

FARM REPORT



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FROM THE PRESIDENT'S DESK: WRAP UP OF 2020

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. Well, this year has been by far the most unique. The Covid-19 pandemic has affected nearly everything we've done in 2020, and it looks as if its impact will be felt well into 2021. Still, I am amazed at what our staff was able to accomplish this year.

Overall, student numbers were down, primarily reflecting losses in summer and fall sessions affected by Covid-19, and research income was down somewhat from 2019. As travel ceased in mid-March, staff wrote more educational articles and engaged in on-line delivery of information rather than face-to-face conferences. Our essential farm operations - including the dairy, crops, and equine program - have not missed a beat despite substantial milk market challenges.

In 2020 we had 48 students enrolled in our educational programs, including undergraduate, graduate students, and interns. Although the year started out normally enough, all teaching went remote in mid-March, with no summer internship program, and a fall semester that included both in-person and face-to-face instruction with Plattsburgh State University students.

This year we brought in over \$620,000

in research support through grants and contracts. That was down a bit from previous years, but it reflected the stoppage of nearly all research earlier in the year. We continue to be well-funded in the critical areas of forage and fiber nutrition, milk analysis as a herd management tool, nutrient management and water quality, and the relationships between herd management and nutrition.

Presentations changed tremendously in 2020. Since March there have been no on-site meetings at the Institute, and our staff has switched to mostly on-line meetings and presentations. A total of 42 presentations (22 virtual) were given by Institute staff in dairy, crops, and nutrient management. More than 3,000 people listened to virtual presentations by Miner Institute staff (not even tracked in previous years). Additionally, 82 articles were written for the dairy industry with 9 peer-reviewed articles and 8 research abstracts published in high impact journals (up from 46 in 2019).

This spring we welcomed a new researcher - Allen Wilder - to our group. Allen did his graduate work in Plant Sciences at the University of Vermont with a focus on management of alfalfa-grass mixtures. He has hit the ground running with projects in

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ALL IN GOOD TASTE

We engage all of our senses when presented with a meal. We eat with our eyes first, then are greeted with aroma, and finally, savor the first bite. As the holidays approach, even if they're a bit different this year, no doubt we're all focused on what comestible delights await us at the dinner table. We all have our favorites, and can be particular about what we like and how we like them. Some people like sage in their stuffing, some don't. Some like the white meat of the turkey, some prefer the more tender dark meat. One of my uncles used to eat the turkey heart immediately after it came out of the oven so I couldn't beat him to it. Preference has also been a multi-year point of contention between my mother and me; for reasons that are unclear, I much prefer a 79-cent can of Ocean Spray cranberry sauce that falls out in the shape of the can to her homemade cranberry-orange relish. I also don't exhibit any sorting behavior; as much variety as can fit on the fork is my M.O., and I don't care if my food touches.

Just as we have our flavor preferences, so do our animals. In fact, they can be a bit more particular than we realize. Dairy cattle experience the same basic tastes as humans: salty, sweet, bitter, sour, and umami. Flavor additives are being evaluated in a variety of uses, such as encouraging animals to visit a robotic milking system and to improve feed intake. Regardless of application, a focus will be on palatability to encourage cows to want to consume the product or the feed to which it is added. Non-nutritional flavor additives such as extracts can improve intake without

adding unnecessary energy as with addition of more sugar products.

Several *Journal of Dairy Science* studies have investigated cows' and calves' preference for different flavors in several applications. In normal feeding settings cows are presented with a bounty of flavors and aromas. Whether they be on pasture or fed a TMR, cows can be choosy, as observed if sorting behavior is present. In one experiment, a "cafeteria style" feeding system was used to determine cows' preference for flavors. Cows were offered each of seven flavored pellets: anise, fenugreek, honey, orange, thyme, molasses, and vanilla. The cows consumed vanilla and fenugreek (which has a taste and aroma similar to maple syrup) the most, and orange and anise the least. Interestingly, cows preferred the vanilla and fenugreek flavors to molasses. These flavors could be added to feed to encourage sick cows to eat more, or to improve palatability of poorer quality silages or commodities.

An Italian study published in the *Italian Journal of Animal Science* found that a concentrate with appetizing flavors (such as fenugreek) encouraged cows to make more frequent visits to a robotic milking system, increasing the number of "lazy cows" visiting the milking system. Cows allotted a portion of their daily concentrate in the milking system consumed more if the flavor concentrate was added. Considering the time that cows have to consume their allotment while in the automated milking system is relatively short, it was found that the cows consumed the feed more quickly with the flavor

additive.

Another *Journal of Dairy Science* study sought to determine if flavor association by calves would increase starter consumption. Butter, milk arôme, and maple flavors were first added to milk replacer, then to starter offered ad libitum beginning at 6 days of age. Calves consumed more of the maple-flavored starter, and these calves had greater average daily gain compared to those fed the butter or milk arôme-flavored starters.

More work is being done to investigate animal preferences for flavors and aromas, as well as the potential physiological effects of liquid feed or flavor additives. Inclusion levels are still being determined, but the use of enticing flavor additives could be beneficial in reducing feed waste and ensuring that nutrient requirements for each cow or calf aren't compromised. The cost incurred for using these flavor additives may be worthwhile as a means to improve or maintain feed intake, or to get the most use of an automated milking system.

As cows sample their way to potentially new and enjoyable tastes, perhaps you'll also discover a new favorite flavor on your menu. While the holidays this year will be anything but normal for most, hopefully we can all continue to find joy in the season. May the magic of the holidays find you and your family in good health, however you spend them. Extending my fondest wishes to you and yours for a blessed, safe and healthy Christmas and a (optimistically) Happy New Year!

— Cari Reynolds
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CLEAR ALFALFA VS. ALFALFA-GRASS: A FRESH LOOK AT AN OLD TOPIC

Most alfalfa in the Northeastern U.S. and adjoining areas of Canada is seeded with a cool-season forage grass. At one time the grass of choice was timothy or orchardgrass, then tall fescue, and now it's meadow fescue. However, most alfalfa in the rest of the U.S. is clear-seeded. There are good reasons for this difference, particularly in the humid Northeast vs. the arid Southwest. But the combination of ever-increasing milk production per cow and high-forage rations puts new demands on forage quality. The availability of reduced-lignin alfalfa varieties is another factor influencing the "grass or no grass" decision. Following are three points to consider in making this decision:

Soil fertility status...particularly potassium. I prefer alfalfa-grass in most situations, but soil test K status may influence this. Alfalfa vs. alfalfa-grass seeding decisions should be based on current soil tests. Note the italics since high forage yields (including corn silage) can quickly deplete soil potassium levels. CAFO regulations mandate soil tests every three years or less, but when making alfalfa seeding decisions a 3-year old soil analysis isn't reliable enough. I don't recommend seeding alfalfa-grass unless the soil test K level is at least medium-high. That's because as the grass becomes established its fibrous root system will suck up the K from applied fertilizer (and from manure as well), and as K becomes limiting the grass will thrive even as your alfalfa starves. Based on our experience at Miner Institute, a high rate of starter fertilizer will not fully compensate for a soil potassium

deficiency. Soil test and fertilizer recommendations are unlikely to include these cautions, so it's up to you and your crops consultant to be vigilant. Midwest research has found that soybeans (another legume) respond better to *existing* soil fertility than to fertilizer applied at planting, and I think this also may be true with alfalfa. So if you need to seed alfalfa and soil test K is medium or lower, *seed straight alfalfa and fertilize with plenty of potassium*. To prevent this situation, increase P and K by using liberal rates of manure on low fertility fields during the years they're in corn production.

High forage rations need top quality forages. High milk per cow with rations that are over 50% forage requires top quality forages. To some farmers that means straight alfalfa, but an appropriate seeding rate combined with the right grass species can also get the job done. Cornell University research has found that meadow fescue has higher digestibility than any other forage grass, but it takes a combination of the right ratio of alfalfa and grass seed and some luck with the weather after seeding to get the desired stand of about 2/3 alfalfa and 1/3 grass the first year after seeding. Harvest timing should be based on the stage of maturity of the alfalfa, not the grass. My goal is to never see an alfalfa blossom from seeding to plowdown, though there's difference of opinion on this. Some university agronomists recommend letting at least one cutting each year reach 10% bloom, but that isn't my cup of tea — especially not 10% bloom

second-cut alfalfa which I never have liked.

Reduced-lignin alfalfa. Reduced-lignin (R-L) alfalfas, primarily the widely-available HarvXtra varieties, are glyphosate-resistant but no forage grasses are resistant so seeding R-L alfalfa + grass means that you can't use glyphosate even though you paid a tech fee for this trait. You can seed R-L alfalfa and not apply glyphosate, but it's also possible to seed clear R-L alfalfa, apply glyphosate to the seedling alfalfa and then post-seed grass a couple days later. However, this means an additional trip in the field with the drill or seeder, and in spite of a few farmers reporting good results it's probably too soon to recommend this as a general practice. And be sure you read the herbicide label to ensure that what you may be considering is legal. If you establish R-L alfalfa + grass you'll need to harvest it when the alfalfa is in the bud stage, because delaying harvest until early bloom will result in fully-headed, low-quality grass. The potential advantages of clear-seeded R-L alfalfa are increased yield by delaying harvest a week, and possibly higher annual yield and improved plant health due to better root carbohydrate status. These aren't possible with bud stage harvest of R-L alfalfa + grass. For these reasons I expect that R-L alfalfa will be much more popular in areas where clear-seeded alfalfa is the standard practice.

— Ev Thomas
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SOUTHERN EXPOSURE

The bride and I are now in winter quarters in Virginia, having left an area — Northern NY — where Covid-19 had mostly been at very low levels. In fact, from March through October our township had only had two confirmed cases of the coronavirus. Such is not the case in Virginia, where coronavirus is much more of an issue in our daily lives than it was in the sparsely-populated North Country. We also went from an area that until we got some timely October rain was very dry, to one that's been inundated all summer and fall — over 50" of precipitation through October, about

40% more than the long-term average, and the James River flooded in November.

This will be an unusual winter for me since it's normally when I kiss The Bride goodbye and head out on several speaking junkets, including farmer meetings and agribusiness conferences. But these meetings were cancelled (as were the several talks I'd had scheduled in March 2020) or they've "gone virtual", On-line meetings are better than nothing, but I sure do miss the face-to-face interactions with farmers and ag

business folks. And don't try to tell me that a Zoom meeting is as effective — it's like the difference between Haagen Dazs ice cream and a "non-dairy frozen dessert".

With face-to-face contacts so problematic, feel free to call or email me with crop-related questions. I always enjoy hearing from farmers and agribusiness professionals, and your questions help me realize "what's shot and what's not" out in the real world. Phone 518-570-7408, email ethomas@oakpointny.com .

— E.T.

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silage and crop management.

Despite the continuing uncertainty associated with the Covid pandemic, we have a lot planned for 2021. We close the books on 2020 with

tremendous satisfaction and look forward to another year of carrying on William Miner's vision of "*science in the service of agriculture.*"

As we head into 2021, I want to wish

all the readers of the *Farm Report* a Merry Christmas and a happy, healthy New Year!

— Rick Grant
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SAVE THE DATE! THE VERMONT DAIRY PRODUCERS CONFERENCE IS TUESDAY, FEB. 23, 2021

* Registration opens in January.

Speakers for the 2021 program include:

- Dr. Adam Lock, Michigan State University discussing feed manipulation to improve fat and protein production from dairy cows and the impact of milk fat composition on human health.
- Dr. Victor E. Cabrera, University of Wisconsin-Madison will deliver a talk about dairy farm efficiency with an emphasis on reproduction.
- Cheryl Jones, University of Kentucky, former Toyota, will focus on lean systems, bringing efficiencies to business.
- Dr. Frank Mitroehner, University of California Davis will cover topics including cows and climate change.
- Dr Shannon Ferrell, Oklahoma State, will cover farm business transition and Coach Tom Wall share his thoughts on employee management and on-farm leadership.

CANCELLED!
Please join us for our event in 2022!

EXPOSING THE COVERUP

Cover crop acreage is on the rise across the country. The 2019-2020 SARE National Cover Crop Survey reported that 93% of the farmers surveyed across the country said that they had tried cover cropping on their farm. The survey asked about cover crop acreage over the past 5 growing seasons; the results show a consistent increase in cover crop acreage each year, amounting to about a 40% increase over this time period. So why are farmers across the country planting more cover crops? Some point to government programs that promote or subsidize cover cropping on the basis that cover cropping benefits everyone. There's also been some private sector support for the practice by companies such as Ben and Jerry's. While there are good arguments that the community should support cover cropping, there seems to be a compelling case that strategic cover crops are providing an agronomic return to farms that use them.

While the survey doesn't tell us exactly why farmers are cover cropping, some of the question areas do support this premise. For example, the majority of respondents indicated that cover cropping allowed for earlier planting in the wet spring of 2019. There is also a growing body of literature on cover cropping that documents improvements in soil health, weed management, water management, and other key agronomic areas as well as



helping to mitigate soil and nutrient losses.

As wonderful as cover crops look on paper, they can be a pretty big challenge to implement on the farm – especially in northern regions. We've certainly found this to be the case here at Miner Institute. The difficulty is that cover crops are ideally planted in September or early October to provide good fall cover, but corn harvest doesn't happen overnight and there is also haylage to be harvested, manure to be spread, and fall tillage to be done in this time period as well. It's difficult to make cover crops a priority when there are so many other areas that need attention around the farm. Fortunately, we've had an unusually mild fall (aside from an early frost

that got some of the corn) which has allowed even late-planted winter rye to put on some growth this year. The photo shows winter rye that we broadcast onto a 63-acre field in early October. We incorporated the seed by lightly disking it and rolling it with an Underfurth basket harrow. The photo was taken on November 6th (about a month after planting) and even more growth has occurred throughout the month of November. We're hopeful that having this crop during the late fall and early spring will help to improve the soil structure and workability of the heavy soils in this field, and we plan to continue to experiment with various cover crops and incorporation methods.

— Allen Wilder
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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

As the milking herd keeps growing we are starting to fill the new barn. On each side of the barn, it can be broken down into 3, 24-stall sections. These stalls are bedded with sand once a week and groomed. Currently, we have fresh cows, high producing mature cows, and far dry animals in the new barn. The average for our high producing cows in the new barn is about 120 pounds. We are milking 10 groups of cows and each group differs in production, DIM, age, and reproduction status. We are milking a total of 435 cows and continue to grow.

In the month of December we are expecting 45 cows to calve. Currently our close up pack is divided in half due to a research transition study. With that being said, the cows on the research side were trained to bins a week prior to dry off and monitored from far dry to about 65 days in milk. After a research cow calves, they are held in a maternity pen for about a day and then trained to their new bin. Some cows can be difficult to train which is why we hold them in these pens so we can see if they go right to eating post calving.

When we have a cow calve, both the dam and calf are removed from the pack and put into appropriate pens. The calf is brought into a bedded pen, naval is dipped with iodine to prevent infections, he or she is given Tri-Shield and then fed a high percentage colostrum within the hour. Tri-Shield helps protect the calf from E-coli, coronavirus, and rotavirus which are all leading causes of scours. We measure the colostrum with a refractometer and ensure the first feeding to be 22% or higher. We bring the cow onto a chute to record her weight, check for a twin and give Bovikal if need be. Like stated above, the research cows are brought to a maternity pen and the cows on the dairy side are brought to the appropriate pen and monitored from there.

As we head into the depths of winter, we are preparing and planning for the extra care and attention our animals, particularly our calves will need. If we are lucky, it might be a mild winter, which will keep calves and staff healthier and happier. We are fortunate to have a great team that will be able to manage regardless of winter's severity. We are eager to leave 2020 behind us and are hopeful that 2021 will be a better year.

—Trina Bigelow
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NOTABLE QUOTES

- Find a job you enjoy doing, and you will never have to work a day in your life.
— Mark Twain
- A woman's mind is cleaner than a man's: She changes it more often.
— Oliver Herford
- Education is learning what you didn't even know you didn't know.
— Daniel J. Boorstin
- Have you ever noticed that anybody driving slower than you is an idiot, and anyone going faster than you is a maniac?
— George Carlin

Learn more about Miner Institute's
equine program, visit www.whminer.org/equine/



EDGE-OF-FIELD MONITORING RESEARCH UPDATE

We recently completed the fifth year of a USDA-NRCS-funded edge-of-field monitoring project at Miner Institute. For this type of project we identify two fields with similar characteristics and cropping histories and then establish a baseline relationship (typically over a two-year period) between them with regard to their runoff and nutrient loss characteristics. To do this, we continuously monitor the amount of surface runoff and tile drainage from each field throughout the year and routinely collect samples for phosphorus (P), nitrogen (N), and sediment analysis. In year 3, we implement a best management practice (BMP) in one of the fields (field T5), while keeping all other management the same in the control field (field T9), to see whether it affects runoff and nutrient losses.

The BMP we're currently testing is drainage water management (DWM) during corn silage production. To enable DWM, a control structure is installed on a field's tile main. Inside the control structure, plates known as stoplogs are installed which prevent tile flow from occurring until the soil saturates to a specific level in the soil, rather than always draining to the depth of the tile lines (~4 ft).

During the nongrowing season, when there is no agronomic advantage to the enhanced drainage tile systems provide, we force the water to rise within 1 ft of the soil surface before exiting the tile drainage system. Approximately two weeks before and two weeks after planting we allow the tiles to drain unrestricted to ensure field trafficability and provide optimal planting and germination conditions. Once we can be reasonably confident that the worst of the spring's wet weather has passed, the tile system is managed to simulate tile drainage at 2.5 ft below the soil surface.

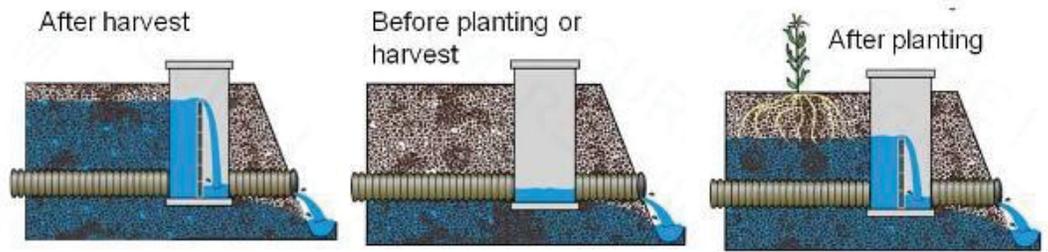
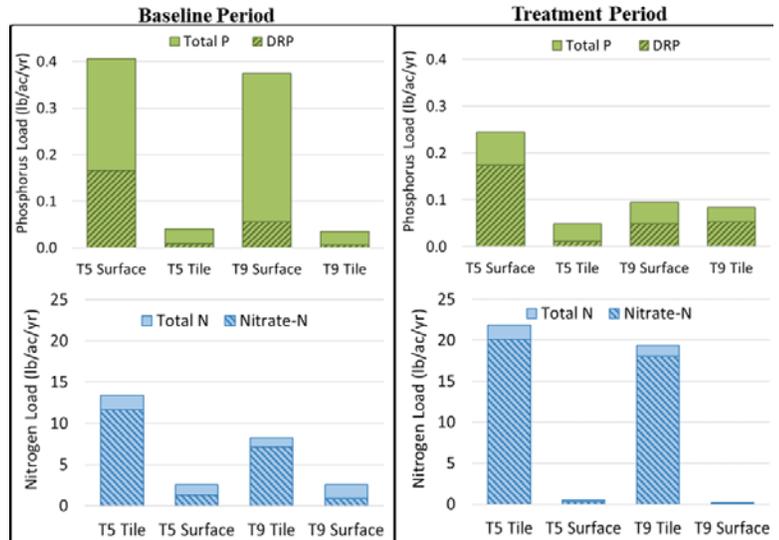


Illustration of the basic principles of drainage water management.

This can help reduce potential drought stress to the corn crop later in the growing season and reduce the rapid transport of water and nutrients to tile lines when the soil is dry and cracked.

While a full assessment of the impacts of DWM on nutrient losses will be completed after the sixth and final year of the project, we can take a look at the annual loads (total mass of P and N lost in runoff) from both fields during the baseline and treatment periods. Throughout the study, the majority of P was lost in surface runoff, whereas most of the N was lost through the tile drains. Nitrate is the form of N most commonly found in tile drainage due to its high solubility, and therefore represents the majority of N losses. Dissolved reactive P (DRP) is the bioavailable and soluble form of P, and is commonly a high proportion of P losses when they result from manure applications, but will be a lower proportion when P losses are driven by sediment-bound P losses (from erosion).

Over the entire 5-year monitoring period, total P (0.35 lb/ac/yr) and total N (25.1 lb/ac/yr) lost in runoff from field



T5 accounted for 0.4% and 8.7% of the applied P and N, respectively. These results were similar in field T9, with total P (0.27 lb/ac/yr) and total N (21.5 lb/ac/yr) representing 0.6% and 10.5% of the applied P and N, respectively. While we can't yet credit this small increase in efficiency in T5 to DWM, the data looks promising for reducing N losses, as T5 lost 32% more N than T9 during the baseline period, but only lost 13% more N during the treatment period. Although impacts on P losses are less clear, there don't appear to be any obvious negative impacts, and therefore the practice shows promise for significantly mitigating the increased N losses that occur when fields are tile-drained, while still reaping the benefits of higher crop yields and quality in the poorly-drained soils of the Lake Champlain Basin.

— Laura Klaiber
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Videographer Paul Frederick gets some footage of a calf for a project he is working on in our dairy barn.

Closing Comment

The problem with trouble-shooting is that sometimes trouble shoots back.

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