FARM REPORT

FROM THE PRESIDENT'S DESK: NO SURPRISES AT THE DINNER TABLE

It's no secret that dairy cows thrive on routines that are consistent from day to day. Nowhere on the farm is that more apparent than the typical cow's desire for constancy at the feed bunk. Cows prefer a ration with consistent nutrient composition, fed at the same time each day, with feed always available when they want to eat.

Researchers from the University of Guelph (2014. J. Dairy Sci. 97:562-571) measured the day-to-day variation in ration nutrient composition on over 20 commercial dairy farms in Ontario to assess its relationship with feed intake and milk production. The authors noted that any number of factors result in ration inconsistency on the farm such as variable feed moisture content, variations in feed mixing, and changes in silage and other ingredient composition over time. Remarkably, these researchers found that for every 0.5-unit increase in variability of dietary net energy measured over 7 days, dry matter intake decreased by 2.2 pounds/day and milk yield decreased by 7.0 pounds/day. It is eye-opening to see just how much ration variability reduces milk yield.

When we consider ration particle size, the same researchers found that for every 5 percentage-unit increase in variability for the long particles retained on the 19-mm sieve (top screen) of the Penn State Particle Separator, milk yield decreased over 2.5 pounds/day. Clearly, cows prefer uniformity in both dietary composition and particle distributions.

When the ration is delivered appears to matter to the cow as well. A good discussion of this topic can be found in the Large Dairy Herd Management e-book published in 2017 by the American Dairy Science Association (chapter by Oelberg and Stone). Ideally, the total mixed ration should be delivered within 15 minutes of the scheduled feeding time each and every day, and no more than 15 minutes after the previous day's feed has been pushed out.

Feed should also be uniformly delivered along the entire length of the feed bunk. Sections that are empty or have very little feed must be avoided. When sections of the feed bunk are essentially empty, or feed is pushed back out of reach, available bunk space is reduced. Cows are territorial within a pen and may be negatively influenced by inconsistent feed distribution in the feed bunk. If a cow's preferred portion of the bunk is empty, time-lapse video data suggests that due to social constraints she often won't go to another portion of the feed bunk that has feed.

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A LOVE-HATE RELATIONSHIP: THE CROPS DUDE CONSIDERS FORAGE GRASSES

It's good to again have an agronomist at Miner Institute who's involved in the farm's forage production program. In spite of arriving in the middle of the coronavirus pandemic, Allen Wilder hit the ground running and in addition to some practical research projects he's become a regular contributor to this newsletter. We sometimes cover similar topics but from different perspectives: He's young, has a solid academic background and is rapidly adding to his practical experience, while I'm old (I prefer "seasoned"), having seen over 50 North Country growing seasons come and go.

In a fall *Farm Report* article, Allen discussed the attributes of several forage grasses when seeded with alfalfa, with some of the information based on regional research data including work he's done. Following is a summary of my experience, opinions, and prejudices about the various forage grasses, both planted in pure stands and as a companion to alfalfa.

Timothy: Allen noted that in a University of Vermont trial timothy had the top quality in a three-cut system. It was aggressive at first cut but "backed off" (his term) during subsequent cuts. Timothy grows well through May, but after first cut it can become almost dormant. None of the cool-season grasses like summer heat, which is why they're called "cool-season". Duh. But timothy can really poop out as the soil warms up, *even with adequate moisture.* That's why I call it the "schoolteacher grass": It works hard through spring, then takes the summer off. That was OK when dairy farmers used to take the first cut for hay and then pasture the aftermath. But that was then and this is now, and the acreage of timothy has plummeted on dairy farms because it's not responsive to today's aggressive forage management.

Orchardgrass: I used to tell farmer audiences "I hate orchardgrass". "Hate" is perhaps too strong word since I've mellowed with age (though The Bride begs to differ) but I still dislike this species. Few orchardgrass varieties are late enough in maturity to be a good match with alfalfa, though there's been some progress on this front. But orchardgrass doesn't like wet feet, and don't even *think* about growing it as a low-K grass for prefresh dry cows. It has poor tolerance to ice sheets; one year at Miner Institute the orchardgrass (our first *and last* seeding of this species) winterkilled while alfalfa in the same field survived quite well. Orchardgrass has an aggressive seedling, good if you're trying to establish a pure stand but problematic for alfalfa-grass. In one of Jerry Cherney's alfalfa-grass trials a seeding rate of 1 lb./A of orchardgrass resulted in too much grass! The one time we seeded orchardgrass we used 1 lb./A (with 14 lbs. of alfalfa) and had plenty of grass.

Bromegrass: I love smooth bromegrass, which is a true sod-forming species. What I don't love is the light, fluffy seed (14 lbs./bushel) that doesn't mix well with alfalfa. I once shipped a bag of bromegrass seed to California to have it coated, in hopes that it would then mix with alfalfa seed in our drill. Nope. A Brillion seeder may have done a better job but Miner Institute didn't own one. Even if you get a good alfalfa-bromegrass stand, the bromegrass won't persist under the 30-day (and sometimes less) harvest intervals that have become common with alfalfa. Bromegrass does really well in pure stands, and you'd think that it would find a good market with horse owners. But you'd think wrong: As one commercial hay producer told me, many horse owners only recognize one species — timothy — by its characteristic heads so that's all they'll buy. And they have some reason to be wary since every year the very best and the very worst hay is sold to horse owners: The best, often leafy, weed-free alfalfa, is sold to racehorse owners at a high price, while some of the worst hay (usually fully-headed grass) is purchased by owners of a "backyard horse" who ask: "What do you have that's cheap?". Miner Institute's equine program has tried to educate horse owners about making informed hay purchase decisions, but there are still too many whose main (only?) criterium is price.

Reed canarygrass: Reed canarygrass has a weak seedling, but once established it's there forever unless killed by herbicide. Armyworms love it, but canarygrass is tougher than the bugs and will survive complete defoliation. It's officially considered a "noxious species" in Connecticut, which might make some farmers (especially organic farmers) think twice about planting it. I used to like reed canarygrass much more than I do now: One of the first articles I sold to a magazine (*Successful Farming*, 1977) was titled "Reed canarygrass — answer to wet fields." Cornell's grass quality data (unavailable way back then) have shown several species to be superior to canarygrass. But some farmers still like it, especially the leafy second cut of the low-alkaloid varieties that are much preferred to native canarygrass.

Fescues: These include both tall and meadow fescue since these species have similar characteristics, though Jerry Cherney's research has found meadow fescue to be tops for quality. I have more practical experience with tall fescue, most of it positive. Both tall and meadow

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TALKING CROPS WITH A COW ACCENT

Editorial commentary

Some years ago the University of Wisconsin's Dan Undersander and I were having a barley pop after speaking at a farmer meeting in Burlington, Vermont. Out of the blue Dan asked: "Do you know how many people are doing this?" "Doing what?" "Running around speaking on a wide variety of crop topics." "I dunno, how many?" "Well, there's you, and there's me." "Oh, come on, Dan — there must be others." "Name one".

And I couldn't — at least not at the time and off the cuff. Now I can think of several others including Tom Kilcer, but most of these folks have something in common: They're either old (like Dan and me) or no longer young (like Tom). Today's agronomy graduates tend to be highly specialized, with a depth of knowledge in their field of study which often stops somewhere short of the feedbunk. It's just my opinion, but it seems that there just aren't many folks out there who can "talk crops with a cow accent" — and are both willing and able to share this knowledge.

It's said that a specialist is a person who knows more and more about less and less until he eventually knows everything about nothing. A generalist knows less and less about more and more until he knows nothing about everything. Hopefully there's a sweet spot somewhere near the middle…

— E.T.

FEED, Continued from Page 1

It also appears that there are preferred times of the day to deliver feed. Efficiency of milk production is enhanced when feed delivery occurs mid-way between milking times compared with feed delivery at milking time. When fed between milkings, cows eat their feed more slowly in smaller, more frequent meals that improve milk production efficiency.

Feed should always be pushed up and available for cows when they return from the parlor. Feed push up helps minimize variation in feed consumed. Greater frequency of feed push-up also boosts lying time by minimizing the time that cows need to wait around for feed to be accessible.

So, if we think of the feed bunk as the cow's dinner table, the bottom line is that cows do best with the exact same entrée, served at the precise same time every day, and at a time that best fits her needs.

— Rick Grant
grant@whminer.com

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

CHEESE PLEASE

Some people drink to forget, but a glass of red wine may help you remember. Yep, according to the results of an Iowa State University study, moderate wine consumption slows the rate of cognitive decline including the impacts of Alzheimer's Disease. The Apostle Paul notes the benefits of drinking wine in his advice to Timothy. (1 Timothy 5:23; look it up.)

But what's even better than wine in slowing cognitive decline? Cheese! Of all the food products in the Iowa State research, cheese had the biggest positive impact on cognitive abilities. So while milk drinkers may be better lovers (a million bumper stickers can't be wrong), cheese eaters are better thinkers! Some "gouda" news for the day…

— *E.T.*

GRASSES, Continued from Page 2

fescue are good companions with alfalfa, and summer yields are better than for some other grass species, most notably timothy. Fescue does better under moderately poor drainage than any forage grass other than reed canarygrass (which must share a few genes with cattails). *I think fescue is a dairy farmer's "go-to" species for alfalfa-grass.*

Regardless of which grass species you intend on using, get your seed order in soon. Seed industry representatives predict tight supplies of most of the above-discussed forage grasses with the exception of tall fescue. Finally, I haven't discussed variety selection within a species, but you can get excellent forage variety and species performance data via the following Cornell University website: https://blogs.cornell.edu/varietytrials/forage/

— *Ev Thomas*
ethomas@oakpointny.com

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 rumen manipulation to increase fat and protein production from dairy cows and the importance of milk fat consumption 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, formerly from Toyota, will focus on lean systems, bringing efficiencies to business.
- Dr. Frank Mitloehner, 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!

ALL THAT'S FIT TO PRINT — EVEN IF IT'S NOT THE OUTCOME YOU WANTED

In 1897, *New York Times* owner Adolph S. Ochs coined the slogan "All The News That's Fit To Print", which became "the seven most recognized words in American journalism". His intention was to declare that the Times would report news impartially, and to support "comprehensive journalism". He staunchly bucked the trend of sensationalism, instead choosing to report everything except that which he found to be dishonest or in poor taste. By doing so, he elevated the status of the *New York Times* to one of the world's most lauded newspapers, and created a standard for true and honest reporting of news to bring all information to readers.

Ochs' slogan applies to the reporting and discussion of scientific data just as much as it does to the popular press. While one may hope for a positive outcome from a scientific study, there is just as much useful information in studies that show no results as in those that do. What is important to remember, especially in studies where an intervention or a treatment is studied, that no response is still, very much, a response. Even if a difference was not observed, there is still valuable information about the study that can be extracted from the results and used to work toward further research. If something didn't work the way you thought it might, why didn't it? What other factors came into play that may have caused a different outcome? It didn't work this time, but if you change x, y or z, would it? And, in some cases, it may be as simple as "You wondered if this was going to work, and it didn't, so now you know". Sleuthing through scenarios like these is what continues to propagate research questions and keep progress moving forward. The sooner you find out what doesn't work means you're one step closer to finding out what does.

A hesitancy exists to publish studies that don't show the anticipated results because it may appear as though the study 'failed'. In fact, it's exactly the opposite. Failure is, at its core, also a result. I'm particularly interested in reading why a study didn't work out for two reasons: First, the research question was raised and deemed important enough to investigate, and second, performing the study has contributed an answer to the question--even if not completely--and opens up other opportunities to pursue the investigation. Why is it just as important to report those studies that didn't show a response as well as those that did? Ijad Madisch, co-founder of ResearchGate, wrote a piece for Scientific American in which he calls for more scientists to be more open in sharing their work--regardless of outcome. In doing so, it gives other scientists who may want to replicate the study an opportunity to structure a different approach.

Sharing all results also greatly contributes to research transparency with the public, which can promote more trust in the scientific community and its work. As a producer, when a company approaches you with a new product, think about what you value when considering the use of the product on your farm. Cost and performance notwithstanding, what other types of information would you want to hear from the company about the product? A question you should be asking the representative is "has this product not worked?" There is merit in asking questions about how (or if) the product has worked on other farms, or in similar herds. To save themselves time and money, a researcher reproducing a study would not want to perform the same experiment as one that did not work- just as you would not want to waste your own time and money on a product that yields no improved result.

Dairy research can benefit from the same philosophy. In scrolling through the latest table of contents of the *Journal of Dairy Science,* I was pleased to notice that the titles of several manuscripts contained the words "failed" and "did not". These words didn't turn me away from reading the papers; in fact, it made me want to read them more. I wanted to know what the authors were interested in examining, what they found in the process, and what they may have done differently. In one of these papers, which evaluated supplementation of TMR with thyme oil on intake, total-tract digestibility, lactation performance and rumen function, the discussion and conclusion sections were ripe with information about the results. The conclusion itself very clearly stated that supplementation of TMR with the experimental dose of thyme oil (in this case, 50 mg/kg of DM at supplier recommendation) had no effect on cows' performance. A failure? Hardly. If someone were to reproduce this study, how could they approach it based on the answers that were found here? Science doesn't stop just because something didn't work once; how many times did the Wright brothers rebuild their wrecked airplane prototype and try again? How many times could Marie Curie have struggled over the three years it took her to discover radium? While the results may have not been successful with this dosage or within this particular experimental unit, there is literature to support its merit, and a subsequent study might be fruitful with another approach.

With a broad array of questions remaining to be answered in dairy research, and the endlessly creative paths we may construct to answer them, the sooner we find what does work, the better. To keep doing that, let's keep sharing all that's fit to print- even if it's not what we expected.

— Cari Reynolds
reynolds@whminer.com

HOW LONG SHOULD THE DRY PERIOD BE?

Pros and Cons of the Traditional 60-day Dry Period

The traditional 60-day dry period has been adopted since World War II and is currently used by the majority of U.S. dairy farms. This involves a dry-off period (from dry-off to 3 weeks before expected calving) and a close-up period (from 3 weeks before expected calving until parturition). The purpose of having the dry period is to 1) treat cows with subclinical mastitis using antibiotics at dry-off, 2) facilitate the renewal of udder tissue, and 3) maximize milk yield in the next lactation. However, during the dry period, the management procedures put cows under increased pressure due to multiple regroupings and diet changes. Increased milk yield and decreased feed intake after a conventional dry period may induce severe negative energy balance and then impair health and fertility in dairy cows.

Dry cows in Miner Institute's dairy barn.

Why Shorter Dry Periods May Work?

Accordingly, shorter dry periods have been suggested as a new management strategy to improve dairy cows' health and fertility. Cows with a shorter dry period partly shift milk yield from post-calving to pre-calving and subsequently reduce the severity of negative energy balance after parturition. Shortening the dry period may also simplify management procedures, decrease pressures on cows, and reduce feed and labor costs.

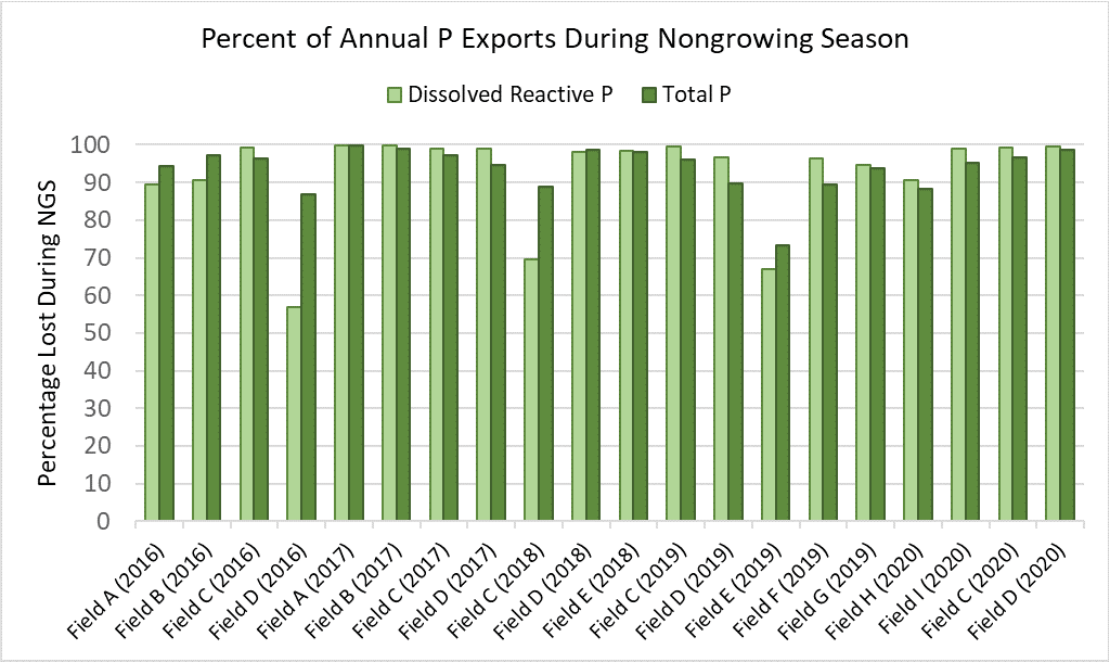
What Do Recent Studies Tell Us About Shorter Dry Periods?

In 2013, Netherlands researchers summarized 22 studies on shorter dry periods. They observed that cows with shorter dry periods (25-35 days) produced, on average, 3 lbs./day less milk in the first lactation after its implementation compared with cows with conventional dry periods (49-63 days). Although milk yield in the subsequent lactation decreased in cows with shorter dry periods, milk yield losses can be at least partly compensated by additional milk produced during the previously extended lactation. They also reported that milk protein concentration increased and ketosis incidence decreased for shorter dry periods relative to conventional dry periods. Finally, reducing dry period length didn't impact the occurrence of mastitis, metritis, and displaced abomasum, and fertility performance in dairy cows during the subsequent lactation.

Dr. van Knegsel's group also conducted an experiment comparing feed intake and milk production in dairy cows with two dry period lengths (30 versus 60 days). During the last 60 days before calving, cows with the shorter dry period ate 2 lbs. per day more feed than those with the conventional dry period. In contrast, postpartum feed intake (until week 14) was similar between the 30- and 60-day dry periods. Cows with the shorter dry period produced 31 lbs. of milk per day during the last 30 days before calving. Postpartum average milk yield until week 14 was 85 and 95 lbs. per day for the 30-day and 60-day dry periods, respectively. Another Netherlands study investigated the effect of dry period length on milk production in the second subsequent lactation. Cows with a 30-day dry period had 18 lbs. per day of milk over the last 30 days before the second calving. During nine weeks after the second calving, milk yield was 9.5 lbs. per day lower in cows with a 30-day dry period than those with a 60-day dry period. Taken together, they concluded that additional milk produced pre-calving for the 30-day versus 60-day dry period can compensate for milk yield losses during early lactation in the first and second subsequent lactations after the implementation of the shorter dry period.

— Patrick Zang
zang@whminer.com

RUNOFF AND PHOSPHORUS LOSS DURING THE NONGROWING SEASON



A series of edge-of-field monitoring projects at Miner Institute over the past five years have sought to identify management strategies that will maximize nutrient retention within our cropland soils. These projects have occurred in fields differing in soil type, topography, management and across a wide variety of annual weather patterns. Despite these differences, we have consistently observed that the majority of P losses occur during the nongrowing season (NGS; defined as October 15 – April 15).

The figure illustrates the percentage of annual P exports that were lost during the NGS from twenty site-years across seven different locations. With the exception of three of the site-years, greater than 88% of annual dissolved reactive P (the bioavailable form of P) and total P losses have occurred during the NGS. On average, 92% of dissolved reactive P and 94% of total P losses occurred during the NGS.

A major factor in this pattern is that the majority of runoff occurs during the NGS. When considering fields C and D (the two fields with data across all five years from 2016-2020), we saw a range of 68-96% of total runoff (surface runoff + tile drainage) occur during the NGS, with an overall average of 78%. During the same period, precipitation amounts were similar across the growing and nongrowing seasons, with a range of 46-57% of annual precipitation occurring during the NGS. The much higher occurrence of runoff during the NGS, despite these similar rates of precipitation, demonstrates the increased risk of runoff during the NGS due to low rates of evaporation and crop uptake.

The distribution of runoff throughout the year is not the only driving factor behind NGS P losses. Fall applications of manure to maximize storage capacity for the winter months is necessary for many farms in cold climates. However, with a high risk for runoff and no crop requirement until spring if soils are left fallow over winter, the nutrients from fall applications are highly vulnerable to loss in runoff.

Given the increased risk for runoff and the lack of crop nutrient removal, it's critical to complete fall manure applications as early as possible to minimize the risk of nutrient losses. Early fall applications will help reduce the risk of loss by lengthening the gap between application and periods of elevated precipitation and runoff. Incorporating manure by injection or tillage will enhance the retention of P by the soil and reduce the availability of P to runoff. Early establishment of winter hardy cover crops will maximize biomass accumulation, reduce the available pool of nutrients to runoff during the NGS, and reduce surface runoff and erosion rates by increasing soil cover. Earlier-maturing corn hybrids can provide additional flexibility and ensure that corn harvest, manure applications, and cover crop establishment can all be completed before the wet weather arrives.

— Laura Klaiber
klaiber@whminer.com

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

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Closing Comment

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www.whminer.org
518.846.7121 Office
518.846.8445 Fax