Cornell Cooperative Extension
South Central NY Dairy and Field Crops Program

Dairy Digest
May 2019

What You Should Know About Dairy Margin Coverage

Mary Kate Wheeler, Farm Business Management Specialist

The **Dairy Margin Coverage (DMC)** program is a new tool, authorized by the 2018 Farm Bill, that dairy producers can use to manage price risk.[1] DMC is a redesigned version of the old **Margin Protection Program (MPP)**, and it shares many of the same features. It also incorporates new features intended to *lower the cost of coverage* and *increase the highest coverage threshold*, particularly for small and mid-sized dairies.[2]

Dairy farms no longer have to choose between enrolling in DMC and utilizing USDA Risk Management Agency (RMA) insurance programs. New rules allow dairy producers to utilize DMC in combination with the **Livestock Gross Margin for Dairy (LGM-Dairy)** or the newly created **Dairy Revenue Protection (DRP)**.

According to the USDA Farm Service Agency (FSA), DMC sign-ups will open in June. This means data will be available to calculate your actual DMC benefit payments for the first few months of 2019, under various coverage levels, **before you sign up**. This transparency should help farmers make the best possible coverage decisions.

How it Works

DMC pays "cash subsidies to dairy farmers when they experience a squeeze between the price of milk and the cost of buying feed to produce that milk."[2] The **margin** in DMC refers to the difference between the price of milk and the cost of feed. FSA also calls this the "milk margin above feed costs" and the "income over feed cost margin."[3, 4]

The USDA calculates an **Actual Dairy Production Margin (ADPM)** on a monthly basis by subtracting the average feed cost, calculated from corn, soybean, and alfalfa prices, from the all-milk price. Participating farms receive a benefit payment for any month in which this margin drops below the farm's chosen threshold.

To participate in DMC, dairy farmers must make **two key choices**: how much milk to cover, and at what threshold.

What Coverage Level Should I Choose?

Under DMC, you can choose a **Coverage Level Threshold** between $4.00 and $9.50, in 50 cent increments. The threshold is important because it determines whether or not you receive a payout. Your farm will receive a benefit payment if the actual margin for a given month drops below your chosen threshold. The higher the threshold, the higher the probability of a payout.

If a payment is triggered, your chosen threshold affects the amount of the payment you receive. The formula used to calculate benefit payments is provided below. Your threshold also influences your premium (cost) to enroll in the program.

How Much Milk Should I Cover?

Farms can choose to enroll between 5% and 95% of their **production history** under DMC. Any farm that participated in the old MPP will maintain the same production history for DMC. The same methods used to calculate production history for MPP will also be used for any new farms joining DMC.

The **amount of milk** that you cover does not have any effect on your chances of receiving a benefit payment. However, it does affect the total cost to participate in the program, as well as the total value of benefit payments, if you receive any.

How do I Sign Up?

DMC is administered on an annual basis. To enroll, you must pay a $100 administrative fee plus a **premium payment**. The total premium is calculated by multiplying the premium fee ($ per cwt) for your selected coverage threshold by the total amount of milk (cwt) that you elect to cover.

There is no premium for the lowest threshold, which triggers a benefit payment if the ADPM drops below $4.00. This level of coverage is known as **catastrophic coverage** because the margin that triggers a benefit payment is so small.

Premium payments for threshold levels above $4.00 depend on two things: your chosen threshold and the amount of milk you cover. Premium prices are set on a per cwt basis. **Tier 1** prices apply for up to 5 million pounds of milk, while **Tier 2** prices apply to milk over 5 million pounds.

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Interested in Growing Industrial Hemp?

State Ag Department requests letters of interest from Agricultural Cooperatives

Reprinted from Morning AgClips

ALBANY — The NYS Department of Agriculture and Markets today announced it is seeking letters of interest from agricultural cooperatives to participate in the State's Industrial Hemp Agricultural Research Pilot Program. The Department is encouraging all new and existing agricultural cooperatives that have considered entering into the industrial hemp industry to capitalize on this growing agricultural and industrial sector.

Agricultural cooperatives present an opportunity for New York's farmers to share resources and reduce financial risk in this emerging marketplace while growing, processing, producing, and marketing industrial hemp and hemp products. Farmers in a cooperative are able to partner in the purchasing, testing, processing, and distributing of farm supplies and farm business services.

Letters of interest from agricultural cooperatives wishing to participate in the industrial hemp research program must be submitted to the Department at ag.dev@agriculture.ny.gov by June 6, 2019. Letters should provide information demonstrating the feasibility of growing, processing, and producing industrial hemp or hemp products under a farm-owned business structure. *For complete article:* https://www.morningagclips.com/interested-in-growing-industrial-hemp/ . Any questions about the grower solicitation period may be sent to industrialhempNYS@agriculture.ny.gov.

Hemp Field Days : Summer 2019 Events:

- Eastern NY Hemp Conf & Expo – Albany- June 2-4
- Willsboro Farm Field Day – July 10
- Aurora Farm Field Crops Field Day – July 11
- Freeville Organic Farm Field Day – July 31
- Hemp Workshop – Empire Farm Days – Aug 6-8
- Cornell Hemp Field Day – Geneva – Aug. 13
- Cornell CBD Hemp Field Day – Bluegrass Lane, Ithaca – Sept. 10?

More information will be posted at https://hemp.cals.cornell.edu/ as soon as details become available.

Two Choices Producers Must Make to Enroll in Dairy Margin Coverage

*The **Amount of Milk** you enroll affects the total premium (cost) to participate in DMC, and also the total amount of any benefit payments. However, it has no influence over whether or not your farm receives a benefit payment.*

*The **Coverage Threshold Level** that you choose is important because it determines whether or not you receive a benefit payment in any given month. The higher the threshold, the higher the probability of a payout. The threshold also affects your premium (cost), as well as the amount of your benefit payments, if you receive any.*

Tier 1 **premium fees** range from $0.0025 per cwt for coverage at the $4.50 threshold, up to $0.15 per cwt for the $9.50 threshold (Figure 1). Tier 2 premium prices are higher than Tier 1 prices, and coverage levels for Tier 2 stop at the $8.00 threshold.

Discounts and Credits

The DMC rewards farms that previously participated in MPP by providing a **credit** worth 75% of their past MPP premiums paid minus the total MPP benefits received. If this applies to you, FSA can credit this amount toward the cost of any new premiums when you sign up for DMC in 2019 or beyond. Alternatively, farms that choose not to use their credit toward the DMC program may request a cash refund equal to 50% of their past MPP premiums less their total benefits received.

DMC also rewards farms that commit to long-term enrollment with coverage levels locked in. This means you can get a **25% discount** on annual premiums if you enroll for a five year period. The farm must commit to the same threshold level and the same percentage of historic production for the full five years to receive this discount.

Farmers that USDA classifies as **limited resource**, beginning, veteran, or socially disadvantaged are exempt from paying the $100 administrative fee.

Calculating Benefit Payments

The USDA Farm Service Agency has released their Actual Dairy Production Margin (ADPM) values for January and February 2019. The milk margin above feed costs was $7.99 in January and $8.22 in February.[3, 4] Thus, **producers that select a threshold of $8.50 or higher are guaranteed to receive DMC payments** for January and February 2019.

When a payment is triggered, the payment amount is determined by a **simple formula**. Subtract the ADPM from your coverage threshold level. Multiply the resulting value by your annual production history divided by 12 months per year. Finally, multiply the result by your percent coverage level.

Your DMC Benefit Payment
= (Your Coverage Level Threshold − Actual Dairy Producer Margin)
× (Your Annual Production History / 12) × Your Percent Coverage

Example

For example, let's take a **hypothetical dairy** milking around 250 cows, with a production history of 5,000,000 pounds (50,000 cwt) per year. Assume the dairy enrolled the maximum amount of milk at the maximum Coverage Threshold Level. This means they chose to cover 95% of their production history at the $9.50 threshold.

The **amount of milk covered** under DMC is equal to the farm's production history of 5,000,000 lbs x 0.95 = 4,750,000 lbs, or 47,500 cwt. This value is less than the 5 million pound limit, so all of this milk will be classified as Tier 1.

The Tier 1 premium for the $9.50 threshold level is $0.15/cwt, so the farm's **total annual premium** is $0.15/cwt x 47,500 cwt = $7,125. This is the farm's cost to participate in DMC in 2019, excluding any possible credits, discounts, or administrative fees.

Since FSA has released the **actual margins** for January and February 2019, we can calculate this farm's benefit payments for these two months, given their choices outlined above.

The Actual Dairy Production Margin in January was $7.99. This **triggers a payment**, because the ADPM was less than the farm's coverage threshold of $9.50. Using the formula provided, we can calculate the farm's January DMC benefit payment as ($9.50 - $7.99) x (50,000/12) x 0.95 = $5,977.08.

The ADPM for February 2019 was $8.22, which was below the $9.50 threshold. This triggers a monthly benefit payment equal to ($9.50 - $8.22) x (50,000/12) x 0.95 = $5,066.67.

To summarize, this hypothetical dairy paid an annual premium of $7,125 to enroll in the 2019 DMC program. It received benefit payments for January and February, worth a combined total of $11,043.75. The result is a **net gain** of $3,918.75, with potential for additional payments during the remaining 10 months of the year.

Disclaimer

Final regulations and guidelines on Dairy Margin Coverage are forthcoming. Farmers should refer to their local FSA office to clarify any specific questions they might have. ~

References

1. Agriculture Improvement Act of 2018, 7 U.S.C. § 1401 (2019). Retrieved May 2, 2019.
2. Novakovic, A.M.; Stephenson, M. (11 December 2018) Dairy Margin Coverage – the new margin protection plan for dairy producers. Dairy Markets and Policy Briefing Paper 18-2. Retrieved April 24, 2019.
2. USDA Farm Service Agency. (25 March 2019) USDA Announces January Income over Feed Cost Margin Triggers First 2019 Dairy Safety Net Payment. Retrieved April 24, 2019.
3. USDA Farm Service Agency. (18 April 2019). USDA Announces February Margin Triggers Second 2019 Dairy Safety Net Payment. Retrieved April 24, 2019.

Figure 1. Tier 1 and Tier 2 premia under the DMC program, exclusive of the administrative fee ($ per cwt).

Coverage Level Threshold	Tier 1 DMC	Tier 2 DMC
Qualifying Production	*5 M lbs or less*	*Above 5 M lbs*
$4.00	none	none
$4.50	$0.0025	$0.0025
$5.00	$0.0050	$0.0050
$5.50	$0.0300	$0.1000
$6.00	$0.0500	$0.3100
$6.50	$0.0700	$0.6500
$7.00	$0.0800	$1.1070
$7.50	$0.0900	$1.4130
$8.00	$0.1000	$1.8130
$8.50	$0.1050	n.a.
$9.00	$0.1100	n.a.
$9.50	$0.1500	n.a.

Give Her Room to Drink

By Jim Barmore, a founding and active partner in GPS Dairy Consulting, LLC, based in WI

Re-print of article from Dairy Herd Management, January 17, 2011

When Mike Larson noticed boss cows staking out their territory around waterers, he suspected the other 800 cows at his dairy were not getting enough to drink, despite providing the recommended water space per cow. So, the Evansville, Wis., producer, who along with his family own Larson Acres Inc., conducted an experiment. During an expansion project, they installed a temporary 40-foot water tank on one side of a 14-foot wide breezeway where the cows returned to the free-stall barn.

To their surprise, every cow that left the milking parlor stopped to drink. In fact, they lined up side-by-side, just like at the feedbunk. The fact that the cows stopped to take a long drink immediately after leaving the parlor — something they didn't do previously upon returning to their free-stalls — was enough to sell the Larsons on the need. This spring they plan to remove the temporary water system and install a permanent 40-foot water trough in its place.

With hot weather just around the corner, you need to make sure that your cows have an adequate water supply. Field observations have shown that inadequate space around the waterer can become a bottleneck for water consumption, says Jim Barmore, technical services specialist with Monsanto Dairy Business in Verona, Wis. More nutritionists and consultants now suggest a minimum of 14 feet of space around waterers.

14 feet of space

Monsanto's Barmore is one of a growing number of people who have been paying closer attention to water. Water makes up about 85 percent of the milk produced by cows. So, when your cows don't get enough water, milk output suffers. And, in times of heat stress, your cows' water needs multiply by 1.2 to two times.

Most dairies already have multiple waterers for each cow group. But even with adequate linear trough space per cow, water intakes can still be limited.

For example, look at the waterers in crossover lanes of free-stall barns. Although many barns have been built with 8- to 12 -foot crossovers, today's facilities designed with cow comfort and 20,000-plus milk production in mind strive for 12- to 16-foot crossover widths. When you place a 2-foot wide water trough on one side of the narrow crossovers, the space around the watering area is 10 feet or less, which inhibits cow traffic and creates cow competition.

When space is limited, dominant cows tend to stake out the corners of the tank leaving the middle open. However, if a more-timid cow does not feel secure — meaning that she can easily back away from the dominant cows without being blocked by a cow crossing behind her — she will not drink from that middle spot for very long, and sometimes not at all.

However, when you place that same 2-foot-wide waterer in a 14-foot crossover, cows line up in a parallel fashion to drink, says Barmore. They do so because 14 feet allows enough room for cow traffic behind the drinking cows, and room for timid cows to retreat from the tank when they feel threatened by dominant cows.

Field results

When structural limitations prevent you from removing a couple of free-stalls to increase the space around the waterer, producers have seen good results with placing waterers in an alleyway or breezeway that the cows use after they exit the parlor. For example, when a 300-cow herd in western Michigan installed a 56-foot waterer in the space between the holding pen and the return alley from the parlor, it saw a 3- to 4-pound increase in milk production per cow per day right away. The water tank went into use last May, and the dairy saw a production response within the first week, says Jeff Kearnan, area marketing manager for Monsanto Dairy Business in western Michigan. Although not all dairies may see such a large response, when water is a limiting factor, you will see results.

Photo courtesy of Shutterstock.com

On the dairies where Barmore and Kearnan have worked with producers to make changes to ensure a 14-foot zone around the waterers, the results have been positive. Among the observations:

- Fewer problems with boss cows around the water tanks.
- Higher dry matter intake and milk production in times of heat stress.
- Almost all cows stop to take a drink when waterers are placed in breezeways or alleyways on the cows' return route from the milking parlor to free-stall barn.
- More cows going directly to the feed bunk — even during the summer — once they have taken a drink. Cows line up in a parallel manner to drink, which means more cows drink from the same tank space.

Water is the lowest-cost resource on the farm, yet it makes up 85 percent of the product you sell, says Kearnan. Don't let it become a limiting factor. Take some time now to evaluate your cows" water supply before summer heat hits full force.

Water checklist

- Provide 2 linear feet of waterer per cow for waterers located in breezeways or alleyways on the way back from the parlor. Use no less than 1 linear foot of waterer per cow.

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Stockmanship Training with Curt Pate: It's All about Pressure

Lindsay Ferlito and Betsy Hicks, Dairy Specialists with Cornell Cooperative Extension

You've been handling cattle for years, and you do it every day, so what's there to think about? At the recent Dairy Managers Training Program, Curt Pate, a rancher and stockmanship expert from Montana, demonstrated that there actually is a lot to think about. Dairy cattle have been domesticated for a long time, and they are handled daily, so it's easy to forget how big of an impact our presence can have on them.

How we handle cattle can significantly affect both their mental state and their productivity. Curt explained that animals can't be in "survival" mode and "growth" mode at the same time, so if we are mishandling them, and creating a stressful environment, their health and production will be negatively impacted. We need to therefore design barns and handle cows effectively to minimize stress and keep the animal in "growth" mode.

Barn and facility design plays a critical role in minimizing stress and making it easier to move cattle, but ultimately it is up to the handler to use the right technique and apply the right pressure to move the cows successfully. As Curt says, moving cattle does not take physical strength, it takes your mind. You need to be smart, aware, and present to effectively move cattle. While cattle handling should be low stress, it also requires you to know how to apply effective pressure at the right time.

There are three types of pressure that a person can use on cattle – driving, drawing, and maintaining. Driving pressure is just what it implies – it is pressure used to move or "drive" cattle away from us to a specific location. Drawing pressure is the opposite of that, and can be slightly harder to achieve. Drawing pressure involves getting the attention of the animal and having the animal walk towards that pressure. The third type of pressure, maintaining pressure, involves being able to maintain the animal's attention, without having them move towards or away from that pressure. Driving pressure can be a person, a crowd gate, or a dog. Drawing pressure can be the sound of pen gates opening or the sound of the vacuum pump, or movements by a person to draw animals closer to them. Maintaining pressure can be the hardest to achieve, as it is asking the cow to wait to make a decision on which way it will go.

When working cattle, they have two options: they can react to a situation, or they can think about the situation before they respond. Rather than having cows that use only their instinct and react to every situation, we can work with our cows to have them think about a situation. Over time, this tendency to have cows think first before reacting can be trained. Depending on how they are handled, however, cows can switch back and forth between thinking and reacting. This makes every moment working with animals a learning experience, as the handler can recognize movements that either engage the cow's brain or switch it off.

Different situations call for different kinds of pressure. Driving pressure is effective for moving cows to the parlor. When moving animals quickly, a handler can use their movement behind the cow to allow the cow to watch them move from the left side of the cow to the right side of the cow. Because a cow's eyes are located on the side of their head, a handler can utilize this when handling by "switching eyes" on the cow. A cow would prefer to stop and turn to look at the handler, but by moving from one side to the other and switching eyes, the cow is continually propelled forward. If the handler just worked from one side of the cow, the cow would eventually stop and turn at least her head, if not her whole body, to fully see the handler. The handler can maintain this forward movement by constantly applying pressure from eye to eye behind the cow.

When getting cows up off their beds, handlers will often stand next to the cow and tap the stall divider or speak to the cow to encourage her to get up. A different strategy explained by Curt involves the handler rocking back and forth from left leg to right leg to encourage the cow to stand up and back out of her stall. This constant movement applies different pressure to the cow that will drive her up and back out of the stall, rather than allowing her to stand and wait for further pressure from the handler. The constant movement keeps the cow just a little bit out of her comfort zone, and she will back out of her stall with little encouragement other than the rocking.

Sorting cows utilizes drawing pressure to be most effective. Many handlers will work cattle in close proximity, with that area getting smaller and smaller as more animals are sorted out of the group. Using drawing pressure allows a greater area around the group of cows. The cow's attention is drawn to the handler as he or she backs up and away from the group. Cattle will spread out and even move towards the handler. Driving pressure can then be used to make a certain cow go the desired direction.

The amount of pressure used in any given situation is about the balance of the cow in that particular moment. If the handler is between a cow and the herd, her balance point is actually behind the handler with the rest of the herd. Using the point of the shoulder of the cow is too close of a balance point, and will likely be ineffective on this cow. She will probably try to move past the handler because the shoulder is too close to the handler to make her move any other way other than to move to the herd. Distance should be factored in when trying to effectively move this cow, and pressure used earlier on to allow for this point of balance being so far behind the handler. The handler should always try to maintain the cow in the "thinking" part of her brain.

The handler wants her to use her mind first, then her feet. The handler should work with her and her balance points in that moment to turn her when sorting and get her to stop with

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Brown Midrib and Leafy Corn Silage Performance

+ A New BMR Economics Calculator

Commercial corn hybrids grown in Wisconsin are often marketed to dairy farmers as "silage-specific." In the UW Corn Performance Evaluation Trials, conventional hybrids have similar yield and quality as bio-engineered corn hybrids. However, we often see yield and quality differences between silage-specific "leafy", brown midrib (bmr), and conventional/bio-engineered hybrids. In addition, companies often market newer 3rd- and 4th-generation silage-specific hybrids implying that breeding progress has improved performance.

Brown midrib corn (picture above) has a distinctive brown midrib on the corn leaf. These hybrids typically have greater digestible energy in the stover (stalks and leaves). Leafy hybrids have 2-5 more leaves above the ear compared to conventional hybrids.

Figure 1 shows the relationship between Milk per Acre (yield) and Milk per Ton (quality) for bmr and leafy hybrids. In most years leafy hybrids tend to be average for Milk per Acre and below average for Milk per Ton. BMR hybrids tend to be below average for Milk per Acre and above average for Milk per Ton. For either hybrid type there does not seem to be a trend for newer generation hybrids.

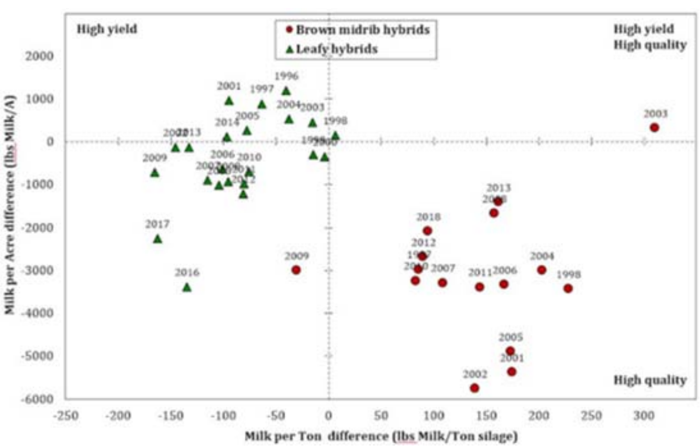

Figure 1. Mean Milk 2006 relative performance of Brown midrib and Leafy hybrids in the UW Corn Performance trials. The origin is the overall average of all hybrids tested between 1995 and 2018 (N= 38,664 plots). BMR plot total= 623 and Leafy plot total= 1538. Difference = overall hybrid average – trial average, Code above symbol= Year

Both bmr and leafy hybrids have lower than average starch content compared to the overall mean of all hybrids in the trial

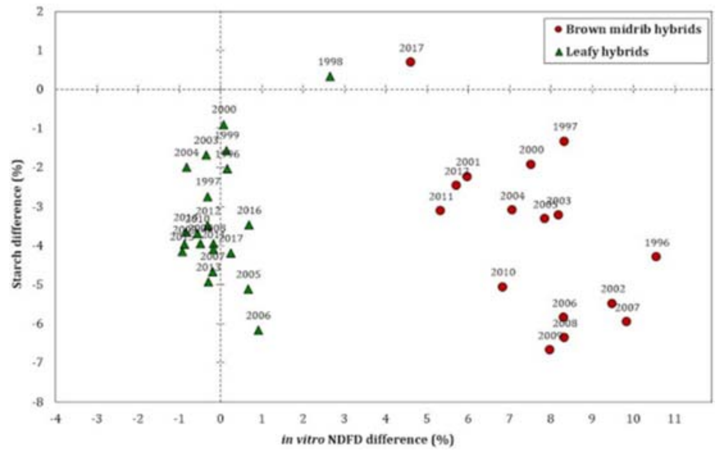

Figure 2. Mean starch and ivNDFD relative performance of Brown midrib and Leafy hybrids in the UW Corn Performance trials. The origin is the overall average of all hybrids tested between 1995 and 2018 (N= 38,664 plots). BMR plot total= 623 and Leafy plot total= 1538. Difference = overall hybrid average – trial average, Code above symbol= Year

ultimately affecting both yield and quality (Figure 2). Leafy hybrids have average *iv*NDFD, while bmr hybrids have above average *iv*NDFD.

Many research reports have concluded that bmr corn silage increases milk production in cows. Our data consistently shows higher Milk per Ton, but lower Milk per Acre yield due to lower forage yield primarily due to grain yield. Since there is typically no premium paid for higher quality corn silage, I have often said, "Buy all of the bmr corn silage you can buy, but be careful about growing it on your farm." Breeding progress has likely improved silage-specific corn hybrids, but there is a corresponding genetic improvement going on with conventional and bio-engineered hybrids as well.

The BMR Corn Silage Calculator: What are the economic trade-offs for yield and quality?

To better understand the economic effect of bmr corn in dairy operation, Dr. Randy Shaver et al. have developed a spreadsheet that can be downloaded here and here. This MS Excel spreadsheet calculates milk production of brown midrib (BMR) corn silage hybrids versus conventional hybrids. The spreadsheet calculates differences based cow herd size. Dr. John Goeser (Rock River Labs and adjunct UW faculty) has produced a video explaining how to use the spreadsheet here.~

Links to Spreadsheet and Video:

Corn BMR Milk vs Yield Calculator:
http://corn.agronomy.wisc.edu/Season

Video: https://www.youtube.com/watch?v=9gEwycmyxMw&feature=youtu.be

Variable vs. Uniform Seeding Rates for Corn

Emerson Nafziger, Extension Specialist, Crop Production, U. of Illinois Extension

Along with colleagues from Ohio State University, we took a look recently at data from a lot of corn plant population trials in both Ohio and Illinois to see if we could come up with estimates of the value of variable-rate corn planting. This work was published in Agronomy Journal (reference is at the end of this article) and my OSU colleagues also put the findings in an Extension fact sheet, available here. (https://ohioline.osu.edu/factsheet/agf-520)

It's not so difficult to do seeding rate trials with today's planting equipment and yield monitors, and it's even possible to do several of these within a field in order to get an idea of how much responses vary within the field. The difficulty is that responses within parts of a field are not consistent across years: they are often more dependent on weather conditions than on soil zone or soil type. As an example, yields in recent years with wet spring weather have often been higher on sloping parts of fields than in the flatter, higher-organic matter soil where we would normally expect more yield, and so be inclined to drop more seeds.

One solution to this problem is to do a simulation, using existing data from a number of population trials over sites and years to get an idea of how much we might expect population responses to vary within a field with different soils and in different years. To do this, we turned the yields from each individual trial into "return to seed" (RTS) data, by taking yield times the corn price at each planting rate and subtracting the seeding rate times the cost of seed. For this exercise, we used a corn price of $3.75 per bushel and seed cost of $3.00 per thousand. So if the yield in a trial was 220 bushels per acre at a seeding rate of 36,000, the return to seed at that population was 220 x $3.75 – 36 x $3.00 = $717 per acre.

The response of corn yield to plant population/seeding rate (we use these interchangeably here; with the precision planter we use for plots, they are nearly identical in most cases) usually takes one of two shapes: 1) yield increases as a curve up to a certain population, then levels off at higher populations—we call this a "quadratic+plateau" (Q+P) response; or 2) yield increases as a curve up to a certain population, then declines at higher populations—this is a "quadratic" (Q) response. When yield data are converted to RTS data, a QP response rises to a maximum, then declines as a straight line, with loss at higher population as seed cost increases but yield doesn't. The data from a Q response, though, shows RTS rising up to its maximum, then declining at higher populations at the same rate as it increased, weighed down both by higher seed costs and loss of yield. Curves from two Illinois trials that illustrate these two responses are shown in Figure 1.

The maximum point on either a Q or QP curve plotted as RTS is what we call the "optimum" seeding rate, or the one that produced the maximum economic return. Using the prices given above, adding the last 1,000 seeds needs to increase yield by $3.00 ÷ $3.75 = 0.8 bushels per acre in order to pay for itself. We used data from 32 Illinois trials in this work, and the RTS curves from each trial are shown in Figure 2.

Nine of these trials showed a Q response, and 23 showed a QP response. All of the Q responses show a curved decline at higher populations, and the QP ones decline as straight lines to the right of their maximum points.

We averaged the RTS values at each population across all 32 Illinois sites, and found that the maximum RTS ($740.05, from a yield of 224.05 bushels per acre) occurred at a population of 33,377 plants per acre. We'll consider that the best uniform seeding rate (USR) in this exercise. Across trials, the population at the maximum RTS (yellow circles in Figure 2) ranged from 23,942 to 40,609, and averaged 33,399 plants per acre, or 22 plants per acre more than the 33,377 in the "uniform" seeding rate. The maximum RTS values ranged from $420.32 to $905.21 per acre, and averaged $742.89 per acre.

Now let's pretend that each trial represents a 2.5-acre part of an 80-acre field. The "best" population in each block is the population that produces the maximum RTS in that block (trial): we can't really know what that is beforehand, but here we're using that range (23,900 to 40,600) as one that might apply in a variable field, and we're pretending that we know just which block gets which seeding rate. As noted above, using "VRT" meant planting an average of 33,399 seeds per acre, and produced an average yield of 224.82 bushels per acre, for an overall RTS of $742.89 per acre.

The USR of 33,377 per acre was higher than the VRT seeding rate in about half the blocks and lower in the other half; the USR is not (by definition) exactly the best seeding rate for any one block. In other words, a uniform seeding rate across the field reduces the RTS in every part of the field. Doesn't that

Continued next page

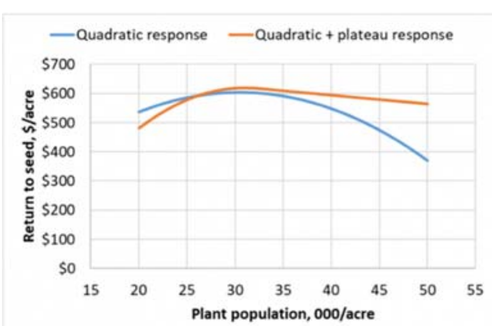

Figure 1. Examples from Illinois trials with return to seed (RTS) data fit by a quadratic+plateau function compared to a quadratic curve. The population that maximizes RTS is similar (between 30 and 31 thousand) for both curves, but the dollar penalty for having population too high is much larger when the response is quadratic.

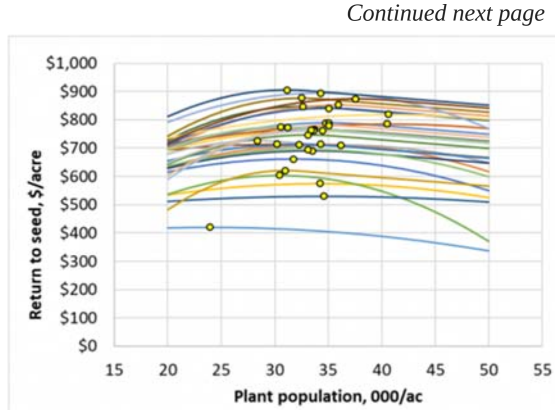

Figure 2. Return to seed (RTS) response to corn plant population in 32 Illinois trials conducted between 2010 and 2016. The yellow circles mark the high point of each curve, which is the "best" population for that trial.

mean that VRT is superior to USR every time? Yes, but the issue (in addition to the larger issue of knowing how to set VRT rates) is how much added return we can get from VRT. With Illinois data, the improvement in RTS in a block ranged from less than one cent to $11.60 per acre; in only half of the blocks did VRT produce more than $1.00 greater RTS than USR. Overall, VRT produced $2.84 more than USR: $2.90 from getting 0.7 more bushels with VRT, and subtracting the 22 more seeds ($0.06/acre) needed for VRT.

Results in Ohio were quite different from those in Illinois. More than 75% of the 93 Ohio trials showed a quadratic response to population. Quadratic responses result from having high populations high enough to decease yield, and this is more common in less-productive soils, under poor weather conditions, or where the maximum population is set very high. Because quadratic responses mean large losses in RTS at high populations, VRT, by avoiding such penalties, provides more of an advantage over USR when responses are mostly quadratic. Across the Ohio trials, the USR seeding rate was 32,721 per acre and the average VRT rate was 592 seed lower, at 32,129 seeds per acre. The yield with VRT was 205.5, or 2.9 bushels per acre higher than with USR, and the RTS with VRT was $12.53 higher than with USR: $10.76 from higher yield and $1.77 from the lower seeding rate. This may signal that VRT might have more promise in forest-derived soils (which are more common in Ohio), but that needs to be confirmed by running trials on such soils in Illinois.

So, VRT or not?

With today's equipment, VRT can be done with little cost, depending on how much we pay for a planting map. So why not use it in most fields, even if returns are modest? There are fields where it makes a lot of sense, such as irrigated fields with unirrigated corners, where dropping the population by a lot may often increase yields in very light soils. There are also fields with soil types ranging from clay loam to sandy loam, where adjusting populations by soil type might make sense. It's not always clear how such adjustments should be made, but any part of the field that tends to show drought stress (this could be on light or heavy soils) may benefit from somewhat lower population. Population should probably never be set so low that yields will take a hit if the weather turns favorable, though: a yield map from a year with above-average yields is a better guide to this than one from years when yields are below average. Most hybrids produce good yields at populations above 28,000 or so, and it is usually counter-productive to set the lowest VRT seeding rates to less than 30,000 seeds in most unirrigated fields, at least ones without very light soils.

As with other aspects of managing today's hybrids, using VRT is unlikely to show large increase in yields or saving of seed, and so we should avoid adding costs or using "high and higher" seeding rates because we've heard that high yields require high populations. Across the six trials we did in 2018, 35,800 maximized yield at 252 bushels per acre, but the average optimum population was 32,600, which produced an average yield of 251. Although this population is a few thousand less than we've sometimes found in trials, it's likely that planting 35 or 36,000 per acre uniformly across less-variable fields will perform about as well as VRT, however we choose to do it. ~

"Room to Drink", *continued from page 4*

- Provide a minimum of 2 waterers per group.
- Clean daily.
- Put outside waterers in the shade.
- Locate waterers on the return trip from the parlor.
- Make sure that you have water-fill pressure that's adequate so cows don't have to wait. Minimum well size is about 10 gallons/minute.
- Consider using a water reservoir if your well capacity will not meet peak demand.
- Plate cooler water is ideal due to the warm temperature; however, delivery can be sporadic. Be sure that you have a way to deliver constant water flow to meet cow demand.
- Prevent stagnant water. Use a water depth in the trough that is between 6 and 12 inches.
- If you place guards around a waterer to keep cows from standing in it, allow for 24 inches of clearance for their heads. Anything less can deter intake.

Install a waterer in the breezeway

Oftentimes, removing a couple of free-stalls to increase the space around a waterer in a crossover lane isn't feasible. Fortunately, you have other options.

One of the best places to add water is in the alleyways or breezeways that the cows use to travel to and from the parlor. The travel lanes are generally 14 feet or wider, depending on group size, so they become a natural place to add a waterer and encourage water intake when cows leave the parlor.

You'll want to size the waterer so that all cows leaving the parlor can drink at once.

If you have a double-16 parlor, for example, you will need a 32-foot tank (allowing 2 feet per cow) and enough water pressure to maintain water levels during peak demand. When sized correctly, in the approximate 12 to 15 minutes it takes to turn the parlor, one group of cows will drink their fill and leave the area shortly before the next batch of cows arrives.~

Reference: Lindsey, Alexander J., Peter R. Thomison, and Emerson D. Nafziger. 2018. Modeling the effect of varied and fixed seeding rates at a small-plot scale. Agron. J. 110:2456–2461 doi:10.2134/agronj2018.07.0426

Avoiding Sidewall Compaction at Planting

Paul Jasa - Extension Engineer, April 19, 2019

Planting season is here and many fields are very wet. As producers watch the calendar, they'll be headed to fields that may be less than ideal for planting. Wet soils are easily compacted and sidewall compaction during planting can be a problem, especially if the crop is "mudded in" and a dry spell occurs after planting. Patience is required for waiting for the soil to dry, but if the next rain is coming or the yield penalty for late planting is growing, it's hard to wait.

Contributing Factors

Shallow Planting

Figure 1. These roots had difficulty penetrating the soil as the seeds were planted too shallow, only about 1 inch deep. The angled press wheels, designed for 2- to 3-inch planting depths, packed below the shallow planted seed, forcing the roots to grow laterally down the seed-vee. (Photos by Paul Jasa)

Many factors contribute to sidewall compaction. While opening a seed-vee in wet soil is often given as the main reason, planting too shallow is the primary problem. In most conditions, corn seed should be planted 2 to 3 inches deep for proper root development. Most corn planters were designed for this planting depth, especially those with angled closing wheels. When the seed-vee is properly closed, the sidewalls of the furrow will be fractured as the soil closes around the seed, eliminating the sidewall compaction and providing seed-to-soil contact.

Most sidewall compaction problems occur when the press wheels are set with too much downpressure, overpacking the seeds into the wet soil. When planting shallow, this press wheel compaction is below the seeding depth, making it difficult for the seedling roots to penetrate the soil (*Figure 1*). If you look at the angled press wheels from the rear, they intersect at an imaginary point about 2 inches below the soil surface. This provides seed-to-soil contact at seeding depth while closing the seed-vee. As such, downpressure on the press wheels should be checked at seeding depth, not at the top of the seed-vee. If the seed-to-soil contact is adequate, don't tighten the downpressure springs trying to close the top of the seed-vee. Make sure that the planter is properly leveled, or even slightly tail down, for the angled closing wheels to have a pinching action to close the seed-vSeed-vee

Closing Wheels

A variety of attachments are available to help close the seed-vee if the standard closing wheels cannot. Some producers use coulters or intermeshing row cleaners to till the soil in front of the planting unit to provide loose soil for closing the seed-vee. However, this loosened soil often sticks to the depth gauge wheels in wet conditions or the tillage dries out the seed zone in dry weather. A better way to provide loose soil for closing the seed-vee is to do it after the seed has been placed in the furrow. There are several brands of spiked closing wheels available to replace the standard press wheels with ones that till in the sidewall around the seed.

Figure 2. By replacing one solid closing wheel with a spiked one, closing the seed-vee becomes easier in a variety of conditions. The spiked wheel fractures the sidewall and provides some loose soil while the solid one provides some seed firming and depth control. (If the closing wheels can be staggered, mount the spiked one in front.)

The less aggressive spoked wheels provide some seed-to-soil contact while closing the seed-vee and reducing air pockets around the seed. The more aggressive spoked wheels tend to dry the soil more and typically require a seed firmer to provide seed-to-soil contact and a drag chain behind them to level the soil. As the soils become drier and more seed-to-soil contact is needed, some producers remove the spiked wheels and put the standard closing wheels back on to reduce overdrying the seed zone. If the downpressure is set too high on some of these spiked wheels, they may "till" the seed out of the seed-vee, especially when planting on curves or contours. To reduce the aggressiveness of the tillage and to provide some soil firming and depth control, some producers run one spoked closing wheel and one standard wheel (*Figure 2*). This combination works well in a wide variety of conditions.

Too Much Downpressure

Figure 3. The seed furrow opener may smear the soil in wet planting conditions, but the closing devices should fracture the sidewall when closing the seed-vee. If not, the smeared soil may harden when it dries, making root penetration difficult

While the seed furrow closing devices are important, too much downpressure on the depth gauge wheels will also create sidewall compaction as the disk openers form the seed furrow. The disk openers may create some sidewall smearing while pushing the soil outward to form the seed-vee. If there is too much downpressure on the depth gauge wheels, they will pack the soil downward at the same time, causing compaction that may be too dense for the closing devices to fracture (*Figure 3*). When this occurs, producers typically put more pressure on the press wheels trying to close the seed-vee, making the compaction around the seed worse yet. Downpressure on both the row unit (depth gauge wheels) and the press wheels should be reduced in wet soil conditions.

Continued on page 10

Soil Structure

Figure 4. While the seed-vee was closed at planting time when the soil was wet, it dried out where there was no residue to conserve moisture. As it dried, the heavy clay soil shrunk and the seedvee opened back up. Staggering the closing wheels, one in front of the other if possible, will help reduce the seedvee from opening back up.

Another contributor to sidewall compaction is the lack of soil structure in many tilled fields. Producers may put extra pressure on the closing devices to close the seed-vee when in wet conditions. Without soil structure, the standard closing wheels "pinch" the sidewalls closed over the seed, particularly in heavier soils. However, as the soil dries, it shrinks and the seed-vee may open back up, exposing the seeds. This often occurs when there is a hot, windy period after planting, drying out the seed zone and reducing the stand (*Figure 4*). This is less of a problem in higher organic matter soils and in continuous no-till soils with improved soil structure.

If the angled closing wheels can be remounted, one in front of the other, this will reduce the pinching effect and compaction over the seed. If there is a dry layer on top of the soil at planting time and good soil moisture at planting depth, don't use residue movers to remove the dry soil because it has already shrunk. Also, when possible, leave residue over the row to reduce drying of the soil and to protect the seed zone from raindrop impact. ~

"Stockmanship", *continued from page 5*

both front feet and ears forward when approaching the handler. This movement shows she is "thinking" rather than reacting. The handler's movements and pressure will allow her to walk past if she's thinking, rather than running past if she's reacting. Working with heifers to train them on this can be helpful in avoiding injuries from cattle. Allowing cattle to run past a handler only teaches them to disregard space; maintaining that thinking action in the cow allows the cow to grow and respond more calmly the next time she's in that situation.

As a handler, there are other situations that might be useful to consider. When loading cows on to a trailer, the loading height should be as level as possible. Also, the surface appearance should be as consistent as possible from the barn to the trailer. For example, putting shavings on the floor of the barn and shavings on the trailer eases the transition from one to the other. In addition, many handlers have found that having the engine of the truck that is attached to the trailer being shut off is helpful.

Additional time and patience should be used to move cows when they are overstocked, in the sick or lame pen, or under heat stress. In any of these situations, the movement of the cow is compromised, whether by her health or physical constraints within the pen. Allowing for ample time to move these cows will benefit all parties, as it will be less stressful and movement more intentional. Young heifers should also be allowed more time and patience when handled. Time spent with these groups of animals will help in the long run, especially if we take the time to train them to "think" rather than react. Many handlers have been knocked over by heifers losing their footing as they run by and slip on manure. Keeping these heifers thinking will minimize their reactions and make movement more deliberate and less chaotic.

Some dairy farms also utilize bulls. While this is not recommended from a safety standpoint, a farm that runs bulls in their pens should properly train their employees to handle them appropriately. When working with bulls, handlers should be able to turn the bull with minimal driving pressure. Bulls should be worked with to maintain that relationship and space requirement of the human, but above all else, handlers need to be vigilant and pay attention to any changes in attitude or demeanor of the bull. Once a bull fails to respect the driving pressure and space requirement of the handler, that bull should be out the door.

Cows should know the difference between when they're being worked and when they're not being worked. For instance, we don't want cows to get up every time we enter the pen, but we do want to effectively get them up to move them to the parlor when it's their time to be milked. Adopting a mannerism when you're moving cows is helpful to let them know what to expect. This can be in the way the handler carries him or herself, eye contact with the animal, utilizing that rocking movement to back cows out of a stall, and making a certain noise when driving pressure is being used.

A good stockman doesn't do the same thing every day no matter the situation. They adapt to the cow and the situation and utilize different amounts and forms of pressure to achieve movement. Keep this in mind as you are moving cows next time and be aware of the type of pressure you are applying and how the cows are reacting. Remember, mind first, then feet.~

Herbicide Mode Of Action Resource

Chart Daniel H. Smith, Nutrient and Pest Management Program, University of Wisconsin-Madison

The Nutrient and Pest Management and the Wisconsin Cropping Weed Science programs have recently updated the Wisconsin Herbicide Mode Of Action Chart. This 4 page publication provides herbicide mode of action, group number, site of action, chemical family, active ingredient, and example trade names for herbicides currently registered in Wisconsin. The second page of the chart details registered herbicide combination products in Wisconsin including the trade name, active ingredients, trade name examples included in the premix, and site of action group. With the widespread occurrence of herbicide-resistant weeds, it's important that farmers and crop advisors select effective herbicides from multiple sites of action. The intent of this publication is to help farmers and crop advisors understand the different sites of action and products registered in Wisconsin and assist with their herbicide selection. The Herbicide Mode of Action chart can be found here: https://ipcm.wisc.edu/download/pubsPM/Herbicide-Mode-of-Action.pdf ~ -This chart is offered for reference, please call Janice if you are unsure if of the one of the listed products is registered in NYS. -Janice

Early-season Weed Control is Important:

Not starting with a clean field can reduce yields.

Christy Sprague, Michigan State University Extension, Department of Plant, Soil and Microbial Sciences

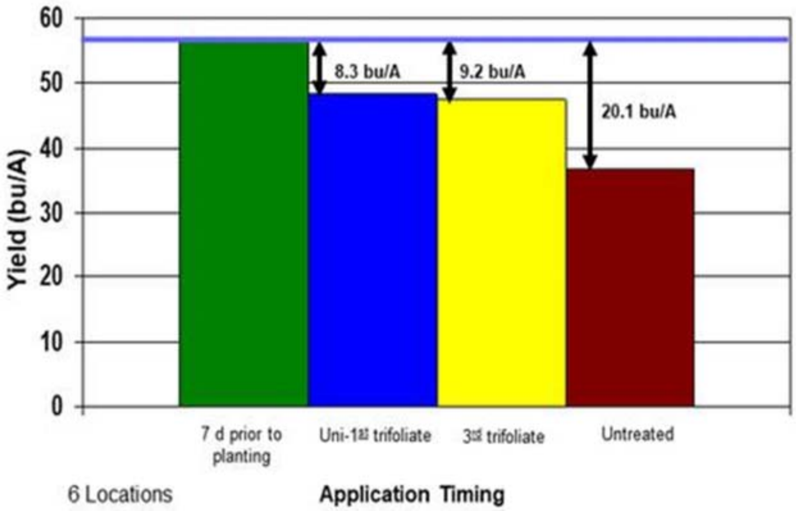

Figure 1. Soybean yield due to delayed burndown herbicide applications. Burndown applications were made seven days prior to planting at unifoliate to V1 (1-trifoliate) soybean and V3 (3-trifoliate) soybean.

Winter annual weeds and newly emerged summer annuals are starting to flourish. As temperatures start to increase, competition for field operations will occur. Most growers will want to start planting as soon as possible, but it is important to make sure weeds are managed prior to planting. Not controlling weeds can interfere with planting and compete with the emerging crop for light, water, nutrients and space that can reduce crop yield.

Several years ago we conducted research over six locations that examined pre-plant burndown applications made at least seven days prior to planting compared with delayed applications of glyphosate at VC (unifoliate) to V1 (one trifoliate) and V3 soybean. Average soybean yield loss was 8.3 bushels per acre if applications were delayed until VC/V1 soybean (Fig. 1). Waiting until soybeans were at the V3 growth stages resulted in a 9.2 bushel per acre loss.

In addition to protecting yield by reducing early-season weed competition, starting the growing season with a clean field either with a burndown application or tillage will also eliminate several winter annual weeds that may potentially serve as hosts for destructive insects and soybean cyst nematode. One of the other challenges we have if we don't control weeds prior to planting is that as these weeds continue to grow, they can be harder to control. This is especially a problem in the case of herbicide-(glyphosate and ALS) resistant horseweed (marestail). If resistant horseweed is not managed prior to planting, there are no post-emergence herbicides for control in Roundup Ready or non-GMO soybean. Also, if not controlled early, this weed will be more difficult to control in LibertyLink, LibertyLink GT27 and Roundup Ready 2 Xtend soybean.

There are several steps to follow when managing herbicide-resistant horseweed that include using effective burndown applications and good soil-applied residual herbicides. These steps are outlined in Michigan State University's "Herbicide-resistant horseweed (marestail) in Michigan" fact sheet or on page 217 of the "2019 Weed Control Guide for Field Crops" (https://www.canr.msu.edu/weeds/extension/2019-weed-control-guide).

Additionally, keep in mind many of the burndown herbicides and effective soil-applied residual herbicides that we use in soybean need to be applied prior to soybean emergence or severe crop injury can occur.

A complete listing of burndown herbicide programs and their effectiveness ratings can be found in the no-till soybean section, Table 2P of the "2019 Weed Control Guide for Field Crops". Remember, treatments that contain 1 pint per acre of 2,4-D ester need to be applied a minimum of seven days before soybean planting.

Corn is also very susceptible to early-season weed competition. Starting with a weed-free seedbed with tillage or an effective burndown herbicide program helps protects corn from yield loss later in the season. Soil-applied (PRE) residual herbicides are also important to an overall weed control program in corn. However, sometimes corn planting operations can get ahead of the sprayer and there are several soil-applied (PRE residual) herbicide options that can be used once corn has emerged. A complete listing of these herbicides can be found in Table 1H of the 2019 Weed Control Guide.~

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CALENDAR OF EVENTS

May 9-30 — **Youth Tractor Safety Certification Course** — **Thurs May 9, 16, 23, May 30, 5 – 9pm**; **Sat May 11 & 18, 8:30-12:30 am**
Venture Farms LLC, 6978 Route 80, Tully, NY 13159 (First Session)
Cazenovia Equipment Company, 9740 3892, US-11, Cortland, NY 13045
Contact Melanie Palmer 315-424-9485 ext. 228 or mjp232@cornell.edu
Or register: https://reg.cce.cornell.edu/YouthTractorSafety2019_231

June 6 — **Small Grains Management Field Day** — **9:30 am-12:00 pm**
New Location: Poormon Farms, 3048 State Route 414, Seneca Falls, NY 13148 — **DEC/CCA** credits requested
http://events.cornell.edu/event/2019_small_grains_management_field_day
Topics: 2019 Crop Development and Management Observations; Small Grain Breeding, Varieties, and Availability of Seed; Progress on the 'Born, Bred, and Brewed in New York' Spring Barley Variety Development; Nitrogen Fertility for Small Grains; Update on Integrated Disease Management in Small Srains – Including New Fungicide Options; New developments in the Barley-Malt-Beer Value Chain: Various Speakers; Updates and Comments from Attendees.

June 17 — **Dairy Margin Coverage (DMC) Sign-Ups Begin:** Visit your local FSA office to enroll in this voluntary risk management program. An online decision tool is now available to help producers evaluate different scenarios under various DMC coverage levels. Members of our team are available to assist producers with the online tool.
https://www.fsa.usda.gov/programs-and-services/farm-bill/farm-safety-net/dairy-programs/dmc-decision-tool/index

July 11 — **2019 Aurora Farm Field Day** — Free and open to public, includes chicken BBQ — **12:00 pm**
Musgrave Research Farm, 1256 Poplar Ridge Road Aurora, NY
For more info contact Jenn Thomas-Murphy at (607) 255-2177
http://fieldcrops.cals.cornell.edu

July 25-27th — **Grasstravaganza Grazing and Soil Health Conference** — **12:00 pm all three days**
SUNY COBLESKILL, 06 Suffolk Cir, Cobleskill, New York 12043
For more info contact: Jeremy M. Call at (35) 477-6536 or jeremy.call@ny.usda.gov
http://www.facebook.com/grasstravaganza2019