

FARM REPORT



In This Issue:

How Do We Define Forage Quality?	2
Calves with Diarrhea have Different Intake, Growth	3
Ordering Seed Corn for 2020; High-Tech Dairying	4
What's Happening on the Farm	5
Dairy Day 2019	6
Many Ways to Win the Race	7
Like, Share, Follow	8
A Transition in How we Think of Health	9
Nutrient Management in a Challenging Climate	10
Barn Construction Progress	11

FROM THE PRESIDENT'S DESK – EDUCATION AT MINER INSTITUTE: GRADE SCHOOL TO GRADUATE SCHOOL

Recently I summarized the education programs here at Miner Institute for our Board of Trustees, and I wanted to share it with you as well. I imagine many of you know the Institute mainly from the research we do, but in fact our status as a 501(c)3 non-profit organization depends primarily on our education programs.

Typically, we educate a total of 70 to 75 undergraduate and graduate students each year. The total attendees who drive through our stone gates to participate in an education or outreach program ranges between 3,500 and 4,000 people annually. I am always amazed at the large educational impact of our relatively small staff: literally grade school to graduate school.

In abbreviated form, here are the major student education programs we conduct every year:

- Farm Days for Fifth Graders: 500 to 600 students attend stations that focus on important aspects of farming and ag research.
- High School Environmental Chemistry Workshops: Approximately 100 11th grade students per year from regional high schools participate in workshops

with a focus on STEM skills.

- Flat Rock Watershed: This 6,800-acre sandstone, jack-pine barrens is used extensively by the SUNY-Plattsburgh Applied Environmental Science Program and the CV-TEC Forestry Program.
- Applied Environmental Science Program: Approximately 40 to 45 SUNY-Plattsburgh undergraduates per year; residential program; day-long courses focused on Agriculture and the Environment, hydrology, soils, and ecology.
- Advanced Dairy Management: Approximately 8 undergraduate students per year from a 2+2 program with Vermont Technical College and the University of Vermont, also other regional agricultural universities. A 15-credit hour experience focused on students wishing to operate a dairy farm or work in allied industries.
- Summer Experience in Equine Management, Farm Management, and Agricultural Research: These 13-week summer programs draw approximately 12 undergraduate students nationwide and even internationally to focus on applied

See EDUCATION, Page 2

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HOW DO WE DEFINE FORAGE QUALITY?

The most common way to measure forage quality is by forage analysis. Grass with 18% CP and 52% NDF is high quality forage, while grass with 10% CP and 65% NDF is generally considered to be low quality. But what if you're feeding corn silage to growing heifers and don't want them to get fat? In this case that low protein, high fiber grass may be the better forage to include in your dry cow ration. I've seen fall-harvested alfalfa silage that on paper looks like "rocket fuel": 24% CP, NDF in the low 30s. But occasionally dry matter intake drops when switching to this forage from alfalfa or alfalfa-grass silage harvested during the summer. There's something about some (but not all) fall-harvested alfalfa that cows just don't seem to like. I'm not sure what it is and the cows are mum on the subject, but maybe it has something to do with the fermentation acid profile after cool autumn weather has killed off many naturally occurring fermentation bacteria. Some forage quality characteristics don't seem to be measurable except by the cow. And although it's only been a few times, I've also encountered corn silage that looked great on paper but had terrible palatability. In these cases, the likely problem was almost pure lactic acid fermentation, with silage pH well below 4.0 but no characteristic "tang" of acetic acid (which smells like vinegar) that cows seem to like.

I once visited a dairy near Houston, Texas and asked about the unusually large number of feed bunkers and other storage facilities given the modest size of his herd. The farmer said that he had a friend who worked less than an hour's drive away at the port in Galveston, and he'd contact the farmer when a shipment of grain or another potential feedstuff was rejected by the buyer and became available at a bargain price. He said that he'd fed a lot of strange feedstuffs over the years, that he probably drove his dairy nutrition consultant crazy at times, but he'd learned that with proper ration balancing he could make some "unconventional" feeds work in his herd.

In the end your cows are the final arbiter of forage quality; a forage analysis means little if your cows won't eat the stuff. That there will be a lot more soybean silage than normal fed in the coming months, often by farmers who have never fed this forage before. If this includes you, always start with a forage analysis but regardless of how good your soybean silage looks on paper I'd suggest that you not offer soybean silage as a major portion of the ration. At the very least start slow and ramp up the rate of feeding only if your cows give you the green light so to speak, which will be determined by dry matter intake and milk production.

— Ev Thomas
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EDUCATION, Continued from Page 1

skills in dairy farm management, equine management, and fundamentals of agricultural research. Most students are pre-vet, interested in a career in equine or dairy management, or graduate school.

- Year-Long Internships: Total of approximately 3 to 4 students in Dairy, Equine, and Agriculture Research.

What do our undergraduates do after graduation? The answer to this question is highly variable, but most of our undergraduates are

employed in a range of agricultural and environmental jobs including: operating or managing dairy or other farms; management at DHIA and milk testing organizations; NRCS positions; agribusiness with a focus on sales and nutrition; and Farm Bureau to name a few.

Amazingly, approximately 50% of the dairy cows in the NY-VT region are affected directly or indirectly by graduates of a Miner Institute education program. Our graduate students and post-docs are in a wide range of leadership positions such as

being a professor, a dairy specialist at major companies, nutritionists, and consultants in a broad cross-section of agribusiness.

Overall, we are proud of the leadership of our students and the impact that they have on the dairy and equine industries, regionally and even globally. If any of this has piqued your interest, there is much more detail provided on our Institute website: www.whminer.org.

— Rick Grant
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CALVES WITH DIARRHEA HAVE DIFFERENT INTAKE, GROWTH, AND EFFICIENCY

Calf diarrhea is a common challenge in our production systems. Current estimates indicate that 21% of heifers in the U.S. have diarrhea or other digestive issues in the preweaning period, with 72% of those treated with an antibiotic.

Identification of calves with diarrhea, including the age and duration of the event, are important in addressing the issue on each farm. Fecal scoring is an easy method to identify calves with diarrhea. A scoring system similar to the following could be used to help identify calves with diarrhea: 1 is well-formed, 2 is soft but still holds form, 3 is loose without form, and 4 is the consistency of water. Often calves with a scores of 3 or 4 would be abnormal while calves with scores of 1 or 2 would be considered normal. Calves with diarrhea would have a score of 3 or 4 for three or more consecutive days. This is a simple scoring system to identify calves that might be sick but by no means indicates that the calf has diarrhea caused by an infectious agent (i.e. e. coli, rotavirus, corona, crypto). However, pairing this scoring system with other signs of sickness, including their attitude and feeding behavior, would indicate calves that need extra attention.

During my time at the University of Illinois we worked to understand and quantify how calves' intake, growth, and efficiency were affected when they had diarrhea in the preweaning period. To do this we combined data from four experiments conducted under similar management with a combined 313 calves. Based on their daily fecal scores we classified 217 calves as healthy and 96 as having diarrhea within the first 21 days after arriving at the research facility. This work was accepted recently into the *Journal of Dairy Science*; following are some of our observations:

The average number of days with an elevated fecal score was 6.84 and 1.88 for diarrheic and healthy calves, respectively. Calves classified as diarrheic were more likely to refuse milk replacer, and the number of days that they refused milk replacer was

2.59 for diarrheic calves compared to 1.20 days for healthy calves. Additionally, calves that were diarrheic were more likely to be administered oral electrolyte solutions, with an average number of days administered of 2.05 for diarrheic vs. 0.22 days for healthy.

Throughout these experiments we measured intake of free water, electrolytes, milk replacer water, and total water intake from all sources. Diarrheic calves had increased water intake from electrolytes and decreased water intake from milk replacer because they were more likely to refuse milk replacer. Free water intake and total combined water intake from all sources were not different.

Over the 21 days, cumulative free water intake for both groups of calves averaged 12 gallons. However, while there was no significant difference between the two groups of calves, diarrheic calves drank about one gallon of free water more than healthy calves. This free water intake combined with the additional water from electrolytes allowed the calves in theory to maintain their fluid balance. We did not measure the hydration status of the calves, but that would be an additional consideration of how these water sources help the calves maintain their fluid balance. I would suspect that had free water and electrolytes not been provided the calves would have an imbalance of water and electrolytes, resulting in a greater degree of dehydration, and would not have recovered as well.

Calves that are sick should not be withheld from milk as this actually extends their recovery period. They should continue to consume at least part of their normal milk or milk replacer meal. Supplemental electrolytes should be offered by bottle a few hours after a meal. Electrolytes when given should not replace normal free water in addition to the fluid and electrolytes consumed in an oral electrolyte solution.

Regardless of the severity of hydration status of these calves, through this classification we also evaluated their

growth and efficiency. From this dataset we observed that diarrheic calves had decreased average daily gain (1.1 vs. 1.5 pounds per day) and body weight (116 vs. 123 pounds) within the 21 days after arrival and had a reduced feed efficiency (0.56 vs. 0.77).

It's no surprise that sick calves don't eat or grow as well, or are as efficient as their healthy counterparts within the herd. However, this data helps us understand and quantify how our dairy calves are responding and affected by a bout of diarrhea.

The calves from one of the studies had a higher incidence of diarrhea compared to the other studies. These calves had been comingled and transported a greater distance prior to arrival at the research facility. Most likely the stress of transportation and comingling before arrival predisposed those animals and made them more susceptible to a challenge. Highlighting that minimizing stressors is important in young calves to reduce the risk of getting sick. Additionally, different seasons seem to also influence calves with diarrhea. Environmental temperature were recorded and were greater for calves that had diarrhea.

This information helps highlight the many factors that we know contribute to the risk of calves developing diarrhea including stressors, environment, and pathogen exposure and how different parts of our feeding management could influence those calves as they go through a bout of diarrhea. It is a complicated challenge to try and minimize as many factors can predispose a calf to get diarrhea. However, the decreased intake and growth that we observed does highlight the continued need to try and prevent, or minimize, the severity of diarrhea that calves experience so that they continue to grow as part of our herd.

— Sarah Morrison
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ORDERING SEED CORN FOR 2020

Many farmers will be ordering much of their seed corn this month. While 2019 might not be a good year in which to base decisions about corn hybrid performance, here are a few reminders:

1. Buy hybrids that will mature every year; better to have your corn ready to chop a week earlier than needed than to fight frost and low DM corn silage. If you're harvesting corn for silage that's 30% DM or less year after year the problem isn't the weather — it's you.
2. Think about where you'll plant and store your corn silage before buying seed corn, especially if you're considering BMR. This forage is so different than conventional corn silage that it needs to be planted in separate fields and then stored in a separate silo. Think of it as an entirely different species.
3. Don't leave some yield potential in the seed bag. Plant enough seed to maximize milk production per ton and per acre. In almost all cases plant over 30,000 kernels per acre; in productive soils perhaps 35,000. Today's high-quality seed corn combined with improved pest protection normally results in less than a 10% difference between planting rate and final stand count.

— E.T.

HIGH-TECH DAIRYING

The low price of transistors and the high capability of computing — “the internet of things”, also called IOT — is increasingly changing the way progressive dairy farmers manage their herds. Dairy farmers already have robotic milkers, transponder feeders and “smart” feed mixing wagons. Now an Austrian firm has developed a sensor that's swallowed by the cow where it lodges in her reticulum and stays there for the rest of her life. The sensor will monitor body temperature, rumination and stomach pH, uploading the results to a computer whenever the cow walks near a wireless detector. The computer can use this information to indicate when the cow is in heat, spot signs of calving over half a day before the big event, and also can detect several diseases days before the symptoms become obvious. This would permit early treatment and therefore less antibiotic use.

Also coming to a farm near you: A computer-connected camera that monitors dairy cows as they move about, alerting the farmer if a particular cow isn't spending enough time at the feedbunk or isn't walking normally. To date this technology is most effective with Holsteins because their unique black/white coloration turns every cow into a walking bar code.

— E.T.



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WHAT'S HAPPENING ON THE FARM: SUMMER EXPERIENCE EDITION

I grew up a mere 15 miles away from the heart of Manhattan, so arriving at Miner Institute in May as a Farm Management intern was a bit of a culture shock for me. I had never seen a cow in person before! However, my ambition to become a veterinarian led me to take on this new challenge. Three months and a whole lot of learning later, I can confidently say that I'm glad I stepped outside my comfort zone and came to Chazy.



Aimee Ding with one of Miner Institute's show cows at the 2019 Clinton County Fair.

Once I got over how unexpectedly massive the cows were and bought myself a proper pair of rubber boots, I was ready to get to work. Like a sponge, I soaked up every bit of information that my mentors gave me. I learned about flight zones, how to move cows, and how to approach and handle them. Before I knew it, I was giving boluses, vaccines, and intravenous treatments! Day by day, I began to understand how to care for dairy cows and what it meant to be a herdsman.

As much as I learned about cows, I also learned a lot about farm life in general. The small things were some of the most surprising to me. For example, I learned what a flake of hay is. Also, that people really do use pitchforks! And wheelbarrows, too! Apparently, they aren't just rustic farmhouse decorations. I learned this the hard way, using them as I ran to catch manure before it hit the ground all week at the county fair.

Showing animals at the fair was a tough but rewarding experience. I've grown very fond of my two show heifers, Peaches and Cherry, who each placed fourth in the spring yearling and spring calf classes, respectively. During halter breaking I definitely got thrown around a bit, flung in the air, and stomped on, but walking my heifers in the show ring and seeing how far we had come was worth a few bruises. Going to the county fair was definitely one of the highlights of my summer.

The time I spent at Miner Institute introduced me to a totally different way of life. I came to appreciate how hard dairy farmers work to put milk on our shelves, and how important it is to care for the animals with a gentle and attentive hand. Coming here was a truly special experience for me, as I learned a multitude of new things each and every day. I am very grateful that Miner Institute took a chance on me, the "city girl" who had never seen a cow before. I don't know too many places that would take that risk! Well, I'm glad I came, because now I can definitely tell you a thing or two about dairy farming. I can tell you that you should cut your hay before it becomes too lignified. I can tell you that your fresh cow that just had twins is probably going to need some extra calcium. But most importantly, I can tell you that if the thought of something new scares you, make like a cow and close your eyes to everything else and face it head on. It worked pretty well for me!

— Aimee Ding
2019 Summer Experience in Farm Management Intern

DAIRY DAY AT MINER INSTITUTE

Wednesday, Dec. 11, 2019

10 am - 3 pm

- 10:10 - 11 am** Dr. Rick Grant, Miner Institute, *Happy Herd, Happy Life: Forages and Feeding Management to Make Your Cows Smile*
- 11 - 11:45 am** Dr. Sarah Morrison, Miner Institute, *Kick the Cold: Winter Management and Feeding of Calves*
- 11:45 - 1 pm** Hot lunch available for \$5, Announcements, Door Prizes
- 1 - 1:45 pm** Dr. Heather Dann, Miner Institute, *Start the Lactation Off with a Bang – Focus on Transition Cow Management*
- 1:45 - 2:30 pm** Katie Ballard, Miner Institute, *Beat the Heat – Are North Country Cows Susceptible to Heat Stress?*
- 2:30 - 3 pm** Laura Klaiber, Miner Institute, *Miner Institute Edge-of-Field Water Quality Research Update*
- 3:30 - 5 pm** Tour of Miner Institute Dairy and Research facilities
- 5 - 6 pm** Dinner
- 6 - 9 pm** Cornell Feed Dealers Meeting with Dr. Tom Overton and Kristan Reed. The Feed Dealer Seminars are specifically targeted for nutritionists, veterinarians, crop and management consultants, extension educators, and dairy producers with specific interest in nutrition-oriented topics. They are designed to blend the latest concepts in feeding and other management aspects of dairies with field level application.



Dairy Day is free and open to the public.

Pre-registration is encouraged.

For more information, contact Wanda Emerich, 518-846-7121, ext. 117 or email emerich@whminer.com

Miner Institute is located at 586 Ridge Rd. Chazy, NY. Travel on Miner Farm Road, 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.



**Learn more
about the Miner Morgans
at <http://whminer.org/equine/>**

MANY WAYS TO WIN THE RACE

Every farm has production goals they want to achieve, especially with the high group. The 6-pound club is a goal of producing 6 pounds of milk fat and protein, and more recently, the 7-pound club is becoming a more attainable goal. What do we feed to achieve these high productions? Recently at the Cornell Nutrition Conference Dr. Larry Chase presented a project quantifying the rations fed to high producing groups making more than 100 lbs./cow/d., mainly in the East and Midwest. There were 51 high groups with average dry matter intake (DMI) of 60.5 lbs./d. and a range of 50 to 69.8 lbs./d. The average energy corrected milk (ECM) production was 110.8 lbs./d with a range of 93.7 to 128.8 lbs./d. These are large ranges, and it's amazing that cows consuming on the low end of 50 lbs./d of DMI can produce 100 lbs. of milk/d. The average feed efficiency when expressed as ECM/DMI was 1.83 lb./lb. with a range of 1.58 to 2.15 lb./lb. This demonstrates that it's not just about producing 100 lbs. of milk, but how efficiently you can achieve it. These are very high producing groups that produced on average 7.43 lbs./d of

milk components with a range of 6.14 to 8.63 lbs./d. While the majority are in the 7-pound club there are some groups in the 8-pound club, meaning that our high cows have the opportunity to produce a large quantity of milk fat and protein.

Of the 51 high groups, 44 used corn silage and 22 used BMR corn silage with 14 of those using a blend of conventional and BMR corn silage. Legume silage was used in 34 high groups while mixed legume-grass silage was used in 13 high groups and only 6 high groups used grass silage. This shows that a wide range of forages can be utilized to achieve high milk production. The range of forage as % of DM in the diet was from 33 to 69%, indicating that high production can be accomplished with a wide range of forage amounts. The average NDF content of the high group diets were 29.9% of DM with a range of 25.7 to 35.7% of DM and the forage NDF content being 75.5% of NDF with a range of 51.4 to 87.1% of NDF. Some herds are using non-forage fiber sources to help provide NDF to the cow, while others are mainly relying on forages. As our growing conditions are becoming more variable and making it

harder to grow high-quality forage it's encouraging that in years with low forage inventory farmers can still achieve high milk production.

Every farm is unique, from the genetic potential of their cows to forages and feeds they provide for those cows. As our goal is to produce more milk components more efficiently, it's important to understand how this can be attained. The project Dr. Chase presented helps to identify different nutritional strategies that can produce 100 lbs. of milk/cow/d. There are a couple important takeaways: The first is that you can produce 100 lbs. of milk with a wide array of diets, which is encouraging as each farm is different. Second is how efficiently you can produce 100 lbs. of milk as the range in this project was from 1.58 to 2.15 lb./lb. of ECM/DMI. It is important to understand how efficient your cows are and ways to improve it. There is no perfect diet for every farm, but luckily for us there are many ways to accomplish high milk production.

— Michael Miller
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NOTABLE QUOTES

- Technology is nothing. What's important is that you have a faith in people, that they're basically good and smart, and if you give them the tools, they'll do wonderful things with them. — *Steve Jobs*
- The older I grow, the more I distrust the familiar doctrine that age brings wisdom. — *H.L. Mencken*
- Everyone is entitled to their own opinions. But not their own facts. — *Daniel Patrick Moynihan*
- The person who has lived the most is not the one who has lived the longest, but the one with the richest experiences. — *Jean-Jacques Rousseau*

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LIKE, SHARE, FOLLOW

Does anyone else remember when an “.edu” email address was required to join Facebook? Since its inception in 2004, Facebook’s audience has grown from just Harvard University to 2.41 billion users worldwide. It’s now easier than ever to stay connected to friends and family, to keep up with the world’s goings-on, and to share information. Unfortunately, this last action is a very sharp double-edged sword. It’s just as easy (and sometimes easier) to spread bad or maligned information as it is to spread good or accurate information. With the click of the mouse, you can have 100 new friends...or 1,000 people trying to figure out where you live to show up on your lawn with pitchforks and torches. Agriculture fights a constant uphill battle against social media every day. How is one to manage the blight of inaccurate or doctored information? How does one defend themselves against a constant storm of criticism born from an onslaught of misconception? How do you effectively counter said misconceptions with facts and truth, and in such a way that you’ll be able to overpower the naysayers? They like and they share...but do they really follow?

A few weeks ago, one of my Facebook posts went viral for the first time ever. If you, like me, have never received this much attention

for anything in your entire life, please allow me to tell you that it’s borderline unmanageable. Especially for a self-proclaimed introvert. My pro-ag post, in honor of National Farmer’s Day, was shared over 4500 times and had over 1,000 comments. I eventually had to turn the comments off because the number of notifications I would receive over the course of an hour was overwhelming. It was a stunning testimony to just how far and wide anything can be spread in a very short period of time. If only everyone would get as excited about checking facts and sources as they did about spreading sensationalized headlines and the proverbial clickbait.

The Internet is full of the cherry-pickers (only paying attention to information that aligns with their personal beliefs), the Chicken Littles (those who believe any sort of negative report or article they see) and the armchair warriors (who seem to be experts on just about any given subject from the comfort of their living room). It’s disheartening to think that the producer works from before sunup to often times well after sundown to provide for those who seem to do nothing but attack agricultural practices based on a video they saw or something that they read. But amidst the negativity, something amazing was happening. A lot of the undesirable comments

were countered not with more negativity, but with a rational, educational approach from other members of the agricultural community. There were even instances where someone who initially had an uninformed stance thanked those who provided them with facts. It was incredible to see the ag community come together in solidarity as cheerleaders, and as educators. Recently, I was a member of the Social Media Corps for the Northeast regional Dairy Challenge, and it felt good to be in a position to spread positive information about agriculture and to showcase all of the great things that are happening on a much grander level.

So, what have I learned from this whole experience? Continue to share the truth and all of the great things about our world. You won’t change the mind of someone who is already committed to misunderstanding, but you might educate someone else in the meantime. Realize when it’s time to stop engaging. Sometimes you just have to pick your battles and act in the interest of self-preservation. For those of you fighting the good fight on the social media battleground, keep it up. I hope one day, they’ll all be able to ‘follow’.

— Cari Reynolds
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A TRANSITION IN HOW WE THINK OF HEALTH

Practical medicine in animal agriculture has shifted its dogma over the past 30 years. Dairy medicine used to focus on clinical diseases and emergency treatment. Now, dairy farmers and specialists are focusing on preventative medicine, bringing animal health to the forefront of animal productivity and welfare. But is it time to reassess how we look at health disorders in dairy cattle? As we learn more about the physiology of the cow, the line between an animal with a subclinical condition and one within the threshold of “healthy” may not be that different. How do we define a healthy cow, and how do we manage cows to meet that definition?

Dairy cows go through major metabolic changes in the transition period. Nutrients that were partitioned to the fetus and to mammary growth must be redirected towards the onset of lactation and immune challenges. Dairy farmers look at this metabolic challenge as the cause of other issues. Traditional dogmas have usually ruled that a cow with milk fever could also be susceptible to retained placenta, and a cow with ketosis could be susceptible to a DA, etc. However, Dr. Lance Baumgard of Iowa State University challenged dairymen to look at this health challenge in reverse. At the most recent Cornell Nutrition Conference he highlighted how immune activation partitions

nutrients away from normal function, leaving the animal’s body to “readjust” or “dysregulate” to maintain survival. For example, when endotoxins and inflammatory markers enter the animal’s blood stream, hypocalcemia may be a strategy that the animal has developed to survive, a survival strategy not too different than that of humans. Maybe these metabolic disorders are not the precursor of other immune issues but are survival mechanisms that indicate a more basic issue of inflammation inducing insults that the transition cow is experiencing.

Inflammation in transition cows has been well characterized by many researchers. Acute phase proteins are proteins that regulate liver health and can characterize inflammation. Italian researchers created a Liver Functionality Index which indexes a combination of acute phase proteins to classify animals into a plane of health. This Liver Functionality Index was validated by clinical health, milk yields, and fertility. By looking at immune metabolites in transition cows, we can estimate their “health potential”. A modified version of this health index was used in my undergraduate research at Cornell University in a commercial setting. Blood metabolites were collected at one time point from animals 5-17 DIM across multiple dairy farms. Once the metabolites were

modeled, we were able to index individual cows onto our own Metabolite Health Index. Even within a commercial setting, animals with a higher index were associated with a higher milk production.

Scientists are developing more tests that can help farmers better determine inflammation levels in cows. Inflammation rather than traditional metabolic markers may be how we determine the plane of health for our cows in the future. Although it may be some time before dairymen have a cow-side test that will allow us to determine individual inflammation levels, there are certainly management practices that can help us to alleviate immune stressors in transition dairy cows. In my research, transition cows that had a higher index or higher plane of health were associated with having a lower stocking density. By reducing stressors, increasing emphasis on cleanliness at calving, and by ensuring animals have the nutrients necessary for immune activation, we can potentially increase the plane of health in our transition cows. Rethinking how we look at metabolic disorders in relation to inflammation may result in more effective preventative health strategies.

— *Kristen Gallagher*
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WINTER WOES: NUTRIENT MANAGEMENT IN A CHALLENGING CLIMATE

Continuing our efforts to better understand the driving forces behind nutrient movement from crop fields and how best to manage them, last summer we instrumented two fields to conduct a new, USDA-NRCS-funded edge-of-field monitoring project. The objective of this project is to evaluate how transitioning from corn production using conservation tillage methods (disk tillage, leaving residue on the surface) to no-till will impact runoff, nutrient, and sediment losses. We began monitoring October 1, 2018 and recently summarized our first year of monitoring data.

The first two years of this project will see us developing a baseline relationship between the two fields. During this period, both fields receive the same management, including tillage method (disk tillage), nutrient application (rate and timing), planting, harvest, etc. After two years, one of the fields will continue to be managed with conservation tillage, while the other will switch to no-till management for an additional four years. Understanding the behavior of runoff and nutrient movement when these fields are managed the same will then allow us to quantify the effects of transitioning to no-till.

The table of results shows the amount of soluble reactive phosphorus (SRP; bioavailable form of P), total P, and sediment that was exported from the two fields during the first year of monitoring. The total exports from each field are broken down to show the contributions of surface runoff and tile drainage.

Fields A and B exported 1.54 and 0.94 lb/ac of total P, respectively. This is on the higher range of the exports we

	Runoff inch	SRP -----lb/ac-----	Total P -----lb/ac-----	Sediment
Field A	25.64	0.59	0.94	42.28
Field B	21.32	1.09	1.54	41.16
Field A Tile	20.90	0.20	0.33	15.64
Field B Tile	19.49	0.95	1.32	32.11
Field A Surface	4.74	0.39	0.60	26.64
Field B Surface	1.83	0.15	0.22	9.06

have seen from other projects at Miner Institute, but within the typical range (0.5 - 1.5 lb/ac) that has been reported in the scientific literature. Both of these fields have relatively similar soil characteristics and levels of soil P to our other research sites, so why were the losses of P greater than we have observed in other fields? While we will need to continue to monitor these fields to see how they respond over time, my suspicion is that the answer is directly related to the interaction of two factors: weather and manure management.

Likely many of you in the North Country remember the challenges the weather presented us with last fall. Numerous heavy snowfalls, beginning right at the start of November, made fields all but inaccessible until December. This resulted in little time between finishing up with fall harvest and conditions that were less than favorable for spreading manure. Therefore, many found themselves spreading manure into December once the snowpack had melted.

While it was necessary to apply manure during this period to provide storage for the winter, it was far from the ideal time to be spreading manure for a number of reasons. First, many fields were still wetter than we would generally like to see for field traffic and manure application. Second, because of this extra moisture and small window of

time for field work, there wasn't an opportunity to make another pass through the fields to incorporate the manure as would typically happen. Third, when applying manure so late in the year, there is a higher risk for large runoff events to occur before the manure has time to more fully interact with the soil.

Many studies have demonstrated that the risk of P loss decreases as the time between nutrient application and the next runoff event increases. As I've discussed previously, early and late winter typically have high rates of runoff and last December was no exception, with rains occurring towards the end of the month which generated relatively large runoff events, given that the water table was already elevated.

All of these factors taken together likely contributed to the above average levels of P export. Of the total P lost during the year, 95 and 87% was lost between October 1 and April 1 for fields A and B, respectively. This highlights a point I've written about several times before; managing nutrient loss in humid, northern climates such as the northeastern U.S., requires close attention to nutrient management during the nongrowing season. While it's easy to write off the losses from last year as a fluke considering the relatively abnormal weather conditions we faced, extreme weather is becoming more common and we will need to identify practices that address these types of challenging conditions. This is the primary goal of the edge-of-field research projects we are conducting at Miner, and this new project will further our ability to address these challenges.

— Laura Klaiber
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Dairy Barn Construction Progress



An expansion of the dairy barn to better accommodate our research program is underway! The research side of the barn will be more than doubled as an additional 40,000 square feet will be added to the south side of the barn. The addition is 291 feet long.

The project is scheduled for completion in June 2020.



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Closing Comment

While a group of cows is called a “herd”, a group of baboons is called a “congress”.
That explains a lot.

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