

FARM REPORT



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FROM THE PRESIDENT’S DESK – STATE OF THE INSTITUTE 2022

Each December I write a year-end report for our Institute Trustees that summarizes the accomplishments of our staff and the programs they’ve conducted. Although I’ve done this report now for 19 years it never grows old, and I am always amazed at what our modest-sized staff of about 60 people can accomplish. As we begin 2022, Covid is still lingering, but I do want to share a few of the highlights of 2021 with you.

Demonstration and Outreach Programs. Covid continued to cast a shadow on face-to-face meetings though we were able to hold several meetings on-site such as Dairy Day. All told, in 2021 about 530 people attended 17 events. That was up from 2020, but still down overall. Let’s hope that 2022 sees a return to normal!

On the dairy farm, Covid also continued to disrupt the milk market. Despite the challenges, our herd remains highly productive with an RHA of about 31,700 pounds of milk with 4.1% fat and 3.0% true protein. Kudos to our farm staff for keeping our herd in the top echelon of U.S. dairy farms in the face of very challenging times. Being able to conduct research and education programs with our high-performing herd remains one of our biggest assets.

Our equine program also had a successful year as well even though face-to-face programs

were limited. Notably, we have begun planning for a riding arena and multi-use facility that will launch the Institute’s equine program into the future. Stay tuned as planning progresses.

Educational Programs. In 2021 we had nearly 50 students enrolled in our educational programs – that includes undergraduates, graduate students, and interns. These students participated in our Advanced Dairy Management semester, Applied Environmental Science Program, year-long internships, and Summer Experiences in farming, equine management, or agricultural research. As always, our graduates are our most impactful product as they enter the dairy and equine industries at all levels.

Research Programs. In 2021 we achieved an all-time high research income of \$1.8 million. Funding remained strong in our core areas of forages, dairy cattle nutrition and management, and nutrient management. New in 2021, we were able to garner grant income aimed at reducing greenhouse gas emissions by dairy cattle. While conducting all this research, our staff managed to make 56 presentations to various scientific and industry groups and wrote 74 papers. Of these, five were in peer-reviewed scientific journals. That is a large footprint for a small and talented staff!

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DON'T LEAVE YOUR CALVES WANTING WATER IN WINTER

Calf feeders often fight with frozen water pails in colder temperatures, which can be pretty frustrating! However, water is one of, if not THE most essential nutrient for animals and, as a result, should not be abandoned in freezing temperatures.

The 4:1 rule. Water is not only the number one requirement for animals; it is crucial for starter intake and rumen development. A good rule of thumb for calf water consumption is the 4:1 rule as they will consume four parts water for every 1-part starter they consume. Offer starter from birth as calves will increase the starter they consume each week. Depending on the milk or milk replacer feeding program, you may not see large amounts of starter intake. Still, the cumulation of starter intake before weaning is very important for weaning success and preventing postweaning slumps. Calves may also increase the amount of water they drink in response to the solid concentration in milk or milk replacer. As solids increase above 14%, expect calves to drink more water. In the first weeks of life, calves drink 1.5 to 3 quarts/liters of water a day, whereas

by a month of age, calves will consume around 4-8 quarts/liters of water per day.

Timing. Calves should have free access to water throughout the day and from birth. However, when temperatures get consistently below freezing, it can be challenging to battle frozen water in buckets. Therefore, offering smaller amounts of warm water to the youngest calves (less than three weeks of age) multiple times throughout the day will help promote water intake. Provide 2 quarts of water to the youngest calves after milk or milk replacer feeding. An additional water feeding in the middle of the day would provide an opportunity for the calves to consume more water. For older calves eating more starter, increasing the amount of water offered after milk or milk replacer feeding is vital. As calves wean, providing water during regular milk or milk replacer feeding times will encourage starting intake in these calves.

Temperature matters. Calves prefer to drink warm water. Ideally, offer water at 100°F. By providing warm water compared to cold water, the warm water

will minimize the amount of energy the calf has to expend to warm cold water to the calf's body temperature. Cold water will also reduce the temperature of the rumen. Work in the 1960s measured the change in rumen temperature in response to different water temperatures. Calves were fed 46-81°F water, and it dropped the temperature of the rumen for approximately 1-2 hours by as much as 15°. Whereas 99°F water only minimally changed rumen temperature for a shorter period.

Overall, do not forget about water for young calves! It is essential from a hydration standpoint and essential for rumen development and efficiency. Strategically when and how much water you offer to calves depending on their age and the amount of starter they are eating. Can you find a way to provide warm water throughout the day to help encourage calves to drink? Any opportunity to get water in front of calves will prevent them from wanting water in winter.

— Sarah Morrison
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As always, the full story for any organization lies behind the year-end statistics. Nonetheless, our student programs, research activity, and outreach tell me that the Institute is on-track and our staff is doing an outstanding job. We have a lot planned for 2022 – so if you have questions about the range of Miner Institute programs – research, education, and demonstration – please feel free to contact us.

As in past years, I close the books on 2021 with tremendous satisfaction and gratitude for our Miner team. As farming moves forward in a world affected by Covid, carrying on William Miner's vision of science in the service of agriculture has never been more important.

As January gets rolling, Happy New Year to all the readers of the *Farm Report!*

— Rick Grant
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LEVERAGING CROP ROTATION IN A YEAR WITH HIGH INPUT COSTS

It's no secret that farming is going to be expensive in 2022. Crop inputs are up 10-15% across the board, with some fertilizer and herbicide products doubling or tripling in price over the past twelve months. While glyphosate alternatives, nitrogen stabilizers, and manure management are all relevant topics, this article will discuss the value of crop rotation in 2022.

For many dairy operations (Miner Institute included), crop rotation is a long-term proposition. We're happy if we can rotate a corn field to alfalfa-grass in 5-10 years in our neck of the woods. Some fields (mostly for heifer feed) might not be rotated at all as long as they are productive. As a result, there's a substantial amount of well-established sod out in our fields that could be a valuable resource for a year with high fertilizer prices.

Cornell University nutrient management guidelines suggest that sod decomposition can provide up to 165 lbs. of N/acre to first year corn (Table 1). With the exception of a low rate of starter fertilizer, first year corn has shown little response to additional nitrogen during the growing season. This suggests that additional crop rotation could be an

Table 1: Expected nitrogen availability for corn from sods in years following sod turnover.

% legume	Total N pool	Year 1	Year 2	Year 3
		lbs N/acre		
0	150	83	18	8
1-25	200	110	24	10
26-50	250	138	30	13
50 or more	300	165	36	15

Source: Cornell University Nutrient Management Spear Program agronomy fact sheet #21

excellent short-term way to meet corn nitrogen requirements. In addition to nitrogen, sod decomposition releases other nutrients that could benefit crops because sod is simply decaying plant material. Therefore, the ratio of nutrients released by this process is likely to be favorable to crop growth. A further benefit is that corn has relatively little weed pressure in the first year after sod is turned over. This could save you from yield losses if corners are cut with the spray program.

As good as it looks on paper, intensifying crop rotation is certainly not an easy task. Additional tillage is required as well as efforts to pick stones and plant the seed (assuming the haylage supply is to be maintained). Some forage seed may be tight in 2022, but alfalfa and tall fescue appear to be readily available. I have even seen alfalfa on sale through some seed companies. My advice would be to purchase seed early if you're thinking about intensifying your rotation. From a logistical standpoint,

you may need to be flexible with alfalfa-grass establishment. Seeding early with nurse crops such as peas/oats can produce excellent spring forage yields when moisture is adequate. If you end up waiting until after the corn is planted, consider adding a small amount of sorghum sudangrass as a nurse crop to boost the seeding year yields for adequate establishment. Late-summer seedings are also a good option if a high proportion of alfalfa is desired. The downside is that there will be considerably less biomass production in the establishment year.

In theory, a more intensive rotation strategy should result in a higher proportion of alfalfa in the following year's haylage. More alfalfa means more nitrogen fixation and higher forage crude protein without additional N fertilizer. Crop rotation will never completely eliminate the need for nitrogen fertilizer in corn, but consider leveraging crop rotation as part of your strategy to manage input costs in 2022 and beyond.

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



WHAT'S HAPPENING ON THE FARM? DEALING WITH THE COVID-19 PANDEMIC

For the first 20 months of the COVID-19 pandemic, the day-to-day operations of the Miner Institute dairy had little disruption from the COVID-19 virus. This all changed the first week of December 2021, when several of the full-time dairy staff members were sidelined for an extended period of time. In the dairy industry, the day-to-day operations of the dairy must continue as usual, no matter what the staffing situation may be. In most other production industries, daily production can be reduced by simply reducing the shifts the product is produced from three shifts to two or from two shifts to one. In fact, during the height of the pandemic some production facilities across the United States shut down completely for a period of time to weather the storm. Unfortunately, completely shutting down daily milk production on a dairy is impossible and switching lactating cows from 3x to 2x milking, although possible, is not a process that occurs overnight.

You may ask, can you reduce a cow's daily milk production by simply reducing the frequency in which the cow is milked each day? In an Ohio study of 285 cows in five herds, research looked at reducing milk production in cows by reducing the frequency of milking to once per day, from 2x or 3x milking, seven days prior to dry off. In this study the cows milked once per day reduced daily milk production by about 30%.

In fact, at the onset of the COVID-19 pandemic, with dairy supply chains broken due to labor shortages, and fluid dairy product demand decreasing due to public schools and restaurants closing, several dairy processors asked or in some cases mandated reduction of milk supply from dairy farms. One of the recommendations from leading dairy industry experts for dairy herds wanting to reduce milk production was to reduce milking frequency from 3x to 2x. Dr. Michael Lormore, Zoetis Dairy Technical Services, stated in a blog "Managing Milk Production During COVID-19: It's up for Debate" on the Hoard's Dairyman website: "By switching from 3x to 2x milking frequency, you can drop almost 7 pounds per cow per day while maintaining your cow numbers as best as possible for when milk demand picks back up." So, the answer to the above question is yes, but careful planning and execution is necessary to accomplish this goal both efficiently and with minimal stress to the health of the cow. In other words, it's not something that can be accomplished in a matter of hours but rather after days of careful planning. With the labor shortage we faced that first week of December 2021 decisions had to be made in hours and sometimes minutes not days.

It's important to remember that labor shortages on a dairy put stress on all aspects of the operation. The feeding schedule of pre-weaned calves is crucial

to their health and growth. Monitoring the close-up pen for dystocia in cows and heifers is crucial for the health and wellbeing of the fresh cow and her calf. Monitoring the fresh cows for metabolic diseases is crucial for future milk production. The list goes on and on. Strong dairies in times of crisis band together and find a way to accomplish the job to keep the dairy moving forward.

I would personally like to take this opportunity to thank the dairy and research staff at the Miner Institute dairy for banding together get the job accomplished. This meant milkers and calf feeders working double shifts to get the cows milked or calves fed. Members of the crops department who stepped in to help clean barns, push cows to the parlor or feed cows for two weeks straight. Last but not least, members of our research department who stepped in to help push cows to the parlor, monitor the close-up pen and feed calves in a pinch.

Update: In the September Farm Report I stated one goal of the dairy is to have a monthly average Bulk Tank Somatic Cell Count (BTSCC) of less than 100,000. I am happy to report, the last three months of 2021 the dairies monthly average BTSCC count was less than 95,000!

— Kevin Tobey, DVM
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CROP INPUT PLANNING

I wish the news was better regarding the price and supply of a number of farm inputs. Extremely high fertilizer prices are unlikely to decrease much if at all between now and spring planting, and farmers will probably be paying about a dollar per pound of N in fertilizers. To make matters worse there are tight supplies of many if not most forage seeds; and higher (in some cases much higher) prices plus uncertain supplies of some key pesticides including glyphosate. I've been advising farmers for at least 55 years and can't recall a situation anything like this. We often complain about high prices, but supply issues are a new and mostly unfamiliar challenge.

This is an excellent time to be in frequent contact with your suppliers, including custom pesticide applicators since often they're the ones ordering

your herbicides. Order your crop inputs ASAP, and take delivery whenever possible. This will be a year where "A bird in the hand..." is important. Flexibility will be a key — perhaps in having to switch to your second (or third) choice in forage grass, modifying crop fertilization plans, and maybe altering herbicide programs. I hope it doesn't happen, but I can foresee a situation where a farmer has ordered HarvXtra alfalfa or Roundup Ready corn or soybeans, paying a hefty premium for the trait, and then discovers that either he can't get glyphosate or that it's so expensive that he's forced to rethink his weed control strategy. It certainly would be a good year to take advantage of any high soil fertility built up by prior years of fertilization and manure application.

Speaking of which: How quickly you

can "farm down" high soil fertility depends on the nutrient, and P and K behave very differently in this regard. Crops will take up as much P as they need and no more, but crops such as alfalfa and particularly grasses will "lush consume" somewhat more K than they need. Charlie Sniffen once told me of a farmer who had some grass forage with over 5% K — try feeding that to prefresh dry cows! Also, a crop of alfalfa or corn silage will remove a lot more K vs. P. And while K might leach a bit in coarse soils, P will stay where it's put unless moved mechanically by plowing, etc. Therefore, a high P soil can remain high year after year even with no further nutrient additions, while a high soil K status can be depleted fairly quickly by high crop removal rates.

— E.T.

NO END TO THE DATA DROUGHT

Dairy farmers in the Northeastern U.S. are fortunate to have two university-run corn silage hybrid trials, one by Penn State and the other a Cornell University/University of Vermont collaboration. These trials include hybrids in several relative maturity groups, with plenty of quality data. However, I continue to be disappointed at the lack of brown midrib (BMR) hybrids in the trials — both these two and other university-run trials. This isn't the fault of the people running the trials since the hybrids entered are determined by the participating seed companies. There are claims that the "yield drag" between BMR and conventional corn hybrids is decreasing, but I heard recently that some farmers are backing off on their use of BMR because of disappointing yields and poor disease resistance. Some seed company reps selling against BMR hybrids claim that BMR standability is a serious problem, but no university corn silage hybrid testing program includes standability in their ratings.

My opinion: There still is BMR yield drag — perhaps 10% or so — and if it's declining I'd like to see independent trial results proving it. I'm not sure BMR yields will ever catch up since corn yield has long been a moving target: While the yields of today's BMR hybrids are higher than older ones, so is the yield of conventional hybrids. Some claim that with higher yields the NDF digestibility advantage of BMR is decreasing, but I don't believe this (though with no data I can't prove it). And while standability is a potential problem with BMR this can be greatly reduced by timely harvest (no more than 35% DM). During the years Cornell University included BMR hybrids in their testing program Bill Cox, the person managing the trials, told me that they never had a problem with BMR standability. The hybrids were planted in 4-row strips (and in the Cornell/UVM trials they still are), which might not offer a true test of standability, but with no data...

— Ev Thomas
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IMPACTS OF NO-TILL AND A DRY YEAR ON EDGE-OF-FIELD RUNOFF

Miner Institute initiated a USDA-NRCS Edge-of-Field water quality monitoring project in October 2018. The objective of the project is to assess the impact of no-till management on field-scale losses of nitrogen (N) and phosphorus (P) from two corn (silage) fields. The limited soil disturbance and increased residue cover with no-till management can result in significant reductions of sediment and particulate P loads in surface runoff as soil quality improves. While the formation of preferential flow pathways (large, connected pore spaces in the soil) in no-till fields can improve field drainage, they may also result in elevated P losses when these pathways end at or near tile drainage lines. Understanding nutrient loss dynamics and the potential tradeoffs that may occur with conversion to no-till is critical for developing sound recommendations and identifying when additional practices should be implemented to address these challenges.

The project utilizes a paired watershed approach and the two fields selected (5.3-acre field referred to as DB6; 5.0-acre field referred to as R20B) both transitioned from grass to their first year of corn silage production in 2018. The paired watershed design utilizes a calibration period during which water quality monitoring is conducted to establish the baseline relationship between the two fields. During this period, both fields were managed with conservation tillage practices. Each fall, a manure application was incorporated with a single pass of a chisel plow. Spring tillage consisted of a single pass with a disk harrow to prepare the soil for planting. These practices leave approximately 30% crop residue cover in the field. The 4-yr treatment period began in fall 2020, during which management was unchanged for the control field (DB6) and the treatment field (R20B) transitioned to no-till corn production and surface-applied manure.

The first year of the treatment period

Year	Precipitation inch	DB6 Tile	R20B Tile	DB6 Surface	R20B Surface	Field DB6	Field R20B
		Runoff (in)					
2019	37.17	19.14	20.55	1.79	4.39	20.93	24.94
2020	34.47	17.45	22.64	0.26	1.38	17.71	24.02
2021	28.50	7.42	14.92	0.09	1.89	7.51	16.81

highlighted the importance of multi-year monitoring projects to address these types of water quality questions. There was 17% less precipitation (28.5 inches) than the 30-year annual mean (34.4 inches) for Clinton County, and according to the United States Drought Monitor, 100% of Clinton County was classified as abnormally dry or in a moderate drought during 42 weeks of the 2021 monitoring period, with just two weeks classified as normal for the entire county.

These abnormally dry conditions were clearly reflected in the runoff data from both fields. Total field runoff (tile + surface) was 58% less in DB6 and 30% less in R20B than was observed in 2020, with reductions in tile drainage responsible for the vast majority of those differences. During 2019 and 2020, both fields generated tile flows nearly year-round, independent of individual rain or snowmelt events, with the exception of July through September. In contrast, DB6 only generated tile flows during 4 rainfall/snowmelt events from October through February. Tile flows also ended approximately 1 month earlier in the growing season relative to 2019 and 2020.

The high rates of baseflow during the nongrowing season (NGS; October 15 – April 15) contributed a substantial proportion of the total tile flows in 2019 and 2020. Baseflow is drainage that occurs when the tiles intercept the groundwater table, whereas event flow is water that directly drains from the surface to the tiles during a rainfall or snowmelt event. The absence of these baseflows was responsible for most of the differences observed in 2021 relative to the two previous years. Although baseflows have been an important component of the

water budgets of both fields, the tiles in R20B have consistently produced higher rates of baseflow than DB6. This difference in field hydrology was particularly evident in 2021, when R20B baseflows continued throughout the fall and winter months despite the dry conditions, albeit at a lower rate than the previous two years. The larger contribution of baseflow in R20B in 2020 resulted in a greater difference in total runoff between the two fields than in 2019 and 2020. While 7 and 23% less total runoff was observed in DB6 relative to R20B in 2019 and 2020, respectively, DB6 generated 55% less total runoff than R20B in 2021.

Although 2021 was the first year of treatment, the steeper reduction in field drainage from DB6 relative to the calibration period is unlikely to be a treatment effect. Any changes in soil structure or other physical characteristics following a transition to no-till would be unlikely to impact baseflows as the physical changes in the soil would occur primarily in the plow layer, rather than at the depth of the tiles (4 ft). The primary treatment effect on field hydrology would most likely manifest during event flows, with improved soil structure and increased preferential flow pathways increasing the rate of surface water transport to the tiles lines via increased rates of infiltration and percolation. Continued monitoring will help us clarify how the no-till treatment may be impacting the water budgets in the fields.

Stay tuned for next month's article where we'll take a look at how this shift in weather and runoff patterns may have impacted nutrient losses from the fields.

— Laura Klaiber
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26TH ANNUAL NORTH COUNTRY CROP CONGRESS AGENDA

The 26th Annual North Country Crop Congress will be February 4th and the 11th, 2022 and begin promptly at 10 a.m. and end at 12:15 p.m. Agricultural experts will discuss the latest crop production technologies and agronomic research that will affect many farms in the region. This event will be hosted online as a live event via ZOOM.



Cooperative Extension
North Country Regional Ag Team

Day One: February 4, 2022

- 10:00- 10:45 Gary Bergstrom, Cornell University,
Tar Spot: The New Corn Disease to Watch
- 10:45 - 11:15 Elson Shields, Cornell University,
Corn Insect Management Updates
- 11:15- 11:30 Scheduled Break
- 11:30- 12:15 Mike Hunter, Cornell Cooperative Extension,
NCRAT Preparing for Herbicide Shortages in 2022
- 12:15 Adjourn



Day Two: February 11, 2022

- Updates on getting the most from nitrogen fertilizer expenses for 2022, corn silage variety trial results, Miner's western bean cutworm research, new carbon and greenhouse gas management opportunities.
- Presented by Dr. Quirine Ketterings, Joe Lawrence, Allen Wilder and Dr. Kitty O'Neil.
- One short 10-minute break is scheduled between presentations.
- CCA Credits available each day.

Registration:

· Pre-Registration Form - 26th Annual North Country Crop Congress-North Country Regional Ag Team- Cornell University - Cornell Cooperative Extension

· Please contact Tatum Langworthy with any registration questions.

Tatum Langworthy

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NOTABLE QUOTES — WEDDED BLISS EDITION

- A man may be a fool and not know it, but not if he's married. - H.L. Mencken
- Women are wiser than men because they know less and understand more. - James Thurber
- Men marry women with the hope that they will never change. Women marry men with the hope they will change. Invariably they are both disappointed. - Albert Einstein

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Closing Comment

Unfortunately, there's no lifeguard in the gene pool.

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