Cornell Cooperative Extension

Central New York Dairy, Livestock and Field Crops

Serving Chenango, Fulton, Herkimer, Madison, Montgomery, Otsego, Saratoga and Schoharie Counties

In this issue:

Winter 2020

A Tale of Two Fibers

Dr. Rick Grant, President, Miner Institute

Recently, we have been focused on the relationship between undigested and physically effective NDF (abbreviated as uNDF and peNDF). The potential interactions between peNDF and uNDF measured at 240 hours of fermentation (uNDF240) is a hot topic among nutritionists and leads to several important, practical feeding questions:

1) what is the effect of peNDF and uNDF240 in diets fed to lactating cows?
2) are there optimal peNDF concentrations as uNDF240 varies in the diet?
3) Can we adjust for a lack of peNDF by adding more uNDF240 in the diet? and
4) if forage uNDF240 is higher than desired, can we at least partially compensate by chopping the forage finer?

Some have even wondered how important particle size actually is as we better understand fiber digestion fractions (i.e., fast, slow, and uNDF240) and their rates of digestion. This is a question that can be answered in another article, but the short answer is – yes – particle size is important, though maybe for reasons we haven't always appreciated such as its effect on eating time even more so than rumination.

We recently finished a study in collaboration with Zennoh – a large Japanese agricultural cooperative with whom we've collaborated for many years – where we assessed the effect of feeding lower (8.9% of ration DM) and higher (11.5% of ration DM) uNDF240 in diets with either low or high peNDF. The diets contained approximately 35% corn silage, 1.6% chopped wheat straw, and chopped timothy hay with either a lower physical effectiveness factor (fraction of particles ≥1.18-mm screen; 0.24) or a higher pef (0.58). We used a Haybuster with its hammer mill chopping to achieve the two particle sizes of dry hay. The lower uNDF240 diets contained about 47% forage and the higher uNDF240 diets contained about 60% forage on a dry basis.

The "bookend" diets that contained the extremes in either uNDF240 or peNDF (i.e., low uNDF240 and peNDF versus high uNDF240 and peNDF) consistently and predictably differed in DMI, milk yield and composition, and chewing behavior. Of greatest interest, the two intermediate diets that contained either low uNDF240 and high peNDF or high uNDF240 and low peNDF resulted in similar DMI, energy-corrected milk, and ruminal pH and VFA concentrations.

Here's the take-home: the calculated "physically effective uNDF240" (pef x uNDF240) was virtually the same for both of these diets (5.9% of ration DM). Our goal is not to coin yet another nutritional acronym, but to focus on a highly useful concept. We were able to elicit the same response by the cow whether we had lower uNDF240 in the diet chopped more coarsely, or whether we had higher uNDF240, but chopped more finely.

If future research confirms this response, then it suggests that when forage fiber digestibility is lower than desired, then a finer forage chop length will boost feed intake and lactational response. A good example would be if a cutting of haycrop get away from you and becomes little too mature, then a finer chop length should boost intake and milk yield when it is fed.

As Charles Dickens wrote in his classic novel Tale of Two Cities "It was the best of times, it was the worst of times…" When it comes to fiber, it looks like we can have the best of times when we are able to integrate both uNDF240 and peNDF when formulating rations. Stay tuned as we report on more of this research in the coming months.

Feeding Baleage to Sheep and Goats

Ashley McFarland, CNYDLFC Regional Livestock Specialist

Baleage is an excellent source of feed that often small ruminant operations have avoided. The main reason is quite often sheep and goat operations are at a much smaller scale and do not feel they can feed through the feed at a fast enough rate. However, baleage offers a low cost, high forage option for sheep and goats, which could really benefit these producers.

Right now with a depressed market producers are finding themselves cutting costs somewhere. Feed costs are the highest cost on these operations. That being said hay prices this year are extremely high compared to the past three years due to the wet spring and summer. As our small ruminant farms look for ways to reduce their feed costs, baleage is one option that would fit this category. However, there are risks with choosing this option for their forage source.

Baleage is a type of hay that is made into large round or square bales which is baled fairly wet (above 60% moisture) and stored in air tight plastic wrap. This type of forage requires a lot less drying time in the field, therefore there was quite a lot being made in May and June this year to get the feed off the fields. By making baleage farmers were able to get their hay off when it was ready vs. waiting until they had a 4 day dry window to make dry hay and the hay was past its prime.

This type of forage is more palatable for small ruminants and they tend to choose to eat baleage over dry hay if given the option. Due to the high risk of listeriosis, also known as circling disease in ruminants. It is recommended that you have a minimum of 25-30 ewes/does to utilize a bale fast enough. Sheep and goats are more susceptible to getting listeriosis than cattle due to their body mass. The bacteria that causes this disease is found in the soil and thrives in fermented environments under cold conditions, when oxygen is exposed. If the feed is processed and stored correctly the risk of listeriosis is much less. Another concern is mold, if the bale is not stored correctly and gets any oxygen exposure, mold will form. We often see mold affecting small ruminants much more than cattle.

More often than not, sheep and goat producers are purchasing their feed from an outside source off the farm. That being said, a good management practice to discuss with the seller is how the baleage was processed before purchasing. Asking a few simple questions can minimize the risk of listeriosis in your herd. Another good practice is to allow fermentation 6-8 weeks prior to feeding.

Feeding baleage is a great way to decrease overall feed costs as well as provide high quality feed to does and ewes, but the proper management practices must be met in order to minimize the exposure of listeriosis.

Corn Residue Breakdown as Affected by Tillage and N Application

Mahdi Al-Kaisi, Professor of Soil Management/Environment Iowa State University

https://crops.extension.iastate.edu/cropnews/2019/11/corn-residue-breakdown-affected-tillage-and-n-application

November 5, 2019—

Crop residue serves an important role in physically protecting soil from erosion during rain events or high winds, as well as enhancing the soil biological activity by providing sources of organic carbon and nitrogen for its energy needs. In order to understand how residue decomposes, we need to understand how the degradation processes are influenced by environmental and soil conditions; namely, air and soil temperatures, soil moisture availability, soil pH, oxygen, and type of microbial community. The composition of crop residue includes lignin, cellulose, hemicellulose, and macro and micronutrients. Certain biological and enzymatic processes, controlled by a wide range of microorganisms and influenced by other factors, must occur in order to release most of these organic forms.

In agriculture, annual cropping systems and other ecosystems management can influence these factors that are critical to the process of residue breakdown. There is a common belief among many farmers and agronomists that tillage can accelerate residue breakdown by the cutting of crop residue into small pieces or burying residue in the soil profile. Also, there is the belief that the application of nitrogen fertilizer on crop residue (i.e., corn residue) after harvest can speed up the process of residue breakdown. Both assertions are not correct.

Tillage Effects on Residue Breakdown

A study conducted to examine the effect of three different tillage systems that include deep tillage (DT), strip-tillage (ST), and no-till (NT) on residue breakdown of both Bt and non-Bt corn residues. The results of this three-year field and laboratory incubation studies show no significant differences in the breakdown or percent of residue that remained among the three tillage systems with either Bt and non-Bt corn hybrid residues. Also, after 12 months, there was no difference between tillage systems or Bt and non-Bt hybrid residue breakdown in the field, where 34-49% of the corn residue still remained on the soil surface. The results of the residue decomposition study are presented in Figure 1, where the residue decomposition rate is represented by CO_2-C release. The results show no significant difference in the breakdown or decomposition due to tillage or type of residue (Bt or non-Bt).

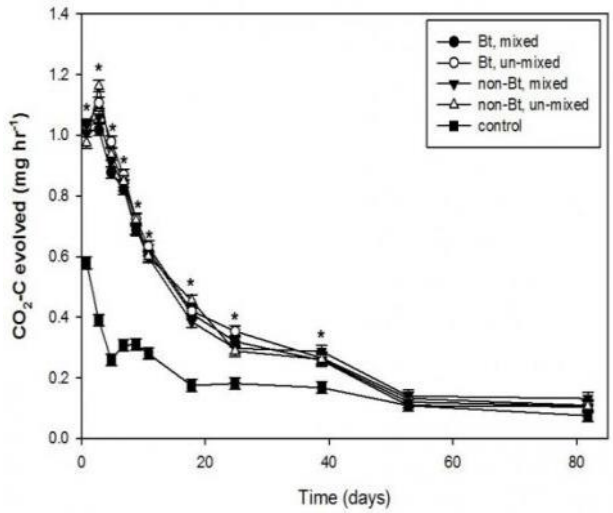

Figure 1. *Rate of CO_2-C released as an indicator of residue breakdown/decomposition from control (bare soil) and Bt and non-Bt corn residue mixed into the soil or un-mixed with soil (left on soil surface). Asterisk represents CO_2-C released rates from treatments that were significantly different from control for the corresponding days at the 0.05 probability level using the least significant difference.*

Nitrogen Fertilizer Application Effects on Residue Breakdown

The results of the study on corn residue decomposition with different N rates in the no-tillage system under field conditions are presented in Figure 2a. Corn residue decomposition was evaluated by applying 32% UAN at three N rates (0, 30 and 60 lb N/acre) to corn residue immediately after harvest, where specific amounts of corn residue were weighed and placed in nylon mesh bags and left in the field immediately after harvest for decomposition evaluation. The rate of residue decomposition was evaluated every three months for the entire year (12 months).

The results showed that corn residue decomposition increased with time with lesser amounts of residue remaining after each evaluation period,

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but no differences existed in the rate of residue decomposition as a result of N application of different N rates. These results show that applying N fertilizer to facilitate residue decomposition is not effective. The timing of N application for corn residue decomposition immediately after harvest, as practiced, is not an effective strategy, as the soil and air temperatures decrease over time after fall harvest. Soil moisture and temperature are essential factors for microbial activity for the residue decomposition (moisture at field capacity and warm temperature above 50 ^{o}F). Therefore, fall N application does not achieve the intended result of facilitating residue decomposition.

The same results were observed with laboratory evaluation of corn residue decomposition that was conducted with the same residue treated with different N rates in the field study. Corn residue samples from the field were incubated in the laboratory under constant temperatures of 32° F and 90° F for approximately 30 days each (Fig. 2b and 2c). The rate of corn residue decomposition under laboratory conditions followed a similar trend as that in the field. Again, no differences in residue decomposition/breakdown with different N rates were found. The laboratory study results confirmed the field results and demonstrated the role of temperature in controlling corn residue decomposition rather than N rate, where a slower rate of residue decomposition was observed at the low temperature (32 ^{o}F) and increased at the higher temperature (90 ^{o}F) (Fig. 2b and 2c) without any effect of N application on residue breakdown.

Summary

The use of tillage or N application to increase residue decomposition can be counterproductive from economic and environmental perspectives. From an economic perspective, both options of management add additional costs of materials, time, labor, fuel, and equipment costs. Environmentally, both tillage and this fall N application are not very sustainable practices. Tillage can contribute to soil health and water quality deterioration by increasing soil erosion potential, sediment loss, and water quality degradation, and fall N applications result in water quality risks. Since residue decomposition is controlled by biological processes that are influenced by environmental and soil conditions, our research and many other studies do not support these practices regardless of the justification or claims that propose tillage equipment can manage residue. Disturbing the soil does not constitute an improvement in soil health nor increase in residue decomposition.

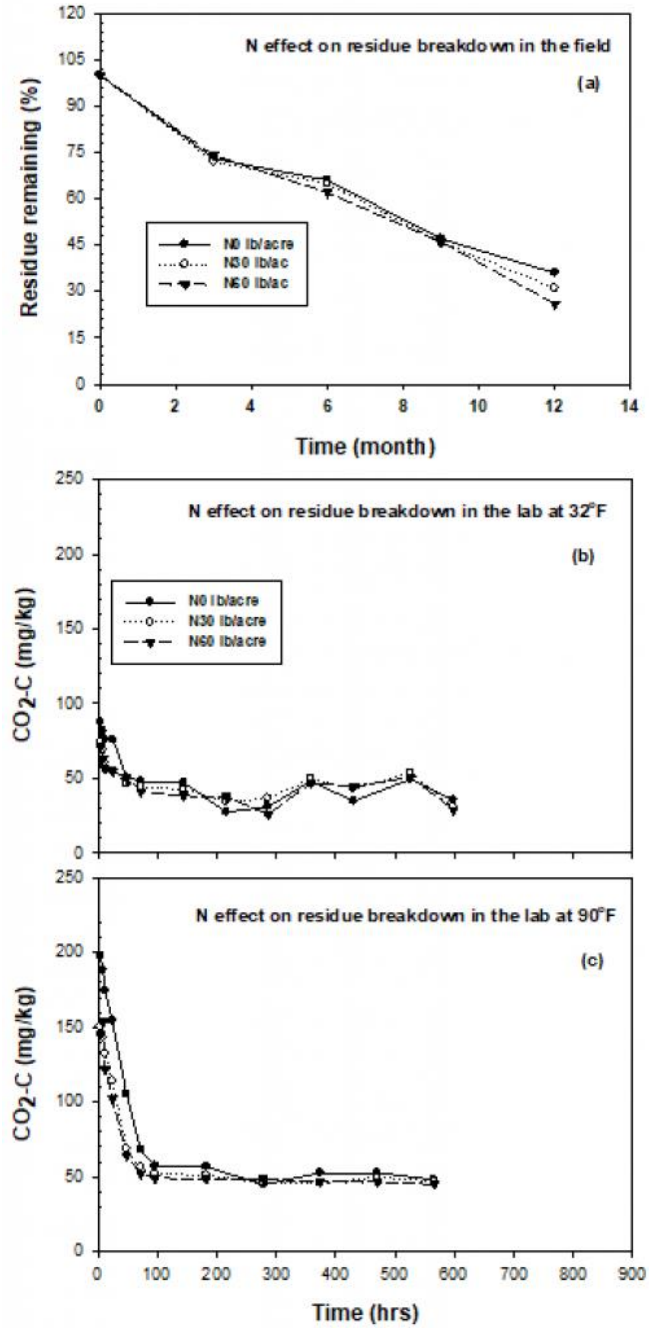

Figure 2. *Nitrogen (N) effect on (a) residue breakdown in the field, (b) residue breakdown in the laboratory under 32° F and (c) residue breakdown in the laboratory at 90° F room temperatures.*

Managing Mud on Cattle Farms

Travis Meteer, Extension Educator, Commercial Agriculture

Wet, cold weather continues to persist in the Midwest. Naturally, these conditions create mud. Muddy conditions are rather difficult to navigate on the cattle farm. These conditions can be frustrating for the farmer and the cattle. Challenges associated with mud on the cattle farm need to be identified and evaluated to ensure the environment is not detrimental to animal health and performance.

Challenges

One of the downfall's to mud is the increase in energy requirement for cattle to navigate the terrain. After all, when you "boot up" and head out to tromp through the mud you are using more energy to travel the same distance through mud too. As you track through muddy lot you are normally out of breath and tired. Same goes for cattle… they are getting a workout too.

The added energy needed results in less going to weight gain and performance. In 1991, University of Nebraska researchers published common numbers associated with loss of gain due to mud.

Mud Depth	Loss of gain
Declaw deep	7%
Shin Deep	14%
Hock Deep	28%
Belly Deep	35%

University of Nebraska also published "Mud Effects on Feedlot Cattle" in 2011. This piece authored by Terry Mader, built a model and simulated conditions based on actual cattle feeding studies. The model showed under cold (16°F) and wet (6 in. rainfall for 120-day feeding period) conditions cost-of-gain was 56.1% higher than 26°F and no precipitation.

Another problem associated with extended muddy conditions is foot rot. Constant exposure to wet conditions can lead to breakdown of the skin around the hoof. This opens the tissues up to bacteria and can lead to infection. Swelling and lameness are usually the first signs that an animal has foot rot.

A dryer, less saturated area for cattle is the answer to maintain cattle performance and avoid health issues. Often times a pasture is considered as the savior. Stockpiled pastures with good drainage can be a big help. However, stocking too many animals in a small pasture area or the trailing of animals across pastures can cause disturbance of the soil. If tracked up, the forage stand will be reduced and opened to weed pressure in the following growing season.

Management

Managing mud is a tough task. Sure, everyone would love to have concrete feeding pads or facilities to get cattle up out of the mud. While these are options, they are expensive. If you continually are dealing with muddy conditions, they could be worth the investment. Geotextile fabric and rock will be a good investment for temporary or mid-term mitigation of muddy, wet conditions.

For those dealing with short term mud challenges, picking well drained areas of the farm to concentrate feeding is best. Also, de-stocking an area and spreading cattle out on cornstalk or tillable acreage temporarily may help. University of Illinois research conducted at the Dudley Smith research farm shows no negative agronomic effect to grazing cornstalks. Removing cattle from cornstalks in mid-winter to allow the freeze-thaw-freeze period to occur will help reduce compaction. Anyways, this is just another reason to have cows grazing cornstalks. If cows are trampling cornstalks, providing extra forage and supplement may be necessary. Don't over-stock these areas or mud and compaction could still be a problem.

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Why Benchmark?... Do you ever wonder what your peers are doing better than you?

Mike Hosterman, AgChoice Farm Credit Business Consultant

https://extension.psu.edu/why-benchmark

Are they controlling their input costs better than you? Do they have greater outputs per unit? How do their gross margins compare?

We all strive to have successful operations. No matter if you have a large dairy operation or small vegetable business, the five keys to profitability for any business are:

1. Volume - amount of product produced on a per unit basis
2. Efficiency - gross margin of your business
3. Overhead - capacity of your business
4. Industry skills - standard measures within your particular industry
5. Cost control - management of costs for your business

To better understand how you are doing in relation to these keys to profitability, benchmarking can be an effective way to see where you are and help make a plan for where you are going. Benchmarking includes comparing your business performance to previous years and/or comparing your business performance to others with similar operations.

Both methods of benchmarking help you to find weaknesses within your operation so that you can make improvements to be stronger and more profitable. Comparing your farm to previous years allows you to assess positive and negative changes in your operation that you might not have otherwise realized. There are few published benchmarks for horticultural crops so comparing against yourself may be your best option. Comparing your farm to your peers shows you how your business stacks up. However, don't strive to just be average. Each year, we lose the bottom 10-20 percent of all industries and the competition continues to get tougher.

Always compare yourself to the best of the best. As you begin your quest in benchmarking, follow these suggestions:

- **Measure and record your data consistently** Consistency is important in benchmarking, so be sure to calculate your benchmarking factors the same, year after year. Otherwise, you may be using inaccurate data in your benchmark analysis.
- **Compare your financials on the accrual basis** Year-end balance sheets should be prepared each year and used to generate accrual-based financial statements. This ensures that inventories or other factors aren't skewing your financial data and allows you to make smarter management decisions.
- **Calculate your ratios** When you have completed your financial statements for the year, be sure to calculate your ratios. This will make comparisons from previous years much easier.
- **Look for benchmarking services to help you** Many benchmarking programs are offered by industry organizations and consultants. These programs can help you gain access to a broader, more accurate database of comparable operations.
- **Don't stop with benchmarking** Take time to assess your data, put an action plan together and follow through.

When used effectively, benchmarking can help operations turn weaknesses into strengths, improving the overall profitability of the business. Get started today by assessing where you've been and making a plan for improvements for the future.

NY FarmNet

Brightening the future of agriculture since 1986

Are your replacement heifers reaching their profit potential?

Multiple factors impact the success of a replacement heifer program. Develop cost-effective protocols to ensure your heifers reach their profit potential.

2019 Boehringer Ingelheim Animal Health USA Inc., Duluth, GA.

There are a number of factors that contribute to the success of a replacement heifer program, including nutritional management, disease prevention techniques and genetic selection. This means producers have many important decisions to make even before heifers give birth to their first calf.

"The most significant challenge producer's encounter when they develop heifers to be replacements is getting those heifers ready to breed for the first time, and doing so in a cost-effective way," said Richard Linhart, DVM, DACT, Boehringer Ingelheim. "Implementing a solid herd health program plays a huge role in ensuring these heifers live up to their profit potential down the road."

Dr. Linhart encourages producers to keep the following strategies in mind when raising replacement heifers:

Start with adequate nutrition

Nutritional management is critical for developing healthy replacement heifers. Body condition score plays a significant role in both the short- and long-term success of replacement heifers, especially while heifers are still growing.

To allow for adequate growth and condition, Dr. Linhart recommends a high-quality ration that includes trace mineral supplementation.

"Providing adequate amounts of trace minerals such as selenium, copper, manganese, zinc and cobalt can improve productivity because they are needed for the immune system to function properly," explained Dr. Linhart. "I've seen herds increase pregnancy rates by 10 to 20% just by implementing a complete trace mineral program."

Working with a local nutritionist can help producers balance cost and quality of the ration depending on specific herd needs.

Consider estrus synchronization

By taking some of the guesswork out of the breeding program and synching first-time heifers, producers can increase the likelihood of them calving on time in future breeding seasons.

"The primary influencer of calf weaning weight is not genetics, it's when the heifer calves," said Dr. Linhart. "If a heifer has her first calf late, she's more likely to calve late in the future. The timing of calving is critical for heifers, because one of the major challenges in managing a beef herd is getting those young females to re-breed. Estrus synchronization programs allow heifers more opportunities to be bred; their calves often weigh more and tend to be healthier when they're born earlier in the calving season."

Establish an effective vaccination program

"***Think of vaccinations as insurance***," Dr. Linhart continued. "You buy flood insurance before a flood, not after. Calf hood vaccinations prepare replacement heifers to withstand respiratory and reproductive disease challenges, so they can maintain adequate condition and produce healthy calves in the future."

Bovine viral diarrhea virus (BVDV) is one case in which we can ultimately see the health of the cow impact the calf. If a pregnant cow is exposed to BVDV at certain stages of gestation, that virus can then be transmitted to the fetus, and the calf is born persistently infected (PI) with BVDV, and is known as a PI calf. These calves can be devastating to a herd's profitability, as they shed the BVD virus to any animals they come in contact with, resulting in reduced reproductive efficiency and increased susceptibility to disease.

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"Make sure you're choosing vaccines that are labeled for the diseases you're trying to prevent, and follow the directions closely," stated Dr. Linhart. "BVDV is a major cause of economic loss for many producers, as it impacts both respiratory and reproductive health."

It's very important that replacement heifers receive reproductive vaccines to prevent potential abortions and PI calves. Today, 78% of BVDV infections are caused by BVDV Type 1b.1 knowing the most prevalent subtype of BVDV in your area will help you select an appropriate vaccine for your operation.

Administering a respiratory vaccine to calves at 2 to 3 months of age with a booster at weaning, followed by a pre-breeding vaccination, will provide the highest level of protection for replacement heifers—helping to both maintain pregnancies and protect the health of their future calves.

Once you have selected your replacement heifers, management plays the biggest role in ensuring they live up to both their profit potential and their potential as the future of the herd.

"A successful replacement heifer program comes down to a combination of strategic management practices," concluded Dr. Linhart. "It's important to work with your local veterinarian and nutritionist to develop a list of protocols that are cost-effective for your herd."

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Another option is to bed cattle. Straw, cornstalks, soybean stubble, wood chips, etc. help cattle stay up out of the mud. Cattle feeding areas exposed to the outdoors will likely need bedded. Be mindful that this may be a temporary solution as the more organic matter added to the pen can create more mud after time. Deep bed packs work well to keep building mounded areas for cattle to stay on "high ground." Lots of bedding will help, but it will also likely result in more manure hauling.

Managing mud is difficult. Frankly, it sucks. It makes for longer, dirtier chores and seems to slow everything down on the farm. While there is no silver bullet for getting cattle out of the mud, it can be managed to an extent. Here's to hoping we get a good freeze and some tame cold weather… so we can all benefit from "poor man's concrete."

Considerations for Continuous Corn

Dr. Mark Licht, Assistant Professor Iowa State University Extension and Outreach

https://crops.extension.iastate.edu/cropnews/2019/11/considerations-continuous-corn

November 18, 2019—

Continuous corn is a "three strikes and you're out" situation. And the first strike is automatic – high residue volume. This is how a farmer recently described it to me.

Making continuous corn work means knowing what you are up against. First, realize that the yield drag for continuous corn can range from 0% to 30% but is typically between 5% and 15%. Yield drag has been associated with cooler and wetter soils, nitrogen (N) immobilization, increased disease risk, and allelopathy – all of which are influenced by corn residue volume.

Continuous corn with strip tillage at mid-vegetative stage.

Tips to avoid strikes 2 and 3 with continuous corn:

1. **Location:** fields that are naturally well drained or have extensive tile drainage systems are better suited for continuous corn. These field types will dry out more quickly, helping avoid costly spring planting delays. Also choose fields that are the most productive and allow the more intensive management needed for success.
2. **Stand establishment:** seed placement is critical for uniform spacing and emergence. Just because there is greater residue doesn't mean residue cleaners need to be set more aggressively. Adjust residue cleaners to move residue and not soil. High residue volumes can change planter performance and therefore how planter adjustments should be made. Make sure furrow opening and closing functions are working well.
3. **Hybrid selection:** choose hybrids that are targeted for high residue situations, have a strong, defensive disease package, and have excellent seedling vigor. Plan for resistance management of transgenic traits by rotating sources of insect protection.
4. **Planting conditions and seeding rates:** a slight seeding rate increase of 10% may offset stand establishment problems often realized with continuous corn. In southern Minnesota emergence fell 1% for every 10% increase in surface residue. Target planting when soil temperatures are continuously above 55°F to decrease risk of poor germination and seedling development.
5. **Soil fertility:** continuous corn requires 30 to 50 pounds per acre more nitrogen than corn following soybean. Consider starter fertilizers but don't expect a positive response in every situation. Response to starter N will be dependent on how much N is immobilized by residue decomposition and how much soil N mineralization occurs. High and very high phosphorus (P) and potassium (K) testing soils will have less response to starter fertilizers.
6. **Disease management:** seed treatments can be used to protect seedlings from root and shoot infections. Make in-season decisions on foliar fungicides based on hybrid selection, environmental conditions, and presence of foliar diseases. Foliar fungicides should be used to protect the ear leaf and leaves above the ear leaf from leaf diseases during the grain fill period.
7. **Insect management:** seed treatments can protect the seed and seedling from insect pests such as wireworms, seedcorn maggots, white grubs, and slugs which can be more problematic in heavy residue situations. In-season insects such as corn rootworms and European corn borers may be problematic, especially for non-transgenic hybrids. Consider insect resistance management when developing management plans.
8. **Manage residue:** at harvest make sure that corn residue is evenly distributed across the harvest width. Create a seedbed that is residue free, preferably by using strip-tillage. Strip-tillage will warm up and dry out faster than a no-tillage situation while providing the soil health benefits of residue cover. Most research shows that application of liquid N will not enhance the rate of corn residue breakdown.

Here are a few offerings from the CNYDLFC Team this winter!

1/7/20 - Livestock Techniques—CCE Saratoga

1/8/20 - Livestock Techniques—CCE Schoharie

1/9/20 - Livestock Techniques—CCE Otsego

1/13/20 - Field Crop Pest Management—Farm Credit East Cooperstown

1/14/20 - Field Crop Pest Management—CCE Chenango

1/14/20 - Ag Labor Meeting–Montgomery County Annex Building Fonda

1/15/20 - Field Crop Pest Management—CCE Madison

1/16/20 - Field Crop Pest Management—Montgomery County Annex Building Fonda

1/17/20 - Field Crop Pest Management—CCE Schoharie

1/21/20 - Field Crop Pest Management—CCE Saratoga

1/21/20 - Sheep and Goat Nutrition—CCE Otsego

1/27/20 - Dairy forage options for marginally drained Land—Farm Credit East Cooperstown

1/28/20 - Dairy forage options for marginally drained land—CCE Chenango

1/29/20 - Dairy forage options for marginally drained land—CCE Madison

1/30/20 - Dairy forage options for marginally drained land—Montgomery County Annex Building, Fonda

1/31, 2/7, 2/14, 2/21 - QuickBooks 1—CCE Madison

2/11/20 - Corn Day—Otesaga Hotel

2/25/20 - Risk Management Series Part 1—Farm Credit Cooperstown

2/26/20 - Risk Management Series Part 1—CCE Madison

2/27/20 - Risk Management Series Part 1—CCE Saratoga

3/3/20 - Risk Management Series Part 2—Farm Credit Cooperstown

3/4/20 - Risk Management Series Part 2—CCE Madison

3/5/20 - Risk Management Series Part 2—CCE Saratoga

3/10/20 - Dairy Day—Otesaga Resort Hotel

3/16/20 - Marketing Workshop for Livestock Producers—Montgomery County Annex Building, Fonda

4/7/20 - BQA Transportation—Unadilla Livestock Company

** Please check our website or call the office for more details! **

https://cnydfc.cce.cornell.edu/events.php

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