FARM REPORT

FROM THE PRESIDENT'S DESK: ELSIE IN WONDERLAND

As I write this article it's mid-April and what an upside-down world we are living in. To paraphrase Lewis Carroll, we're truly milking Elsie in Wonderland. The dairy industry — like much of the U.S. — has fallen through a rabbit hole into a world where everything is upside-down. Some farmers are milking their cows, then dumping the milk, then feeding that dumped milk back to their herd. Or, I have been getting questions from nutritionists about the best way to reduce milk production by 10 to 20% without causing disease (i.e., mastitis) or harming welfare (i.e., hunger or malnutrition). And some stores around the U.S. have actually limited the number of dairy products people can purchase even while farmers are dumping milk because there is no market for it. Strange and upside-down ... and I hope that, by the time you read this report in early May things will have returned at least little toward normal.

For dairy producers and consultants faced with these challenges, fortunately there's a wealth of great information easily available on the internet from sources such as Cornell University's ProDairy Program. As you're reading this article in May, the acute need for feeding and management recommendations may have passed but many of these resources remain useful under any circumstances.

One fundamental topic worth considering is optimizing feed-bunk and herd management whether times are good or bad. An excellent resource has been written by Tom Overton and Larry Chase from Cornell University that is available on the ProDairy web site. To me, the key take-aways are:

1. Track the herd's income over feed cost (or even better, purchased feed cost) because it is more highly related to overall farm profitability than any other measure. Herds with greater income over feed cost produce more milk fat and protein, and they produce it more efficiently.
2. Be sure to optimize home-grown forages and feeds. The payback here includes higher quality forage and higher forage diets, cheaper rations, and better on-farm nutrient balance.
3. Always seek to improve feed-bunk management. Volumes have been written about this topic, but simply remember that herds that ensure feed availability 24/7 produce 4 to 9 lb/d more milk than other herds. Not much else gives you that magnitude of a milk response!
4. Make certain that herd demographics are fine-tuned. Is the herd overcrowded – and can some cows be profitably culled? Does the herd have the correct heifer inventory for the size of the lactating herd? Is the herd's heifer culling strategy on target? As reproductive performance has increased

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REST: THE OVERLOOKED REQUIREMENT

The modern dairy cow produces a large quantity of milk, which equates to high energy requirements. This is achieved by eating a diet that is balanced to meet her energy demands. Ingredient selection and diet formulation is an important focus but is not the only requirement for high milk production. Rest, as measured by lying time, is essential for the cow to maintain high production and health. There are several factors that can affect lying time including competition for stalls, time outside the pen, stall size, and bedding type and quality.

Rest or lying time is essential for all animals, including humans, to function normally. Just like during corn silage harvest where you may get only a few hours of sleep, you start to make more mistakes and don't perform at your best. Dairy cows are the same: As lying time is restricted they begin to have lower milk production and poor hoof health, among other problems. To understand when lying time is affected you must know the average lying time for a dairy cow. In a conference proceeding from the Cornell Nutrition Conference, Rick Grant reported that dairy cows require approximately 12.5 hours of lying time per day. This can be higher depending on the cows' production levels, as higher producers will spend more time lying. This makes sense as those cows will devote more energy to milk production and will need more time to recover. Rick went on to report that every hour of rest lost equates to 2.2 lb. of milk loss.

Since lying time is so essential for health and production, we should create an environment to maximize comfort and time for rest. First, are the stalls big enough for your cows? Researchers at the University of British Columbia reported that Holstein dairy cows spent 1.2 hours more time lying in wider stalls (51.9 inches) compared to narrow stalls (44.1 inches). Once a barn is built, it's a costly and time-consuming process to re-configure stalls, but if you're planning to build a barn make sure to design it with cow comfort in mind.

Another important consideration is competition for stalls, as overstocking has become a common practice in the U.S. As competition increases, cows will spend more time standing in the alley instead of lying down or eating. The mature dominant cows will be able to get their required rest, but the younger submissive cows will be more greatly affected. Some companies offer services to measure lying time in your herd, and this is very valuable data to understand how comfortable your cows are. Of course, look at the average lying time of the pen, which is hopefully close to 12.5 hours, but also look at the range. This range can tell you how badly the less dominant animals are being affected by overstocking. The goal is to decrease this range and can be accomplished by giving more time to rest by providing a diet that can be eaten quickly and not sorted, make sure stalls are clean, and less time out of the pen for milking, to name a few.

Rest is a vital requirement for any animal to stay healthy and perform at their best. Lying time for dairy cattle is a good indicator of rest and should spend approximately 12.5 hours a day lying. We are always looking for a few more pounds of milk in the herd, and it just might be how comfortable your cows are. To ensure your cows have adequate opportunity to lie down, make sure stalls are clean, and they're not away from the pen for milking more than necessary.

— *Michael Miller*
mdmiller@whminer.com

A WARM BOTTLE FOR BABY: DOES HEAT TREATMENT TIME IMPACT COLOSTRUM QUALITY?

Colostrum management to prevent the spread of disease, provide optimal nutrition to stimulate growth, and maximize passive transfer of immunity to newborn calves is no doubt a focus for every producer. Numerous publications and guidance exist reiterating the significance of clean, high-quality colostrum for calf health, growth, and sufficient transfer of antibodies, as well as best practices on-farm to maintain colostrum quality. This 'liquid gold' is influenced by a number of factors including dam's age, calving season, and even the length of dry period. While some factors are outside our control, how we manage colostrum prior to feeding is not, especially with regard to cleanliness. But, could we be potentially eliminating more than just harmful bacteria?

Contamination of colostrum with bacteria not only elevates the calf's illness risk, but also interferes with passive transfer of immunoglobulin G (IgG), one of the most important factors in immune development and calf survival. In addition to sanitized equipment and proper protocols for colostrum collection, many farms employ heat treatment (lower temperature, longer time) to reduce bacterial count. Several studies have investigated the effects of temperature and duration of heat treatment on colostrum, and have found that heating above the recommended 60°C (140°F) for 60 minutes can have a detrimental effect on IgG concentrations.

However, there are still concerns that heat treatments might influence colostrum quality across varying quality levels. Research at the Pennsylvania State University aimed to evaluate the effect of heat treatment times (no treatment, 30 or 60 minutes) on three levels of colostrum quality (low, medium, and high) and its effect on passive transfer rates. The authors hypothesized that high quality colostrum would be more affected by heat treatment than lower quality colostrum.

First milking colostrum was pooled by quality according to colostrometer results and then divided into 3 batches. The initial IgG concentrations used to dictate low, medium and high colostrum quality levels were 52.3, 65.7, and 98.1 mg/mL, respectively. Three uniform batches of each quality level were then created. Of these, one was frozen untreated at -20°C (-4°F), while two were heated to 60°C (140°F) for either 30 or 60 minutes, cooled, and immediately frozen at -20°C (-4°F). Samples from each batch were taken prior to treatment to determine bacterial content and initial IgG concentration. Calves (54 heifers and 54 bulls) were randomized to receive 1 of 9 colostrum batches, stratified by heat treatment (0, 30 and 60 minutes) and quality (low, medium, high), within 2 hours of birth. Blood was collected from each calf prior to colostrum feeding and then 24 hours after birth for serum IgG measurement and determination of successful passive transfer.

Colostrum IgG levels in the unheated batches were greater than in those that were heated. When compared to the unheated batches, those heated for 30 and 60 minutes had IgG concentration reductions of 9 and 12%, respectively. However, calves fed colostrum heated for either 30 or 60 minutes showed a 3.4 and 27.2% increase in serum IgG concentration over those fed unheated colostrum. Absorption was also improved in those calves fed colostrum heated for 60 vs. 30 minutes. Ultimately, there was no significant change in IgG concentration with either 30 or 60 minutes of heating time, irrespective of initial colostrum quality.

Regardless of heat treatment's impact on IgG concentrations in colostrum, there is still considerable benefit to the calf in terms of available IgG antibodies and lower bacterial counts in batches subjected to heat treatment vs. those that are not. The colostrum used in this study had comparably low bacterial count, so absorption rates may have been attributable to initially higher antibody availability from less bacterial interference, and less to heat treatment. Other considerations may need to be made for colostrum with variable bacterial presence. Other studies have also highlighted the improvement of passive transfer through heat treatment of colostrum. Difference in duration of heat treatment seemed to have no effect on IgG concentration, but likely still improved absorption and passive transfer rates by lowering the bacterial content of these batches. While this study was unable to positively determine the effect of heating time on colostrum quality, inferences for good colostrum management are still supported by the results. Colostrum quality should still continue to be measured when possible to ensure that IgG levels and bacterial count are within industry-recommended standards, and cleanliness should always be at the forefront from teat to tummy. So keep warming up that bottle for baby!

— Cari Reynolds
reynolds@whminer.com

CORN PLANTING TIPS

May is corn planting time for much of the northern half of the U.S. Plant extra-early for top yields? Not so fast! Regional date-of-planting research shows that the earliest planting dates (first week of May or earlier) do not result in the highest yields. The main reason to start planting early is to be finished by the end of May. For some that means starting in early May, but for many farmers mid-May is time enough, especially for fields that are fairly well-drained. At Miner Institute our goal was to be finished with corn planting by May 25th. The crops crew would almost immediately go from corn planting to first cut grass harvest, and usually our corn planter hadn't been cleaned up and put away for the season before we were out there with the mower-conditioner.

When should you make the switch to earlier-maturity corn hybrids? Probably not until the last week of May, depending on how aggressive you are in maturity selection. Some farmers are overly optimistic in maturity selection, planting hybrids that simply are too late for their area and planting dates. If you decide that you need to switch, for a one-week planting delay use hybrids that are about 5 days RM earlier, 10 days RM earlier for a 2-week delay. Plan ahead and keep your seed dealer informed if you think you'll need to switch corn hybrids. There could be some shortages of early-maturity hybrids this spring, but this will vary among seed companies.

Another thing to consider is how late this fall you want to be out in your corn fields. Some fields can handle a fair amount of rain, other fields not so much. Corn harvested for grain can sit out there for a while with relatively little negative impact, while corn chopped for silage has a fairly narrow harvest window for 33-35% whole plant DM. (Reminder: 30% DM corn silage is not ideal; by waiting a few days to a week you'll gain yield, almost all of it grain, with little change in NDF digestibility.) Long-term weather data shows that we get more rain now than we were a generation or two ago, with much of it coming late in the season. Another consideration is what you plan on doing with the field after harvest: Apply manure? Plant a winter cereal? You should be thinking about these decisions now, not in September.

— *Ev Thomas*
ethomas@oakpointny.com

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on many farms, heifer inventories have grown beyond what is optimal.

Overall, the coronavirus epidemic has upset nearly every aspect of our life and our society – including the dairy industry. It is anyone's guess when things will return to normal. But now, more than ever, is the time to take advantage of the resources that are available to manage a dairy through these challenging times. And remember that many of these same recommendations will continue to benefit you as times improve.

Stay safe and healthy.

— *Rick Grant*
grant@whminer.com

EASILY MEASURE COLOSTRUM QUALITY AND PASSIVE TRANSFER ON-FARM

Successful passive transfer of immunity in a newborn calf is vital for health and survival. Colostrum management is a critical step in achieving passive transfer of antibodies to the calf through immunoglobulin G (IgG) in the colostrum. Measuring the amount of IgG in both colostrum and the serum of calves after ingestion can help manage the colostrum program and evaluate its success. While the "gold standard" is the measurement of the amount of IgG in either colostrum or serum, there are quicker and more cost-effective methods that can be performed on-farm. One tool that can help farms effectively measure both colostrum quality and the success of passive transfer in calves is the Brix Refractometer. The Brix Refractometer was originally developed to measure sugar levels; however, there are good prediction models that correlate Brix readings with IgG in both colostrum and serum.

Supplies needed to use Brix Refractometer.

Example of applying a couple of drops of water to the reading window.

An optical Brix Refractometer can be purchased for around $100, while a digital Brix Refractometer will cost more. The other supplies that will be needed are distilled water, non-sterile plastic pipettes, Kim wipes (or equivalent), and, if able, supplies to collect serum. Once the Brix Refractometer is purchased, the cost of the additional supplies is very minimal per sample and the test can be conducted fairly quickly.

Here are the simple steps to test either colostrum or serum of calves using a portable Brix Refractometer.

- Calibrate the Brix Refractometer.

a. Add 1 to 2 drops of distilled water to the reading surface.
b. Close the lid slowly and press gently to spread the water into a thin, even layer.
c. Point the Brix Refractometer toward a light source and look through lens.
d. The line between dark and light section should be at "0". If it is not, adjust the screw as directed by manual until the line is at "0".
e. Wipe off reading window with a Kimwipe.
*Calibration does not have to be done every time the Brix Refractometer is used, but it should be checked regularly.

- Measure % Brix of a colostrum or serum sample.

a. Add 1 to 2 drops of sample to the reading surface. The sample should be at room temperature but with the small volume used for the measurement it should only take a minute or two.
b. Close the lid slowly and press gently to spread the sample into a thin, even layer.
c. Point the Brix Refractometer toward a light source and look through lens.
d. The line between dark and light should be above "0" with these samples. Record the value observed.
e. Wipe off reading window with a Kimwipe and clean with distilled water.
*Note: a digital Brix Refractometer will display a numeric value of % Brix.

What are the values we are looking for in both colostrum and serum? While the % Brix reading does not directly relate to the amount of IgG in either colostrum or serum, there are models and equations that can be used to estimate amount of IgG in the sample. Generally, first milking colostrum should be at least 22% Brix to be fed as a first feeding but higher values will only provide more IgG to the calf. When evaluating serum, a target of at least 8.1% Brix indicates successful passive transfer. Overall, using the Brix Refractometer is a very useful and quick way to help manage the colostrum program on your farm. When raising calves this is one tool that should be a staple in your toolbox!

— Sarah Morrison
morrison@whminer.com

STRAIGHT FROM THE MILK SOURCE

The last few weeks have been a whirlwind of uncertainty for everyone, especially for those working in the world of farming. I reached out to some NY dairy farmers with different business models to ask them how they are reacting to the current state of the industry. Hopefully, their responses will offer ideas on how to navigate the dairy world. The dairy farmers hail from:

TaylWind: Taylwind Farm of Oneida County. Milking 270 cows. Workforce are owners Glen and Sheryl Taylor with 3 full time and 2 part time employees.

Miner Institute: Milking 422 cows. Workforce of 16 employees for the dairy and crops.

Welcome Stock: Welcome Stock Farm of Saratoga County. Milking 1000 cows. 18 employees, and 2 partner owners.

What is your business philosophy towards running your dairy business?
TaylWind: "Historically we've operated with a theory of high input and high output, and that has been a model that worked for us. We will be more committed to lowering input costs going forward … our 4 robotic milkers were a response to try to make the farm less labor intensive."
Miner Institute: "Run a commercial dairy. We are research group and a dairy, and our job is to focus on being a profitable dairy."
Welcome Stock: "We want to be good stewards of the land, have good animal husbandry, and be good employers. We want to be good community citizens. We want to do this all in a profitable way to keep the longevity of our business…giving the opportunity to the seventh generation to continue this dairy business if they choose."

On a scale of 1-10, how severely have the NYS PAUSE restrictions affected your normal operation or revenue? (1 being unaffected, 10 being severely affected)
TaylWind: "I picked a 5. We are still doing the same, all of our employees are still employed…going through every single step as normal. But on the downside of that, we have had to dump some milk. Our co-op has had to dump some milk. Our current revenue has not been affected yet…but future milk price is going to be hurting our income significantly. The beef market has really taken an impact, and that is more direct on us than the milk at this point."
Miner Institute: "Maybe a 3. All of our employees are still coming to work and no one had been sick. So far it hasn't affected our revenue, except for the beef prices are down a little bit and some of these beef plants have closed. Milk prices haven't fallen yet… we are waiting on word from our cooperative to tell us if we have to decrease production. We ask employees not to travel away from home except for groceries and essential needs."
Welcome Stock: "In the last 30 days we have not severely changed our day to day operations, so that would be a 2. Income revenue right now is a 3. But in the next few months that will go to a 10. We are going to see a severe 30-40% drop in milk price which is projected here over the next 2 months."

Have any management changes been implemented on the dairy to account for the recent PAUSE act?
TaylWind: "We have been talking about management changes in the future… there is a lot of uncertainty right now. We expect that we may have to reduce milk production, or milk sales, and we've been exploring how to do that. Less person-to-person interactions and more communication via phone and email."
Miner Institute: "We have limited the people interacting with us like the nutritionist, although the veterinarian is still doing his herd check once a week. Because of the barn addition, we were gearing up to expand milk production…Some people are talking about going 2x day milking over 3x day, we are probably not going to do that. Leaning towards more forage less grain in the diets, and will do some heavier culling."
Welcome Stock: "Well, number one is the employee safety and education on the pandemic, and safety requirements for separation between workers. Continual cleanliness and washing. If anyone were to feel ill, they immediately report to myself. From a cost standpoint, we try to cheapen our ration… we have tried to take out any additional items that we don't think are cost effective at the current milk price."

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BOLD PREDICTION

On the evening of November 9, 1965 a power failure in Ontario resulted in a widespread blackout affecting several Northeastern States and parts of Canada. The blackout only lasted about 13 hours but affected over 30 million people. The most notable (and lasting) impact of the blackout would not be felt until the following summer, when hospital maternity wards were filled to overflowing. No lights? No TV? No problem!

I remember the date well since I was a grad student at Cornell University, and that evening Katy (an Ithaca College coed, not yet The Bride) and I sat in my car — the front seat of course — on a hill overlooking Ithaca and looked out at an utterly dark city. The few lights were most likely from Coleman lanterns. As we watched the lights went on in the hospital, which obviously had a generator.

April 2020 was a month with no sports on TV except for the ever-popular axe-throwing competition. Meanwhile, couples throughout the nation were (mostly) obeying stay-at-home orders, severely limiting contact with people outside their home. Entertainment options were extremely limited but there were a few that didn't require the use of a TV remote. Bold prediction: In the weeks around the Christmas holidays this year there will be an unusually large number of "presents" delivered by someone other than Santa Claus.

— *E.T.*

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Has your business used any risk mitigation strategies to control costs or protect revenue in an uncertain market?

TaylWind: "We actually did utilize the Dairy Revenue Protection program. Which now looking back, I am glad we did it, but wish we had done it all. We also have contracted some grain earlier in the year."

Miner Institute: "We contract and pre-buy our commodities, also seed and fertilizer in the fall, but that had nothing to do with the current pandemic. We don't do any milk futures."

Welcome Stock: "I contracted…my fuel and my protein mix in advance of the COVID-19 epidemic. So I know I am paying over market prices on those 2 things. From a milk standpoint, I previously signed up for Dairy Revenue Protection and the Dairy Margin Coverage program prior to the COVID-19 pandemic."

What type of programs would you like to see the government, milk cooperatives, or dairy processors consider to help dairy business in your current situation?

TaylWind: "It is probably time for some milk supply balancing program. During this crisis in the next 6 months, there needs to be some sort of check on production to get things back, so we have a chance of paying bills… and quit the dumping of the milk. And I know there is that debate about free market vs a quota, but when we are talking about a food product… consumers have gotten used to cheap food, so there is a little government play already in our industry already, not just in the markets. So it seems like a beneficial thing if everybody could be assured a market of some sort, going forward. At a reasonable pricing for farmers too."

Miner Institute: "The rumor is our cooperative might ask us to cut back on production. Whatever that line is… if some of us dairy farmers have to give up production I think we should all give. In the long run this could help us all."

Welcome Stock: "Well, I like the National Milk Producers Federation proposal that they had come out with supported by…the International Dairy Foods Association. The problem in a 10% nationwide reduction of milk…with a March base through the next 6 months… is Southern states wouldn't really be affected because they naturally drop more than 10% in the summer months. The proposed direct payment base of $3/cwt split over 3 months in combination with the milk reduction is a pretty good program. AlsoUSDA is putting in place more funding for SNAP and other product removal programs."

When asking for some final comments, there seemed to be a theme between all 3 farmers: No one has all the answers, but hopefully as we navigate this conflict we can learn from it. Maybe it's time that we re-evaluate how milk is priced and how it is moved across the supply chain. We will always need farmers. It may take time to get through this situation, but we will learn and be better prepared for the future.

— *Kristen Gallagher*
gallagher@whminer.com

WHAT'S HAPPENING ON THE FARM

As I write this article the "Stay at Home" orders for non-essential workers due to the COVID-19 pandemic has just been extended to May 15th for New York State. With the uncertainty of how long these orders will extend, the Miner Institute management team has decided to cancel the "Summer Experience" Program for the summer of 2020. This is the first summer since 1982 that the Institute hasn't hosted third and/or fourth year college students looking to gain more experience in farm management, equine management or agricultural research. It's unfortunate, but our top priority is the safety and wellbeing of the students and our staff!

On a broader scale, on a daily basis the dairy industry is faced with the question of "What level of milk production can the current market sustain during these uncertain times?" With schools and restaurants across the country closed, the demand for fluid milk has declined significantly. The short-term fix to this problem is to have dairy producers dump tanker loads of milk, but this isn't sustainable over a long period of time. Now the questions are "What percentage does each dairy need to reduce their daily milk production?", and more importantly, "How does a dairy farm effectively reduce daily milk production without having a detrimental effect on herd production once the economy rebounds?"

Enough depressing news: Let's take a look at the positive things happening at Miner Institute. First, the crops crew has received shipment of their new (used, but new to the Institute) Kinze 3600 12-row corn planter, and the John Deere 7930 has been outfitted with a new GPS system. As the corn planter has been sitting outside all winter at the dealership, the crops crew has been busy replacing essential parts to make it look and run like new. The last thing we need is for untimely break downs once the window of opportunity arises to plant corn. If the weather holds that window of opportunity to plant corn may be as soon as the first week in May. With the new planter and GPS setup in the John Deere, the goal is to plant corn more efficiently which will in turn maximize corn silage yields this fall.

The other piece of good news received this month: After a brief two-week layoff due to the "Stay at Home" orders, the construction team working on the dairy barn addition has recently been deemed "Essential". This is AWESOME news as the construction team is still on pace to complete the barn addition on or close to the projected finish date of mid-June 2020. Both the cows and the research department are eagerly awaiting the completion of the addition, which is a four-row barn with 144 sand-bedded free stalls. There will be six pens of 24 stalls, which can be further broken down into pens of 12 stalls. This setup will provide our research department more quality space to conduct topnotch timely research to support the needs of the dairy industry going into the future, and it will also provide 144 more comfy sand beds for our lactating cows.

— Kevin Tobey, DVM
tobey@whminer.com

A NEW FORAGES ENTHUSIAST JOINS THE MINER TEAM

My name is Allen Wilder, and I was recently hired on as a forage agronomist at Miner Institute. It is an interesting time to be making first impressions, but I have been putting my best virtual foot forward and jumping right in. I was fortunate enough to attend Miner's Advanced Dairy Management Program several years ago, so I'm not a total stranger to the Institute.

I grew up a mere 16 miles from Miner, as the crow flies, in the Champlain Islands of Vermont. Life on a rural island is wonderful, but traveling can be frustrating at times since the fastest route to the mainland of New York is by boat. I grew up adjacent to an old farm which was owned by my grandparents. The land has since been sold and now furnishes a modern freestall barn, but it was here that I fell in love with the working farm landscape and seeds were planted that have grown to shape my education and career.

In college, I signed up for the Vermont FARMS 2 + 2 program. The name flows from the unique structure of the program which involves two years at a small applied college (Vermont Technical College), followed by two years at the University of Vermont (UVM)/Miner Institute. My path through the program was especially unique, since I was the first (and might be the only) student in the program to major in plant and soil science rather than animal science. As a result, I was introduced to UVM Extension forage agronomist Sid Bosworth, who taught at forages class at the time. Sid convinced me to continue my education in a graduate program at UVM, offering to be my advisor. In my thesis work, we examined various legume-grass mixtures under differing cutting management strategies. We measured fresh and ensiled forage quality over two years of production at our site in Burlington, VT. I hope to apply the findings of our research moving forward and eagerly await future opportunities to conduct agronomic studies at Miner Institute.

– Allen Wilder
wilder@whminer.com

IS THERE STILL TIME FOR A NEW SEEDING?

As I write this at the end of April, new seedings are well underway across the North Country. Most perennial forages can be seeded as soon as the soil is workable, and getting the job done early frees you up to focus on corn. But if things are running behind schedule, should you still try for a spring seeding? Cornell University recommends that spring seedings that include cool season grasses should be completed prior to May 15th due to increased weed pressure thereafter. During my thesis work at the University of Vermont, we had a spring legume-grass seeding that was completely overrun by annual weeds and had to be abandoned. Luckily, if you miss the boat in the spring, you get a second chance at establishment in the summer, and we were able to get our research back on track by replanting our study in early August as a late summer seeding.

As compared to spring seedings, late summer seedings are a little less common, but they are an excellent way to establish legume-grass mixtures since weed and disease pressures are less of an issue. However, moisture is often a limiting factor during this seeding window in late July or early-mid August. It is important that adequate soil moisture be available in the period following planting so make sure the weather pattern isn't setting up for an extended dry period. This is especially important for the grass component of your mixture. Ensuring proper seed-to-soil contact with a firm seedbed is also a must. I have found that legumes tend to do particularly well in late summer seedings, but only if they are given adequate time for establishment prior to a killing frost. Some species, such as birdsfoot trefoil, require six weeks or more of fall growth before a hard freeze. In contrast, many grass species are happy to be planted on the later side. As a result, the timing of your late summer seeding could influence the proportion of legume and grass species in your established field.

— Allen Wilder
wilder@whminer.com

The William H. Miner Agricultural Research Institute
1034 Miner Farm Road
P.O. Box 90
Chazy, NY 12921

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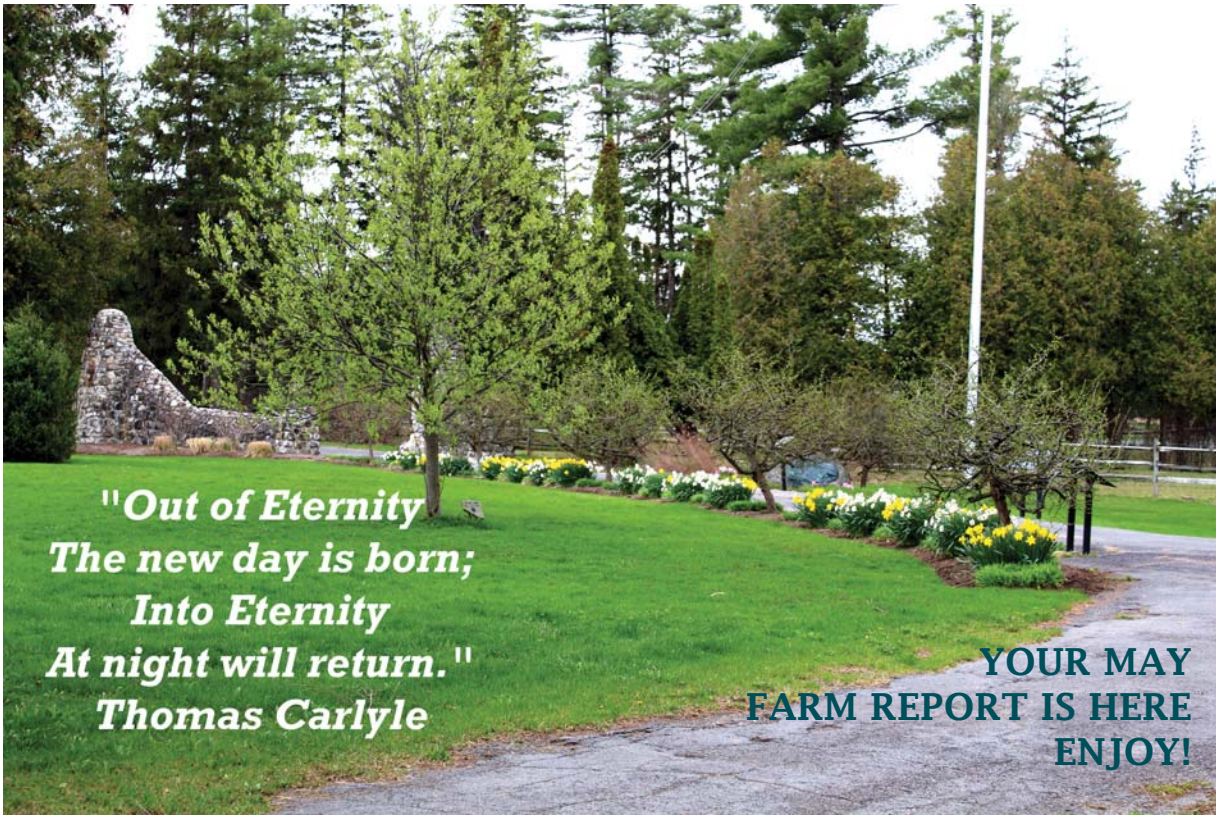
Best wishes and stay safe!



Closing Comment

Being an adult is just walking around wondering what you're forgetting.

www.whminer.org
518.846.7121 Office
518.846.8445 Fax