick Grant, Miner Institute  
“Economic Benefits of Improved Cow Comfort”

Dairy Day is free and open to the public.

For more information contact: Wanda Emerich, 518-846-7121 x117 or [emerich@whminer.com](mailto:emerich@whminer.com)

Miner Institute is located in Chazy, NY on Route 191, 1 mile west of Interstate 87, exit 41. Travel time is approximately 1 hour south of Montreal, 20 minutes north of Plattsburgh, NY, 1.5 hours from Burlington, VT, or 3 hours north of Albany, NY.

## **SAVE THE DATE**

### **2012 NEAFA/PRO-DAIRY Herd Health & Nutrition Conference April 3 (Syracuse, NY) and April 5 (West Lebanon, NH)**

#### **Speakers and Topics:**

1. Nina von Keyserlingk, University of British Columbia — Cow Comfort Audits
2. Heather Dann, Miner Institute — Fresh Cow Nutrition and Management
3. Bill Weiss, Ohio State University — New Research in Macro- and Micro-mineral Nutrition
4. Trevor Devries, University of Guelph — New Concepts in Feeding Dairy Heifers

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### *Closing Comment*

If carrots are good for the eyes,  
why are there so many dead rabbits on the highway?

[www.whminer.org](http://www.whminer.org)

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