



FROM THE PRESIDENT’S DESK: CARRYING ON WILLIAM MINER’S VISION OF SCIENCE IN THE SERVICE OF AGRICULTURE

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During the early 1920s William Miner envisioned that his Heart’s Delight Farm would “become an agricultural and research college focused on subjects such as dairying, animal husbandry, plant pathology, soils, agricultural chemistry, ... (with) opportunities for experimental work in order that the school...may advance the science of agriculture.” Over 100 years later, Miner Institute resides at the Heart’s Delight Farm location and we work to carry on William Miner’s vision of science in the service of agriculture. Through our education and research programs, we strive to change agricultural practices for the better.

So as we welcome 2025, it’s the perfect time to reflect on the milestones our Miner team achieved in 2024. Here are just some of the highlights:

Education and Outreach: We hosted 45 educational and community engagement events at Miner, attracting ~2,000 attendees. These events provided valuable learning experiences for the general public and those involved in the dairy and equine industries. Our local programming brought in people of different ages ranging from school-age children to retirees. Many

visitors received a tour of our farms, grounds, and/or research facilities. A total of 73 college students and interns participated in our structured educational programs. Programs included our Advanced Dairy Management semester, Applied Environmental Science Program, year-long internships, and Summer Experiences in farming, equine management, agricultural research, water quality, and history. Also, our team delivered 41 presentations across the globe at various industry and professional meetings, sharing insights and advancement with the broader agricultural community. We wrote more than 90 *Farm Report* articles and an additional 24 popular press and peer-reviewed articles, disseminating valuable information to the agricultural community. It is extremely important to our team to train and mentor the next generation of farmers, agribusiness professionals, and scientists while supporting the current generation.

Research: Our diverse research program garnered \$1.3 million in grants and contracts, enabling us to continue our work in dairy cattle nutrition and management, forage agronomy, nutrient management,

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<https://www.instagram.com/minerinstitutione/>



facebook.com/MinerInstitute

LET'S MAKE THIS A BETTER YEAR

Happy new year! The new year is usually replete with an aspiration for a new beginning, and a renewed hope to continue life's journey. A proven approach at this time of the year is to set goals either for the short, medium, or long term, or to pursue existing goals. Although we're advised to set SMART (specific, measurable, attainable, realistic, and time-bound) goals, two components that will help us achieve our goals better are monitoring and evaluation (M&E). According to the Food and Agriculture Organization of the United Nations (FAO), "Monitoring and Evaluation (M&E) is a continuous management function to assess if progress is made in achieving expected results, to spot bottlenecks in implementation and to highlight whether there are any unintended effects (positive or negative) from an investment plan, program or project ("project/plan") and its activities."

If we picture our goals as a vehicle that takes us from the point of our dreams to the destination of actualizing them, then M&E are like our dashboard. They tell us how fast the vehicle is moving, how much gas we have, if we have sufficient pressure in our tires, when we need an oil change, etc. M&E can serve as "emergency" tools to troubleshoot any issue along the way, and with them, we can avoid sudden stops on the

road due to a flat tire, empty gas tank, over speeding, etc. M&E should be incorporated at the start of goal setting (typically at the commencement of the year) for proper planning, it should be done throughout the year to constantly appraise our efforts and preliminary results, and then at the end of the year to measure our set objectives against our achievements. When rightly done, these tools help us to efficiently manage resources and prevent/minimize damage.

Translating this to us as individuals, businesses, corporates, institutions, etc., M&E involves evaluating our available resources to determine if they are enough to meet our objectives. It also involves an assessment of our previous results or outcomes to see trends and note practices that we need to avoid or adopt in the new year. This is where record-keeping is very important because we can only make inference from available data/records. It is important to have a strategy for when/how we plan to carry out M&E throughout the year as this should not be left to chance but carefully laid out in advance to guarantee a smooth ride. The "when" can be monthly, quarterly, mid-year, etc., depending on organizational culture and available resources, while the "how" can be tailored to the most suitable tools for our peculiar setting.

Sometimes, an external individual/entity can be hired to carry out M&E to ensure objectivity and to help identify blind spots that may evade our scrutiny. Irrespective of the timing and methodologies we decide to use for M&E, the important thing is to ensure that it is done in a systematic manner. As we set our goals for the year, let's ensure we effectively communicate and constantly reiterate those goals to everyone concerned (especially for businesses/organizations). A quote by Venus Williams: "*Set realistic goals, keep re-evaluating, and be consistent.*"

As humans we tend to be so 'destination-conscious' that we miss out on enjoying the adventures along the way, but I hope that this year we can take it one day at a time, savoring the thrills of the journey and taking advantage of all the learning opportunities that our missteps afford us. I hope that we can find the courage to try again irrespective of seemingly past failures. I hope that we can reignite lost enthusiasm, dream bigger, and lend a helping hand to those we meet along the way. I hope that this is a better year for all of us.

"A year from now you may wish you had started today." - Karen Lamb

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HEART'S DELIGHT SPRING PREMIER OPEN HORSE SHOW
MAY 24-25, 2025
Clinton County Fairgrounds Plattsburgh, NY

SIXTY YEARS: LOOKING BACK — & AHEAD

I've been involved in Northern New York agriculture for almost 60 years. I arrived in the North Country as a County Extension Agent in July 1966, fresh out of six years of ag college (UConn and then Cornell) and so wet behind the ears I must have leaked. There were about 1000 farms shipping milk in Clinton, Franklin and Essex counties, so I guess about 2000 dairy farms in the six-county Northern NY region. There was a big shakeout about 50 years ago with the closure of the last of the "can decks"—dairy processors that accepted milk in cans. (Amish farmers continue to haul their milk in cans, but that's another story.) Some farmers built new milk houses and installed bulk tanks, while others — mostly small dairies and those with owners nearing retirement age -- called the cattle dealer or auctioneer. There are now about 450 dairy farms in Northern NY, down by half just in the past 10 years.

While the declining number of dairy farms may cause some to wring their hands in despair, look at today's dairy industry: On many farms the sons and daughters have taken over for the previous generation, and not only have they increased herd size — total dairy cow numbers in Northern NY

have changed little since the 2017 Census of Agriculture — but they've modernized in the field and in the barn. Laser installation of drainage tubing has converted wet fields to productive cropland that farmers can get on earlier to plant and later to harvest. Soybeans have gone from an almost nonexistent crop in the region to being a common cash crop, with yields comparable to those on many Corn Belt farms. Our longer growing season is partly due to global warming, but progressive farmers have lengthened their own growing seasons on both ends by better soil and crop management.

I retired from Miner Institute in 2008 but remain active via writing/editing the Farm Report, a regular column in Hoards Dairyman, and Oak Point Agronomics, my "one-horse" (one cow?) consulting business. When I was about to retire Rick Grant asked if I'd continue as Farm Report writer/editor and I agreed. I asked how long he'd like me to do so and he said: "Until you're 100." I was 66 at the time. This year makes 17 years, so I'm halfway there! People occasionally ask when I'm going to retire, and I reply "From what -- doing something I enjoy? Why on earth would I?"

I continue to get questions from farmers, Extension educators and agribusiness reps, but now their questions are often harder to answer. That's because today's farmers know the answers to the easy ones, so by the time a question makes it to me (perhaps in desperation) it's more likely to be a toughie. An increasing percentage of dairy farm managers have an ag college degree, so they not only have a good technical background but they know where to find most of the answers.

Nor is this all that new: Many years ago Charlie Sniffen and I were at a regional dairy meeting and it was "Q & A" time. Listening to the questions the farmers in the audience were asking the speakers, Charlie turned to me and whispered "Boy, I'm glad I'm not up there trying to answer those questions!"

There are far fewer dairy farmers in the region, but some tough years have left the remaining ones "lean and mean", well-equipped to handle both the current challenges and those in the years ahead. As a result I think the Northern NY dairy industry is in very good hands.

— Ev Thomas
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NOBODY ASKED ME, BUT... (Marital bliss edition)

... the quickest way for me to get my wife's attention is to sit down and look comfortable.

... 90% of being married is just shouting "What?" from another room.

... Adam and Eve were the first to ignore the Apple terms and conditions.

... "We need a bigger TV" are words often spoken by the husband, but seldom by the wife. I am blessed.

— E.T.

COULD A COMPUTER PROGRAM BE THE SILVER BULLET FOR SUSTAINABILITY?

When I engage in conversations about the sustainability of the dairy industry with people at the community arts studio I frequent, I walk a fine line between education, interest, and trust. That is to say, I share as much useful context as I can to battle misinformation without losing the trust or interest of the person I'm speaking to.

Some of these people have ideas they've read about online, heard from a friend, or seen on the news. "Have you guys tried feeding the cows seaweed?" "Can you capture the greenhouse gases emitted by cows in the barn?" "Could you breed cows to make less methane?". Often I'm impressed and heartened to see the interest these folks have in the industry, and their questions get at an important point. These specific ideas might not be ready for research, or might have already been discussed and found implausible, but their line of questioning gets at a bigger point. How do farmers and the wider dairy industry decide which sustainability measures to research and implement?

In a recent study published by the *Journal of Dairy Science*, researchers at the University of Wisconsin developed a computer program or "decision support model" to help farmers do just that. Called the DairyPrint model, this tool allows farmers to input specific data about their farm including herd dynamics, housing information, manure management specifics, crop data and more, to form a fully realized model of a farm. In development, researchers found that

the theoretical farm producing the least greenhouse gas (GHG) emissions used the lowest NDF-ADF levels in their diets, incorporated 3NOP additives, used sand bedding, and emptied their manure storage in the fall and spring. The highest theoretical GHG emitting farm used the highest NDF-ADF levels in their diets, used sawdust as bedding, and emptied their manure storage only in the fall. Beyond describing the possible highest and lowest GHG emitting farms, this model can suggest to the farmer using it what practice might make the biggest difference in their GHG emissions.

This research was done with a theoretical lens to see if this model could interpret the data it was fed to create an image of a farm. My interest is more often piqued by the discussion of how this tool could be used by farmers. In reading sustainability literature, attending talks and forums, and speaking directly with farmers, I know that decisions that are made usually have an aspect of practicality and must improve margins or efficiency in some way – they can't just "be sustainable." While the importance of consumer perception of dairy industry sustainability is of vital importance in the long term, it's difficult and unrealistic to make expensive and drastic changes based on how an outsider views a farm, a farmer, or an industry.

The potential beauty of the model is in its straightforward product. While the information fed into the model is complex, that data would already be largely coalesced by the farmer. The

model would be able to tell a farmer the specific change in practice that they could implement to make as much of a difference in emissions as possible. The issue with this simplicity is in the nuance lost through the model, and through the singular nature of that suggestion.

Let's take the imaginary farm with the lowest emissions as an example. There may well be a farm that uses these practices already, but there are considerable barriers between this ideal and the reality for many farmers. Sand bedding, for instance, might not work with the manure management system of a farm or might not be available to the farmer. The addition of 3NOP to diets may be too novel and its safety too uncertain for a farmer to be interested in using it. Farmers may be limited in labor or avenues to empty their manure storage in both the spring and the fall.

This research describes exciting advancements in decision making tools for farmers. The decision-making fatigue of farming, of business in general is not often addressed. This model could be a great step in farmer advising and simplifying that decision making process to home in on specific practices that would best serve the farm and farmer. The application of this model is still being developed, and hopefully the more nuanced factors that go into the decision-making process will be ironed out along the way.

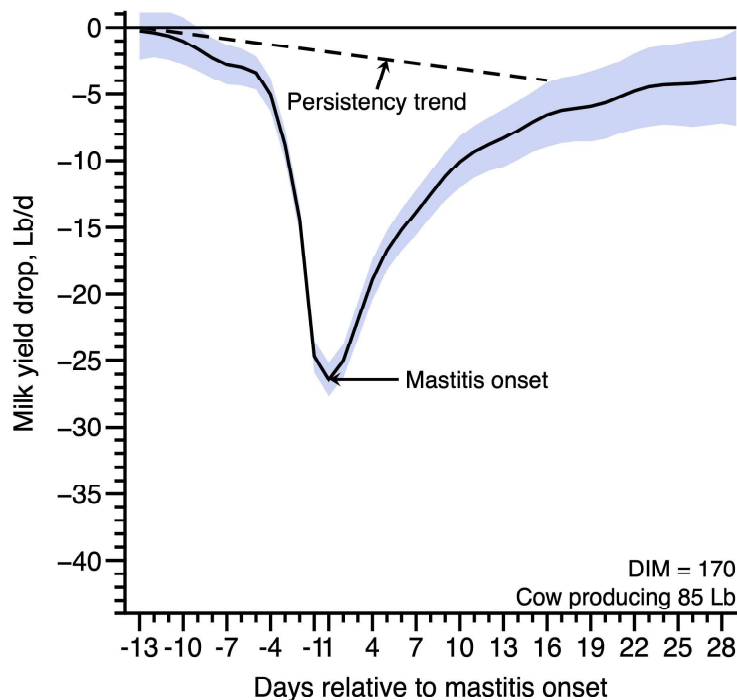
— Bridget Craig
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UNDERSTANDING MASTITIS IN DAIRY COWS & ITS IMPACT ON MILK PRODUCTION

Mastitis is one of the most prevalent and costly challenges in dairy farming, directly affecting milk production and herd health. This inflammatory disease of the udder can lead to significant milk yield reductions, economic losses, and health repercussions for cows. Recent research sheds light on the timing, severity, and long-term effects of mastitis, offering valuable insights for dairy producers.

Mastitis occurs when the udder becomes inflamed due to bacterial infection. It ranges from mild, with slight changes in milk consistency, to severe, causing fever, swelling, and discomfort for the cow. Regardless of severity, mastitis impacts both the quantity and quality of milk produced, representing a substantial financial burden for dairy operations.

Mastitis affects cows before, during, and after clinical symptoms appear. Studies show that milk production can begin declining up to 14 days before clinical detection, highlighting the importance of proactive monitoring. Even mild



cases can cause daily milk losses of 11 to 18 pounds, depending on the stage of lactation and severity of infection.

Recovery is not immediate. Full recovery of milk yield post-treatment can take 15 to 25 days, influenced by treatment efficacy, severity, and management practices. In some instances, milk production never fully returns to pre-infection levels.

Mastitis has the greatest impact during the early stages of lactation, when milk production peaks. In mild cases, losses can reach 348 pounds, while severe infections can cause reductions of up to 635 pounds.

As lactation progresses and production naturally declines, the impact diminishes but remains significant. Mid-lactation losses range from 278 to 522 pounds, underscoring the persistent effect of mastitis on production.

This study found that mastitis-related milk losses are more severe than previously reported, with cumulative losses during lactation exceeding 2,500 pounds in severe cases. Prevention and early detection are critical to mitigating these effects. Proper milking

procedures, effective hygiene practices, and vigilant herd health monitoring can reduce mastitis incidence and economic losses. Mastitis remains a formidable challenge, but producers prioritizing prevention and swift intervention can safeguard herd health and profitability. A proactive approach ensures higher milk yields and better overall welfare for dairy cows. For more detailed insights, refer to the original study in the *Journal of Dairy Science* at <https://doi.org/10.3168/jdsc.2024-0579>.

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BUILDING A WHOLE-FARM NUTRIENT MASS BALANCE

In last month's issue I introduced the concept of the whole-farm nutrient mass balance (NMB) for dairy farms as a nutrient management tool that can help farms better understand the sources and sinks of phosphorus (P), nitrogen (N), and potassium (K) throughout the farm to increase profitability (reduce costly grain and fertilizer purchases) and reduce pollution potential (fewer instances of nutrient applications exceeding crop needs). Tracking your farm's K balance is not to be overlooked, but the combined pollution potential and economic cost of P and N make them somewhat more interesting targets and thus, the two factors I'll focus on for this discussion. Admittedly, while diving into this process the first year may seem a bit daunting, we'll walk through some of the basics this month and hopefully convince some of you that it's not actually too heavy of a lift relative to the benefits gained from a clearer vision of your production system as a whole. Then next month we'll start getting into the good stuff and look at an example report and what kind of recommendations you can expect to receive after submitting your farm data. As mentioned last month, visit the Cornell University Nutrient Management Spear Program (NMSP) website for background information, including farmer testimonials and all necessary datasheets/software (<http://nmsp.cals.cornell.edu/NYOnFarmResearchPartnership/MassBalances.html>).

After familiarizing yourself with some of the resources, the first step is to download the "Input Data Sheets". These are well-organized, fillable PDFs that walk you through each source of data you'll need to track down and record. While it might be a bit tough to retroactively go back and collect some

FARM CROP PRODUCTION

Crop name	% legume	Area (acres)	Manure applied	CP (%DM)	P (%DM)	K (%DM)	Crop type*	Yield (t/a)	DM (%)	Inventory (tons)	
										Beginning year	Ending year

IMPORTS

Feeds (purchased)	Tons /year	%DM	CP (%DM)	P (%DM)	K (%DM)	Feed type*	% forage (if TMR)	Inventory	
								Beginning year (as fed tons)	Ending year (as fed tons)

Purchased fertilizers	Tons/year	% N	% P ₂ O ₅	% K ₂ O
		%	%	%

EXPORTS

Milk sold (lbs/year)	Milk protein (%)	Milk fat (%)	Milk urea nitrogen (MUN) (mg/dl)

Animals sold	Type*	Description	Number	Weight/hd (lbs)

Crops sold	Tons/year	%DM	CP (%DM)	P (%DM)	K (%DM)	Feed type*

Exported manure, compost and other exports	Amount	Units*	% solids	N	P	K	Units** (as sampled)

of the data in the first year, depending on your level of organization and detail, looking at the required information can help you organize your files to more easily summarize things at the next year's end. The following are the three general categories of data requested: basic farm characteristics (animal numbers, tillable acres, etc.), nutrient imports and nutrient exports. If interested in estimating greenhouse gas emissions, there is also a fourth section of data that can be submitted to examine the N balance in more detail. However, that's outside the scope of the NMB discussion we'll focus on here.

Screenshots of the main portions

of the data input sheets illustrate that while there's a handful of major factors we need to keep track of across the farm, it all boils down to having a reasonably reliable estimate of the tonnage of the major N and P sources (fertilizers, grown/purchased feeds, milk, animals) that enter and exit the farm. By multiplying the N and P content (percentage) of each of those sources by the total tonnage brought on or off the farm, we get the tons of N and P from each source. Weights of the sources should be estimated by the best reliable methods (yield monitors, truck scales, invoices, etc.) and the N and P contents are estimated through

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WHAT'S HAPPENING ON THE FARM

The first few weeks into the New Year have been feeling more like winter with snow and temperatures in the single digits. The cows are faring well, and the new year brings excitement for change and new opportunities. It's a good time to reflect on last year's trials and victories as well as planning for progress. Change is good, but sometimes a solid routine paves the way for success. Part of our weekly routine at the dairy barn is doing our pen moves every Tuesday.

We do pen moves in our lactating and non-lactating mature cow pens. We move them to different pens based on their stage in lactation, and each pen is fed a specific diet tailored to their needs. We have a fresh group that is monitored closely every day for two weeks to make sure they are healthy and comfortable. Fresh cows stay in the fresh group from the day they calve until 15 days in milk when they're moved out of this group.

We have high and low production groups. In the high groups, cows average 120 pounds of milk daily. Most of the cows in our high production pen are around 125 days in milk. High production

groups are fed a high-energy ration. Cows in our low production groups average 80 pounds per day. The majority of the cows in this group are 200+ dim and are fed a low-energy diet. Cows in our low groups are generally closer to the end of their lactation. Mature cows will stay in the low group until they have reached 227 days carried calf (DCC), and then will be dried off. First lactation cows are dried off at 223 DCC while cows that are pregnant with twins will be dried off at 210 DCC. Sometimes there will be a special case where a cow is ready to be dried off but is still making 85-90 pounds of milk a day. In this case we move her to a maternity pen and instead of milking her 3 times a day we'll start milking her only 2X for a couple days and then only once a day to encourage her milk production to slow down. We'll also start feeding her the "far off" dry cow diet. Once her production has dropped below 40 pounds she's finally ready to be dried off and moved to our far dry group.

We use two different intramammary dry off treatments. If a cow's somatic cell count is higher than 200 she will be treated with Spectramast dry cow

treatment. Cows with somatic cell counts under 200 will be treated with Albady treatment. Cows stay in the far dry group until they have reached 260 DCC and then are moved to our close-up bedded pack where they stay until they calve. Pregnant heifers are also moved to the close-up bedded pack from our offsite heifer facility at 260 DCC. A benefit we experience by completing pen moves each week is the ability to tailor the diets to specific milk production and stage in lactation. While pen moves are necessary and benefit herd production, they could increase the risk of injury to the cows. It's crucial to identify slippery flooring and make sure any maintenance or repairs to the pens, floor scrapers, and gates are finished before moves begin to prevent injuries. We spread ground lime where the footing is especially slippery to prevent cows from falling and getting injured. We also make sure all staff responsible for sorting and moving cows to different pens have completed training and have proficient stockmanship skills.

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a combination of measured (lab) values (whenever possible) and accepted book values (if/when samples aren't available for lab analysis).

The more detailed the inputs, the more useful the outputs will be, but work with whatever you have and try to improve your data management a little bit each year if major changes aren't possible or desirable. But regardless of whether you have truck scales for every forage load with matching lab data or you only know the total tonnage of all the corn silage harvested

and are relying on book values for the nutrient content, you're still very likely going to find benefit in beginning to track these additional data streams across your farm. In many cases you may already have a farm consultant tracking much of this data who can assist with some of the collection and collation. Don't be afraid to reach out to the feed mill or your fertilizer rep to get a summary of your purchases for the current year, as they'll also be able to help you identify the total tonnage of P and N across your purchases. As the tool is only intended to help inform

the farm's decision-making processes, you can include estimates for the data as much as you feel comfortable with, as you ultimately will be the only one deciding how useful the recommendations that you'll receive in the report are and whether or not to implement them. Tune back in here next month when we'll finally dive into some example outputs and we'll see what you'd actually get in return for all your diligent data collection!

— Laura Klaiber
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SELENIUM IN TRANSITION COWS: IMPACT ON REPRODUCTION & IMMUNITY

In mid-October I attended the 86th Cornell Nutrition Conference in East Syracuse, NY, an event renowned for its wealth of information and engaging discussions. The week-long conference featured an array of dynamic speakers, thought-provoking sessions, and opportunities to connect with seasoned professionals eager to share their insights with those new to the field.

One standout session was by Dr. Stephanie Hansen, a professor of animal science at Iowa State University and an accomplished mystery novelist. Her talk, titled “Optimal vs. Adequate: Trace Minerals in Transition Cows,” explored the intricate balance between sufficient intake and optimal physiological response to trace minerals in the diets of transition cows. The session delved into key trace minerals, including zinc, copper, and selenium. I was particularly intrigued by the discussion on selenium (Se), as Dr. Hansen emphasized its pivotal role in reproductive health, immune strength, and overall success in dairy cattle.

The transition period, encompassing the three weeks before and after calving, is a pivotal stage in a dairy cow's lifecycle. During this time cows experience substantial physiological transformations as they transition from pregnancy to lactation. This window is also associated with significant changes in the metabolic and nutritional needs of a cow. Supporting a transition cow at this time can be integral to setting them up for a productive lactation.

Appropriate trace mineral supplementation is of particular importance, as there is often a narrow margin between toxicity and deficiency. Each mineral plays a different role in the diet of a cow and can be used to fill some gaps that a herd may be experiencing. In transition cows, trace mineral

supplementation (or the lack thereof), can have an impact on the health of both the dam and the offspring. Selenium is an example of a trace mineral that can have a strong influence on reproduction and immunity in a herd.

Excessive reactive oxygen species (ROS) production during the periparturient period can induce oxidative stress, a condition linked to various health issues in dairy cattle transitioning from late gestation to lactation, including retained placenta, fatty liver, ketosis, mastitis, and metritis (Xiao et al., 2021). Selenium, a crucial component of antioxidants, can mitigate oxidative stress and potentially prevent these diseases.

Research by Jaaf et al. (2020) demonstrated that supplementing dairy cows with low amounts of Se-biofortified alfalfa hay increased blood and liver selenium concentrations. Notably, Se readily crosses the placental barrier, even at the expense of maternal stores (Abd El-Ghany et al., 2007). This can lead to maternal Se deficiency as fetal demand increases, reducing antioxidant accumulation and activity. Supplementation during the third trimester may be necessary to maintain adequate maternal Se levels. Consequences of maternal selenium deficiency include reduced milk production due to Se's essential role in milk component synthesis. Additionally, a weakened immune system is a significant effect, increasing the susceptibility of cows to various infections such as mastitis, metritis, and other diseases. Se deficiency can impair ovarian function and embryo development, leading to reduced fertility rates and increased risk of abortions. Furthermore, it can weaken the muscles involved in labor, increasing the risk of dystocia. (Abd El-Ghany et al., 2007).

A study by Ceko et al. (2015) using X-ray fluorescence (XRF) imaging revealed that Se is concentrated in granulosa cells of large bovine follicles. Van Emon et al. (2020) proposed that this localization and Se's antioxidant properties protect oocytes from oxidative stress and DNA damage during folliculogenesis. In vitro research by Basini and Tamanini (2000) showed that Se directly stimulates granulosa cell proliferation and estradiol synthesis. Estradiol, a key hormone in the reproductive cycle, plays a crucial role in follicular development and ovulation. By stimulating the release of gonadotropin-releasing hormone from the hypothalamus, increased estradiol production, stimulated by Se, triggers the preovulatory luteinizing hormone surge, which is essential for ovulation to occur (Van Emon et al., 2020). This research suggests that selenium (Se) plays a crucial role in enhancing reproductive success in cows by protecting oocytes from damage and stimulating follicular growth. In summary, by protecting oocytes, stimulating follicular growth, and regulating the hormonal cascade leading to ovulation, selenium contributes significantly to improved reproductive performance in cows. This translates to increased fertility rates, reduced risk of abortions, healthier calves, and enhanced overall reproductive efficiency, ultimately leading to increased profitability for dairy farmers.

In the United States, selenium supplementation in livestock feed is regulated by the Food and Drug Administration. The FDA establishes maximum allowable levels of selenium in animal feed to prevent toxicity. The maximum allowable level of selenium in dairy cattle feed is 0.3 ppm (parts

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2025 VT DAIRY PRODUCERS CONFERENCE

FEBRUARY 18, 2025

DoubleTree by Hilton
870 Williston Road South Burlington, VT 05403



Agenda:

8:00 am	Registration Opens
8:00-9:00	Visit Sponsor Exhibits and Breakfast Refreshments
9:00-9:05	Welcome – John Clark
9:05-9:55	Dr. Kirby Krogstad – Are Hot Diets Harming the Gut? (Sponsored by Phoenix Feeds & Nutrition)
9:55-10:50	Jacob Shapiro – Geopolitics and the Future of American Agriculture (Sponsored by Nutrien Ag Solutions)
10:50-11:20	Break
11:20-12:10	Dr. Ryan Breuer – Neonatal Calf Care: Making the Most of the First 24 Hours (Sponsored by Cargill)
12:10-1:15	Lunch
1:00-1:15	2024 Vermont Milk Quality Awards Presented by the Vermont Dairy Industry Association
1:15-1:30	Sponsor Recognition and Announcements
1:30-2:20	Bruce Vincent – With Vision There is Hope (Sponsored by Feedworks USA)
2:20-2:30	Remarks by Governor Phil Scott (Tentative)
2:30-3:00	Break
3:00-4:00	Dr. Andy Halloway – A Practical Conversation on Dairy Carbon Credits (Sponsored by Elanco – Animal Health)
4:00-4:10	Door Prizes and Adjourn

Live Spanish Translation will be available-please indicate who will need this service when registering.
<https://vtdairyconference.com/registration/>

Contact: Louise Waterman for additional information or to register and pay with a check.
LWalshWaterman@gmail.com
802-373-3352

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per million) (Ullrey, 1992). However, these are maximum limits, and the optimal level of selenium supplementation will vary depending on factors such as the selenium content of the forage, the animal's physiological status (e.g., pregnancy, lactation), and the risk of selenium deficiency in the region.

In conclusion, Dr. Hansen's presentation highlighted the critical role of trace minerals, particularly selenium, in supporting the health and productivity of transition cows. Selenium plays a multifaceted role in immune function, reproductive health, and antioxidant defense. While appropriate supplementation is essential, it is crucial to adhere to regulatory guidelines and avoid excessive selenium intake, which can lead to toxicity. Continued research is needed to further refine our understanding of selenium's role in dairy cow health and to develop optimal supplementation strategies for different production systems.

— Hannah Jones
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FAT CHANCE: FUELING DAIRY CALVES WITH EXTRA ENERGY TO COMBAT THE DEEP FREEZE

As winter settles in, farmers face significant challenges in maintaining the health and growth of their young stock. The plummeting temperatures can drastically increase the energy demands of calves, making it difficult for them to maintain body condition and achieve optimal growth rates. Dairy calves are particularly sensitive to temperature changes; unlike adult animals, they experience higher environmental stress due to the lack of heat production from rumen fermentation and underdeveloped subcutaneous fat reserves. Consequently, their energy requirements increase as they strive to maintain body heat in freezing conditions. Research indicates that calves under three weeks of age experience a 40% increase in maintenance energy requirements when exposed to temperatures of 37°F or lower, while calves over three weeks see a 13% increase (Ghasemi et al., 2017).

Despite consuming more starter grain compared to other seasons, calves average daily gain (ADG) was not significantly affected, as noted by Holt (2014), for calves up to 13 weeks. This highlights the disruptive impact of cold stress on animal productivity, which can interfere with the daily operations of dairy facilities. To meet the increased energy needs during the cold season effectively, supplemental fat can be incorporated into the diets of calves using starter grain. This provides an efficient energy source, helping calves stay warm, grow, and thrive during harsh winter conditions. It also is encouraged to introduce calves to starter as soon as 2 weeks of age to improve rumen development (Sander et al., 1959). Fat is an energy-dense nutrient, offering more than twice the energy per unit weight

compared to carbohydrates and protein, making it an excellent supplement during the winter months. Adding fat to the diet of dairy calves helps meet the increased energy demands without significantly increasing the feed volume, which is critical for young animals with limited stomach capacity.

The primary benefit of feeding supplemental fat is the provision of additional calories without increasing feed volume. This is especially important during winter when cold stress may reduce the feeding frequency of calves and lower intake (Ghasemi et al., 2017). Additionally, integrating fat into the diet provides a consistent energy source that supports their energy requirements and enhances growth rates. Although some studies have shown that supplemental fats may limit dry matter intake and reduce ADG in thermoneutral conditions, Ghasemi et al. (2017) reported no significant decrease in dry matter intake when feeding 6% soybean oil supplemental fat during the winter months. Their findings indicated that combining supplemental fat with a high-protein or high-fiber starter grain was optimal for increased growth and performance. Beyond the energy boost, supplemental fats can support the development of the immune system in young calves. Essential fatty acids and certain hormones synthesized through fat supplementation can help maintain calf health during the cold season.

Calves might be reluctant to consume certain types of supplemental fats, but alternative forms can be added to their diet to boost intake. Vegetable oils like soybean oil, canola, and palm oil are commonly used due to their high fat content and palatability. These oils are

easily digestible and can be added directly to starter feeds. Whole fat sources such as soybeans, sunflower seeds, or corn offer high oil content and additional nutrients like fiber and protein. Blended fats and tallow are also viable options that can be easily incorporated into calf diets.

Supplementing young animals with fat provides significant benefits, but it is essential to recognize and address potential challenges. As with any dietary change, fat should be introduced gradually to avoid digestive issues. Overfeeding fat can lead to complications such as diarrhea or reduced feed intake, so monitoring the inclusion level is crucial. Typically, 3-6% DM fat is recommended in the overall diet, though this can vary based on the calves' individual needs and environmental conditions. Another challenge is ensuring a balanced diet. While fat is energy-dense, it doesn't supply all the necessary nutrients for growth. Therefore, ensuring that the diet includes adequate protein, vitamins, and minerals is vital to prevent nutrient imbalances. Combining supplemental fat with a high-quality milk replacer or starter grain helps provide a balanced diet that supports both growth and immune function.

Supplemental fat is particularly valuable for supporting the health and growth of dairy calves during the cold months. By offering a concentrated energy source, fat helps calves meet the increased energy demands associated with cold stress, enhances growth rates, and boosts immune function. With supplemental fat, dairy farmers can ensure their calves remain strong, healthy, and well-prepared for the challenges of winter.

— Sommer Thompson
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water quality, and methane mitigation.

Farming Operations: Our farming operations were key to supporting our education, outreach, and research programs. The dairy farm (~550 lactating cows) was used for many workshops, meetings, classes, and tours this year for students, farmers, and agribusiness professionals. It continued to be productive, allowing us to ship over 18.5 million pounds (more than 2.1



Miner Institute staff photo taken in June 2024.

million gallons) of low SCC milk to AgriMark showcasing our commitment to quality and productivity. Also, we marketed many heifers and cows to other dairy farms in the Northeast region. Our equine program managed a ~30-horse herd while providing mare and stallion station services to the equine community.

Community Support: We strive to follow William Miner's lead of community support through hosting and participating in community events, volunteering, and fundraising. We raised over \$15,000 to support our local community, demonstrating our commitment to giving back and making a positive impact. Some of the activities included cow kissing, cemetery clean-up, blood donation, and bicycle building for kids.

I am beyond grateful to lead such an amazing team and feel privileged to say I love what I do for work. I am excited for the opportunities that 2025 will bring for Miner Institute. Happy New Year!

— Heather Dann
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QUICKIES

An assortment of items that the Crops Dude found to be of interest:

- Music promotes plant growth. Researchers have discovered that a soil fungus, *Trichoderma harzianum*, used in farming to improve soil health and plant growth, reacts positively to monotonous noise. The scientists are looking to see how it could be used to benefit farmers. They may have also discovered — finally — a positive use for political speeches.
- Sayle's Law: In any dispute, the intensity of feeling is inversely proportional to the value of the issues at stake. (I've been told by a college professor and long-time friend that this is especially true for university faculty meetings.)
- Flooded alfalfa: Useful research results from South Dakota State University: Alfalfa regrowth was reduced by 56% when alfalfa was cut 2 days prior to flooding. Alfalfa crowns are very susceptible to disease if more than a few days of flooding occurs just after harvest. However, the same research found that alfalfa withstood flooding much better if it wasn't recently harvested. Those plants remained unaffected 14 days post- flooding.
- The average person in the U.S. walks about 1200 miles per year and drinks 20 gallons of beer, which works out to 60 miles per gallon.

— Ev Thomas



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- Student Testimonial

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Closing Comment

The trouble with living alone is that it's always your turn to do the dishes.

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