Cornell Cooperative Extension
South Central NY Dairy and Field Crops Program
Broome * Chemung * Cortland * Onondaga * Tioga * Tompkins

DAIRY & FIELD CROPS DIGEST
July 2020

COVID-19 Safety Plans Required for All Businesses in "New York Forward"

From Richard Stup, Cornell Ag Workforce Development

New York Forward is the state's plan to begin re-opening in phases as regions of the state achieve certain COVID-19 management metrics. An important part of New York Forward is for all businesses to have a customized, written safety plan that details specifically how each business will prevent and manage COVID-19. Details for particular industries, including agriculture can be found here: https://forward.ny.gov/industries-reopening-phase.

All Farms Need a Plan

All farms are required to have a written plan, this includes essential, food-producing farms (e.g., dairy, fruit, vegetable) that have been open all along, and non-food-producing farms (e.g., ornamental horticulture, equine). The state provides a Business Safety Plan Template that farmers can use to meet the requirement. Completed safety plans do "not need to be submitted to a state agency for approval but must be retained on the premises of the business and must (be) made available to the New York State Department of Health (DOH) or local health or safety authorities in the event of an inspection." If a business already has a prior written plan that addresses some or all of the issues in the safety plan, then that plan can be updated to current guidelines and used as the safety plan. A Cornell Extension team is working to develop further educational resources to help farms with safety plan compliance.

New Guidelines for Non-Food Farms

Detailed Guidelines for Non-Food Agriculture (e.g., ornamental horticulture, equine) is part of the New York Forward plan. These businesses may re-open as of May 15 if they are in a region that meets the state's metrics, they have a safety plan developed, and they are actively carrying out all aspects of that plan. Note that the state instructs farms at the end of the guidance document to "affirm that you have read and understand your obligation to operate in accordance with this guidance: https://forms.ny.gov/s3/ny-forward-affirmation."

Enforcement

It is not entirely clear at this time how the state will enforce the New York Forward guidance but most likely enforcement will be complaint driven as incidents arise. The New York Forward plan includes an online form and phone number for anyone to file a complaint, the NY State Department of Labor has a separate online form for employees to file COVID-19-related complaints against their employers. Certainly, businesses will need to provide their safety plans in the event of an actual COVID-19 case or outbreak in the business. Enforcement, however, should not be the primary motivating factor. Farm businesses should develop safety plans and continue safety practices to protect employees, customers, services providers, neighbors, and communities because it is the right thing to do.

Risk Management

A likely outcome of the COVID-19 pandemic is an increase in lawsuits: customers might sue businesses they interacted with and employees might sue their employers for real or perceived injuries. These are highly uncertain times but farm businesses can take steps to help control the risk of being sued and improve their ability to defend themselves in court. This topic deserves a more complete discussion, but for now, consider taking every action you can to: 1. understand government requirements, 2. develop plans and procedures to meet requirements, 3. enforce discipline and compliance with established procedures in your workplace, and 4. document your plans, actions, and important decisions that affect employees and customers.

Subscribe to The Ag Workforce Journal for updates and information on agricultural labor topics.

Inside this Issue:

The **South Central New York Dairy and Field Crops Program** is a Cornell Cooperative Extension partnership between Cornell University and the CCE Associations in 6 Counties.

New Podcast from CCE Dairy Educators and PRO-DAIRY, "Dialing into Your Best Dairy"

This podcast is a series about management practices and tips to reaching your herd's full genetic potential. It features PRO-DAIRY and CCE Dairy Specialists who over the course of 8 episodes will discuss the different life stages of the dairy cow, including episodes focusing on raising calves through the milk phase and weaning; managing weaned heifers up to freshening; making decisions about which replacements to keep including talking about inventory, disease prevention, and culling decisions; feeding and nutrition management during lactation; facilities, time management, and ventilation considerations throughout lactation; and management factors around reproduction, gestation, and the dry period. This series also features interviews with Cornell's Dr. Mike Van Amburgh, the owners of Selz-Pralle Dairy in Wisconsin, and Paul Fouts, a NY dairy producer. Check out the podcast on the PRO-DAIRY website (https://prodairy.cals.cornell.edu/events/podcasts/) where you can find each episode along with additional resources and speaker contact information. You can also listen via SoundCloud on the CCE Dairy Educators channel, and check back for future podcast series. For more information, contact PRO-DAIRY's Kathy Barrett (kfb3@cornell.edu) or your CCE Regional Dairy Specialist.

We are pleased to provide you with this information as part of the Cooperative Extension Dairy and Field Crops Program serving Broome, Cortland, Chemung, Onondaga, Tioga and Tompkins Counties. **Anytime we may be of assistance to you, please do not hesitate to call or visit our office.** Visit our website: http://scnydfc.cce.cornell.edu and like us on Facebook: https://www.facebook.com/SCNYDairyandFieldCropsTeam.

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We put knowledge to work in pursuit of economic vitality, ecological sustainability, and social well-being. We bring local experience and research-based solutions together, helping our families and our community thrive in a rapidly changing world.

Building Strong and Vibrant New York Communities

USDA Announces Details of Direct Assistance to Farmers through the Coronavirus Food Assistance Program

By Christopher Wolf, Mark Stephenson and Andrew Novakovic

May 20, 2020 - Beginning May 26, USDA's Farm Service Agency will be accepting applications from agricultural producers who have suffered market losses. Eligible producers will receive direct payments based on a national payment rate and their own documented production.

Direct Payments from Two Different Programs

The new direct payments program requires one application and results in one benefit, but it is built with funding and legislative authority from two separate programs. This enables USDA to leverage two different sources of funds to create a larger benefit than would be possible with only funding from one program.

The CARES Act provided funding for a new program, which USDA calls the Coronavirus Food Assistance Program. CFAP has two components. One is the Farmers to Families Food Box program, which uses $3 billion to fund the preparation and distribution of emergency food boxes to be distributed by local food pantries and the like. The second component of CFAP involves direct payments to farmers and ranchers.

CARES Act funds will be used to partially compensate producers for price losses from the first quarter of calendar year 2020. USDA estimates that total farm payments will be about $9.5 billion under the CFAP program.

The long-standing Commodity Credit Corporation, a business entity within USDA, will be used for the support of production in the second quarter of 2020. Under New Deal era law, the Secretary has broad, discretionary authority to use CCC funding for various purposes, including direct payments and food assistance. USDA isallocating $6.5 billion of its existing funds for these second quarter payments.

The CARES Act provided additional funding of $14 billion to the CCC but these funds cannot be used before 1 July. Although USDA has not announced any additional programs, this $14 billion provides USDA with flexibility to initiate new programs later this year.

Payments and Timing

Although USDA is taking advantage of two different programs and funding authorities to provide direct payments for farmers, there will be one application and one payment.

USDA will make an initial payment of 80% of an eligible 2020 CFAP participant's calculated 2020 CFAP payment. This strategy serves two purposes. It gets checks to farmers quickly, but it also gives USDA some flexibility to assess the total payments for all applicants and compare that to their statutory spending limits. Thus, the final payments (20%) may be subject to some pro-rationing to ensure that USDA does not exceed its budget. This is different from many USDA programs, such as Dairy Margin Coverage or Dairy Revenue Protection; which are not subject to a limit on government cost.

First Quarter CFAP Payments

For dairy producers, payments under the CFAP program will be determined by multiplying a producer's milk production for the first quarter of calendar year 2020 by $4.71. This payment rate was calculated as 80% of the decline in prices as determined by USDA during that quarter (Table 1)https://nyfb.informz.net/NYFB/data/images/DMAP.pdf.

"Milk production" will likely be established in a manner the same as was used for Dairy Margin Coverage (or Margin Protection Program). Typical documentation would be marketings of milk as verified by a cooperative or processor. Dumped milk that was pooled under a federal order will be automatically included in those reports.

Second Quarter CCC Payments

Payments under the CCC Charter Act are determined by:

1. An estimate of each producer's second quarter production, which is to reflect a typical increase in production from the first to the second quarter and
2. A different payment rate that was calculated as 25% of the decline in prices as determined by USDA during the second quarter of calendar year 2020 (see Table 1).https://nyfb.informz.net/NYFB/data/images/DMAP.pdf

Specifically, second quarter production will be calculated by multiplying each producer's milk production for the first quarter of calendar year 2020 by 1.014 (the percentage change in milk production for quarter 2 compared to quarter 1). The payment rate is set at $1.47.

Payment Limitations

CFAP payments are subject to a per person (or legal entity) payment limitation of $250,000. This limitation applies to the total amount of CFAP payments made with respect to all eligible commodities.

Similar to the manner in which statutory payment limitations are

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Identifying Risk is the First Step to Managing It

By Mary Kate Wheeler, Farm Business Management Specialist– SCDFC Team

NORTHEAST EXTENSION RISK MANAGEMENT EDUCATION

USDA United States Department of Agriculture National Institute of Food and Agriculture

Most of us live in a culture that values comfort and control. Modern technologies give us the ability to meet our basic needs and modify our environments from the convenience of our living rooms. We use smartphones and virtual assistants to access food, shelter, transportation, even social interaction. From ordering groceries, to booking a vacation, to adjusting the thermostat, an app exists for everything. Consumers embrace this technology because it provides a sense of security, convenience, and control.

Agricultural producers, on the other hand, exist in a world of uncertainty. Uncertainty means not knowing what will happen in the future, and making decisions when the future outcomes of those decisions are unknown. Farmers face uncertainty related to weather, crop and livestock performance, input and output prices, cash flow, access to capital, consumer demand, legal liability, family and business relationships, and more. While adoption of modern technologies may help producers reduce some types of uncertainty, farmers do not have the luxury of ignoring it.

Uncertainty implies risk, which means there is a possibility of failure. Yet while uncertainty creates the potential for loss, it may also create the potential for gain. In the words of Extension Risk Management Education's *Introduction to Risk Management*, "Risk is what makes it possible to make a profit. If there was no risk, there would be no return to the ability to successfully manage it." Not only is risk unavoidable in agriculture, but managing it well is an essential function of any farm operation.

For agricultural producers and consumers alike, the coronavirus pandemic has provided a stark reminder that none of us has complete control over the many forces that influence our lives. Despite experiencing rapid change and profound uncertainty, farms continue to operate as essential businesses. In uncertain times, producers can benefit from an organized approach to managing risk. This process begins with identifying and categorizing different types of uncertainty that farms face. This article describes five types of risk that affect farm businesses, and illustrates each category with examples from the COVID-19 context.

Production Risk

When you manage an agricultural business, you develop a production system to achieve a desired yield. Depending on your enterprise, you may measure yields in tons or bushels per acre, pounds of gain per day, or pounds of milk per cow. Regardless of the production system, any variation in production outcomes has an impact on the farm's financial bottom line. Production risk encompasses the chance of poor yields, low quality products, or other unfavorable outcomes from production activities.

Farm yields fluctuate over time in response to numerous conditions, some of which are easier to manage than others. Variable weather, including impacts of climate change, is perhaps the most obvious source of production risk. We consider pests and diseases to be major production risks for crop and livestock enterprises.

Variation in input quality, such as forage quality on a dairy farm, is also a source of production risk. The COVID-19 outbreak has threatened to disrupt supply chains in many industries, including agriculture. As a result, some farms may be experiencing greater uncertainty about the availability and quality of production inputs, compared to previous years.

Marketing Risk

In economic terms, a market is both a system that facilitates the exchange of goods and services between buyers and sellers, and a process through which prices are established. Any event that impacts the behavior of buyers or sellers has the potential to affect markets and prices. When farmers face uncertainty around prices or market access, it is called marketing

What are the most significant production risks on your farm? How have they changed since COVID-19?

What marketing risks affect your farm business? Do you have greater uncertainty about input or output prices? How secure is your access to markets, and what conditions might make it less secure?

What is your farm's exposure to financial risk? How has COVID-19 affected your farm's cash flows and access to capital?

What legal risks affect your farm business? Is regulatory compliance a concern for your farm? What about public perception and neighbor relations?

What are the most significant human risks on your farm? How has COVID-19 affected relationships among key people involved in the farm?

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(Identifying Risk - Continued from page 4)

risk.

With the closure of schools and restaurants, the spike in unemployment, and the adoption of social isolation practices, the coronavirus pandemic has affected U.S. consumers and producers in numerous unexpected ways. Market prices for agricultural inputs and outputs responded quickly to these changes, with some prices rising and others falling. For example, the sudden drop in export and food service demand contributed to a 20% decline in the USDA all-milk price from March to April 2020. Over the same period, the average consumer price for eggs climbed 15%, while consumer prices for poultry and beef increased by 4.7% and 4.2%, respectively.

Whether or not an individual farm experiences negative impacts of the pandemic depends greatly on how it markets its products. Farms selling directly to restaurants, or to wholesale channels supplying the food service industry, may have lost expected revenues and market access because of COVID-19. On the other hand, farms that sell directly to consumers, particularly through channels that allow for social distancing, may have benefitted from higher product prices and sales volumes.

Financial Risk

Most businesses rely on outside capital to grow and sustain operations. Financial risk refers to uncertainty about the cost and availability of capital and other financial resources necessary to operate a business. This category includes uncertainty around interest rates, a lender's willingness to put money into your business, the market value of your collateral, and your ability to meet cash flow needs. All of these considerations influence a farm's capacity to overcome short-term financial shocks and grow equity in the long term.

The economic impacts of the coronavirus pandemic may increase uncertainty around cash flows and access to capital for farm businesses. Farms that experience an unexpected drop in product prices or sales will immediately face greater uncertainty about their ability to meet short-term cash obligations. Some farms may be able to defer principal payments as a way to improve cash flows, but how long will the lender support that strategy?

Some farms businesses may need greater access to capital to overcome the short-term shock of COVID-19. At the same time, the economic contraction accompanying the coronavirus pandemic may make lenders more cautious. One of the five C's that agricultural lenders use to evaluate creditworthiness is "condition," which refers to the overall state of the industry and the broader economic environment. As the economy enters a recession, and the agricultural sector faces processing bottlenecks and changes in consumer demand, lenders may be more conservative about extending credit to agricultural businesses.

Legal Risk

In the course of their normal activities, farm business regularly make commitments that have legal implications. Legal risk refers to the possibility of unfavorable consequences stemming from contractual arrangements, organizational structure, laws and regulations, tort liability, and public relations. For example, a farm's failure to comply with food safety or labor regulations could increase its exposure to legal risk. The ownership structure of a farm business has legal consequences that span tax liability, tort liability, and business succession. Public perception influences a farm's social license to operate in the short run, and may shape public policy to be more or less favorable to agriculture in the long run.

The arrival of COVID-19 introduced new uncertainties about a farm's legal obligations and liabilities. What obligations does a farm business have to protect its employees and customers from COVID-19? What are the implications of compliance, or non-compliance, with new social distancing regulations? Uncertainties about the government's COVID-19 policy response also falls into this category.

Human Risk

We all know that people can sometimes be unpredictable. In a farm business, people are not only a source of risk, they are also a key resource for managing it. Human risk encompasses uncertainty related to human health and wellbeing, family and business relationships, employee management, and business transitions. The ultimate goal of human risk management is the safety, productivity, and satisfaction of everyone who participates in the business.

The coronavirus pandemic has elevated concerns about the risk of human illness, since a COVID-19 outbreak on a farm has the potential to severely disrupt labor and management. To mitigate the health risks, farms have adopt new policies and procedures around social distancing, cleaning, and sanitation. However, by reducing in-person interactions, some of these policies may make team communications and employee management more challenging. Strong leadership and communication skills can help farm managers to maintain key business and family relationships while adapting to change.

This is material is based upon work supported by USDA/NIFA under Award Number 2018-70027-28588.

Resources

For more about identifying and managing risk, check out the Introduction to Risk Management handbook compiled by Extension Risk Management Education and the USDA Risk Management Agency: http://extensionrme.org/pubs/IntroductionToRiskManagement.pdf

Back to Basics: Herd Management Lessons from COVID-19

By Lindsay Ferlito, Betsy Hicks, and Margaret Quaassdorff, CCE Regional Dairy Specialists

In response to these especially volatile times, producers have been faced with having to make rapid changes. These changes have led to some unintended consequences, many of which would often be considered positive in a typical dairy market. When producers take a step back to ensure they are doing the basics of herd management, it provides cows the best environment to be productive and healthy. Below are some reminders of best management practices, and stories of producers who implemented these strategies and saw positive results.

Cow Comfort

Given that cows spend about 11-12 hours per day lying down, providing a properly designed and managed stall is one of the most significant factors impacting cow comfort and production. While deep-beds are usually considered the "gold standard" (reduced lameness, fewer injuries, higher lying times), other types of stalls can work really well with the right amount of bedding and management. Cows lay down longer with more, dry bedding, and lameness is reduced when there is at least 2 inches of bedding covering the stall surface. Maintaining stall hygiene and comfort is key to overall cow health and performance no matter what the circumstances.

Cows resting comfortably in sand-bedded stalls.
Photo credit : Lindsay Ferlito

Stocking Density

When cows are too crowded, lying time is reduced, feeding rate increases, competitive interactions increase, and milk production and reproduction can suffer. While there are multiple research studies that show these negative impacts of overcrowding at the feedbunk and the stalls when stocking density gets above 115-120% and less than 24 inches of feed space, there is no perfect stocking density – this is a number that is herd and situation specific. What works on your herd is unique given your facilities and management, and it will vary depending on other factors, such as outside temperature, time spent out of the pen, feed management. Stocking density is something that should be continually evaluated, and you may be surprised that you've slowly crept up and are above an optimal level. Several producers have mentioned how they sold an extra 20, 50, or 100 cows and milk in the bulk tank actually went up.

Water Space

When was the last time the linear water space was evaluated per cow in the high pen? Recommendations are for at least 4" of linear water space per head, but often pens have been crowded and cows on average have less than 2" of water space. One producer recently pulled out waterers that were not using the full length of crossovers, as he measured only about 2" per head, and put in waterers that fit the full length of the crossover, putting him closer to that 4" per head. Within a week, the whole herd average increased about 4 pounds of milk. This is in agreement with research that has shown a linear milk response with increasing water space.

Diet Considerations

High quality forage sources in lactating cow diets are always important, but become increasingly so when we raise the forage to concentrate ratio. This has been a strategy to reduce excess milk production, increase components, and contribute to overall rumen health, without threatening future production. Working with a nutritionist to properly balance and strategically feed a higher forage diet will also give producers a chance to uncover opportunities to save on diet and health costs, and set a plan for forage production and inventory goals in the future. Many producers have also taken this opportunity to work with their nutritionist to become more knowledgeable about the return on investment of feed additives, while focusing on a more efficient and profitable ration with better cow health and components.

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Strategies for Feeding Milk to Calves

Feeding an increased plane of nutrition to calves has long been recommended and studied by researchers at Cornell. The benefits include higher and more efficient growth rates early on that last throughout the cow's productive life, as well as increased nutrient availability in times of cold stress (where nutrient requirements are increased for maintenance and growth) and for immunity response. The presence of excess milk production over what milk processors will pick up have given farms the chance not only to feed whole milk to calves, but the opportunity to keep calves on milk longer. Transition milk (the first four or five days post-calving) contains a high amount of growth factors that research says enhances health and long-term performance of calves. Producers have experimented with extending milk feeding up to 60-90 days of age, which has reduced waste of excess milk, and showed noticeable improvements in calf growth and condition.

First Lactation Cows

It is well recognized that heifers have different requirements than mature cows; in terms of growth, milk production and behavioral/social needs the first lactation heifer is a vastly different animal than a 3rd or 4th lactation cow. Herds that take the time to identify a strategy for making a separate plan for housing first lactation animals see results quickly, and often state they wish they had done it sooner. One producer, after figuring out how to manage lactating first calf heifers separately, saw pounds of milk at peak increase almost ten pounds and whole herd milk production increased almost five pounds.

Culling Strategies

What does your optimal herd look like? We have seen farms experience disturbances in labor, and reduced milk pickup. This had led to farm managers to evaluate each cow before you invest in dry cow treatment, or another straw of semen/sync program. On the heifer side, determine how many replacements are needed, and whether each heifer has the potential to improve overall herd performance when she reaches the productive stage. Producers have improvements in overall herd performance when choosing to cull less productive and problem animals.

Farm Team Communication

Communication between employees and the farm management team is important during the best of days, and especially during times of struggle or challenge. Writing protocols and organizing staff meetings are probably most farmers' least favorite tasks, but they are critical to a smooth and successfully run farm business. Further, most dairies are required to have written protocols and continuing education training with their employees through programs like the FARM Program. Ensure your dairy has a detailed on-boarding process for new employees, up to date written protocols (in their language), and a plan to have staff meet regularly to not only address issues as they arise, but also to celebrate farms wins, contributing to a sense of farm culture and community.

Recognizing All Farm Options

When thinking about making a change, only looking at one option is just that: a farm either makes a change or stays doing what they're doing. Instead, producers should sit down and evaluate the problem or issue at hand, and identify a few ways to remedy that problem. Sitting down with a CCE farm management consultant to do a partial budget analysis on more than one option often gives clarity to what move is best. Today, a hard option to think through might be what it looks like not dairy farming, but in some instances that can be a valid scenario to work through. In the end, a change in operation should be the result of a decision-making process and not a knee-jerk response. CCE educators can help with the process.

Coronavirus Food Assistance Program (CFAP) Provides Funding to NY Producers

By Mary Kate Wheeler, Farm Business Specialist

As of June 8, 2020, nine hundred and forty-one dairy farms in New York State have applied for funding through the Coronavirus Food Assistance Program (CFAP), and the Farm Service Agency has approved a total of $38.3 million in CFAP payments to dairy farms. If we include New York producers of field crops, specialty crops, dairy, and non-dairy livestock, a total of $45.5 million in CFAP payments have been approved for farms across the state.

How to Apply

Producers should apply through their local Farm Service Agency Service Center. While USDA Service Centers are open for business by phone appointment only, FSA is working with our agricultural producers by phone and using email and online tools to process applications. Please call your FSA county office to schedule an appointment.

Applications can be submitted electronically either by scanning, emailing, or faxing. Please call your office prior to sending applications electronically.

A CFAP Call Center is available for producers who would like additional one-on-one support with the CFAP application process. Please call 877-508-8364 to speak directly with a USDA employee ready to offer assistance.

For more information, visit https://www.farmers.gov/cfap

Crop News

Side-Dressing Fertilizer in Corn

By Janice Degni, Extension Field Crop Specialist

It won't be long and it will be time for side-dressing corn nitrogen needs in continuous corn or fields with no or low rates of manure. This spring's dryer conditions have not lead to high losses of N. North Dakota State University provides a nice summary of considerations and tips.

"The greatest need for nitrogen is from the V12 stage to the corn blister stage in a corn plant's life. Typically, corn is side-dressed at the 6 leaf (V6) stage; however any time prior to V12 will achieve management goals.

Soil type heavily influences the side-dressing decision. High clay soils should have a planned split-application of nitrogen fertilizer due to the risk of nitrogen loss by denitrification. Fine-textured sandy soils also have high risk of nitrogen loss due to leaching.

Corn at 2-3 leaf staging can withstand a broadcast application of urea. Urea can used in older corn plants can cause fertilizer burn or plant death and the least favorable nitrogen choice. Urea broadcast should be limited at 60 lb actual N/acre.

By 4 leaf crop staging, nitrogen should be applied between the rows. In older corn, anhydrous ammonia can be applied if the soil will seal up. The second most desirable application method is the application of UAN (28%) with a coulter which places fertilizer at an approximate 2 inches depth. The third-best alternative is to apply UAN as a surface band using orifice nozzles between the rows. Corn injury can be reduced if a stiff hose which drags or nearly drags on the ground is configured to the stream bar.

Fertilizer placed in every other row is sufficient. Slow-release formulations should be avoided.

If the corn is 2-3 leafs at most, urea broadcast can be done. If you can't count on at least ½ inch of rain coming at one time to soak the urea into the soil, applying the urea with Agrotain should give about 10 days of safety from urea volatilization. If the corn is more advanced than 3 leaf, too much urea will settle into the whorl and injure the corn too much to tolerate. The option from 4 leaf on is to apply the N between the rows. If the soil will seal, anhydrous can be applied. In most of the state, soils with high clay will not seal and many loam textured soils are also saturated and will have trouble sealing. The next most desirable application method is the application of UAN (28%) with a coulter. This will place the UAN below the soil surface, but shallow enough that practical application can be conducted without going very deep 2-3 inches is plenty of depth. If this is not possible, apply the UAN as a surface band using orifice nozzles. If you anticipate wind (it's hard not to anticipate wind in North Dakota) configuring the outlet with a stiff hose that drags or nearly drags on the ground will eliminate most splashing on the corn leaves that could be harmful.

Things not to consider-
Stream-bar UAN or Nisol-type products, the consequence is too much burn. Low rates of slow-release N products. The consequences are not much burn, but not enough N. The efficiency factor advertised by product marketing has not been evaluated in research trials." -Dave Franzen - NDSU Extension Soil Specialist

NYS Corn Nitrogen Calculator V1.0 June 2004 — G.L. Albrecht, Q.M. Ketterings, and K.J. Czymmek

Manure Analyses (for all fields)	Current Year	Last Year	2 Years Ago
Animal Species	Cows	Cows	Cows
Units	lbs/ton	lbs/ton	lbs/ton
Total N	9	9	9
Ammonium-N	4	4	4
Organic-N	5	5	5
Total Solids (%)	8	8	8
Density (lbs/gallon)	8.34	8.34	8.34

N Guidelines at the Nutrient Management Spear Program site (must be online)

Set all analyses to same as Current Year

Field and Crop Info	Field 1	Field 2
Soil Type	HONEOYE	WILLOWEMOC
Artificial Drainage	Adequate	Adequate
Yield Potential (YP) bu/acre	140	122
Use Cornell Yield Potential	Yes	Yes
If No, Enter Yield Potential		
Tillage Depth	1-7 Inches	1-7 Inches
Type of Plowed Sod	26-50% Legume	1-25% Legume
Year in Corn After Plowed Sod	Second	Third
Manure Application Info		
Current Year Application Units	gallons	tons
Application Rate/acre	7500	15
Application Method & Timing	Topdressed or incorporated after 5 days	Spring incorporated within 3 days
Last Year's Application Units	gallons	tons
Application Rate/acre	5000	15
Application 2 Year's Ago Units	gallons	tons
Application Rate/acre	5000	10
Starter Fertilizer N lbs N/acre	20	25

N Balance		lbs N / acre		lbs N / acre	
N Guideline=(1.2xYP-Soil N-Sod N)/Use Efficiency		84	±10	88	±10
Manure N Credit		72		62	
Starter N Credit		20		25	
N Balance	Surplus	8		1	Deficit
Need for Sidedress N		No Sidedress N		1	

PSNT Connection

To double check on the need for sidedress N, we recommend taking a PSNT. If the PSNT is ≥25 ppm nitrate-N, no sidedress N is needed, even if originally called for, above. With a PSNT of 21-24 ppm, there is a 10% chance of a yield response; if you expect a yield response based on experience with the field, then consider 25-50 lbs N/acre. If the PSNT is <21 ppm, either recommend the "Need for Sidedress N" value and/or re-evaluate the inputs, above.

Calculating Sidedress Rates

A pre-sidedress soil test result will tell you if you need additional N or not or if you are in a gray zone of maybe. It does not tell you the rate of additional N needed. To figure the rate needed you must calculate backwards from the N needed for the crop subtracting contributions that season from soil, old sod decay, manure applications and fertilizer.

The Cornell Nutrient Management Spear Program has a handy calculator on their website that you can access at http://nmsp.cals.cornell.edu/software/calculators.html. Select the Corn Nitrogen Calculator.

Source: https://www.ag.ndsu.edu/crops/corn-articles/side-dressing-fertilizer-in-corn

https://www.ag.ndsu.edu/cpr/soils/corn-side-dress-options-6-16-11

Spraying Weather

By Tom Wolf, Ph.D. P.Ag. Agrimetrix Research & Training

It's time to spray and what's the first thing you do? Check the weather forecast, of course. More often than not, the suitability of the weather is the main factor in the decision to spray. Let's have a closer look at what each weather component contributes to the decision.

Wind:

Everyone knows that small droplets can drift if it's windy, and the windier, the worse it is. But that's hardly the whole story. Here's how can we improve our understanding of wind and its impact.

Look beyond the wind forecast. It's standard practice to look a day or two ahead for wind forecasts. At any instant, the wind speed and direction may be acceptable for our planned spray job, but we know that it will change. Consider wind speed sites such as Windfinder, Ventusky, or Windy for added insight. These services show trends over time in a great visual interface, allowing users to anticipate changes in wind speed and direction for better planning. While they aren't forecasts per se, visualizing wind patterns over a larger region allows a better understanding of what's coming your way.

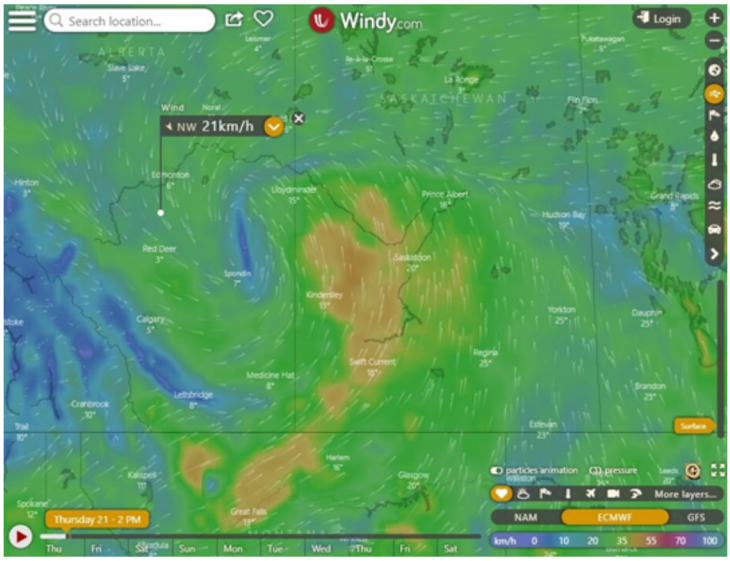

Figure 1: Sites such as Windy.com offer powerful visualizations of current and future wind conditions.

Use wind as an ally. We're conditioned to think of wind as having a negative effect on spray drift. The less the better. Yes, droplet displacement increases with wind speed. But the "negative-only" perspective is being re-evaluated in light of dangers associated with wind-free conditions that often occur during temperature inversions (see "Temperature", below). In fact, wind provides several advantages over calm conditions:

1. ***Directional certainty.*** We can assess the risk to downwind sensitive areas. This is not possible with calm conditions because inversion air flow may follow terrain, and as inversions dissipate, the first daily winds can be changeable and unpredictable in direction.

2. ***Turbulence***. Wind creates mechanical turbulence which helps sprays deposit and disperse. Both of these effects have value. In a calm environment, such turbulent eddies don't exist.

3. ***Low drift options.*** If it's windy, we have options to respond. We can lower the boom or lower the spray pressure. We can mix the next tank in higher water volume, forcing either a larger nozzle (larger flow rates of the same model nozzle usually produce coarser sprays) or slower travel speeds. All these practices reduce drift when it's windy. In comparison, nothing (except not spraying) can be done to reduce risk during inversion conditions. This is because even low-drift spray contain enough fine droplets to cause damage if they linger.

Know your wind speed. The international standard for wind speed measurement is 10 m above ground level. When 25 km/h wind speeds are reported, they are at 10 m, not the 1 m height where the boom is located. Within the surface boundary layer, the part of the atmosphere closest to the ground, wind speeds typically increase linearly with the natural log of the height above the canopy. The slope of that line depends on atmospheric stability and roughness length. Very close to the ground, the wind speed reaches zero, and that height is a function of the roughness of the surrounding terrain. As a rule of thumb, over a short crop canopy, expect the wind speed at 1 m above ground to be about 0.67x of the speed at 10 m. So if the weather reports 25 km/h, the actual wind speed at boom height is closer to 17 km/h. Remember that weather stations can be far away, and local conditions will vary. Always measure your local wind speed and direction with your own weather station or handheld device, and keep a record.

Figure 2: Hand-held wind meters or weather stations are an essential part of a spray operation and record keeping.

Wind and Mode of Action. Coarser sprays are a common way to reduce drift in windy conditions. But some modes of action aren't well suited to coarser sprays. We can schedule our spray jobs throughout the day to correspond to spray quality tolerance. Apply the products that require the finest sprays (contact products, grassy herbicides, insecticides) when conditions are best, and save the sprays that tolerate the coarser sprays (systemic products, broadleaf targets) for less certain conditions later in the day. Or treat the fields whose downwind edges border a sensitive crop during better conditions. Here's a rough guide to spray quality and herbicide mode of action.

Temperature

Like wind, air temperature is more complex than it appears at first

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(Spraying Weather—Continued from page 9)

sight. Here are some other aspects to consider:

Understand temperature inversions. Temperature matters. But perhaps the most important aspect of temperature when it comes to spraying isn't the temperature per se, but how it changes with height. The temperature change with height is used to identify dangerous temperature inversions.

Here's how temperature profiles work (for a quick Sprayers101 overview, here, for the best in-depth explanation (NDSU), here): Due to atmospheric pressure, there is always a slight temperature decrease with height, about 1 ºC per 100 m (the dry adiabatic lapse rate). This temperature profile describes a "neutral" atmosphere, i.e., no thermal effects.

When it's sunny, solar radiation heats the earth, which in turn warms the air near it. As a result, the rate of cooling with height is greater than the adiabatic lapse rate, and we have "unstable" conditions that are characterized by thermal turbulence (warm air rising, cold air falling) that actively mixes air parcels. Thermal turbulence is very good at dispersing anything in the air, including spray droplets.

When solar radiation is low or absent, the earth cools and so does the air near it. As a result, air temperature rises with height. Air parcels no longer move up or down, in fact they return to their original location if displaced. This results in a "stable" atmosphere, also called an inversion.

Inversions are dangerous because they are associated with very low dispersion, and a spray cloud will remain concentrated and may linger over the ground for a long time, like ground fog.

Most weather services do not actively measure inversions. Instead, their presence has to be inferred by clues. For example, inversions: (a) occur primarily when solar radiation is low, from early evening, overnight, to early morning; (b) are more likely on clear nights, when soils cool more; (c) can be seen when ground fog is present, or when dust hangs, moving slowly; (d) are associated with low ground temperatures that also cause dew.

Recent findings about inversion in Missouri were summed up in this excellent webinar by Dr. Mandy Bish, Extension Weed Specialist at the University of Missouri. Her studies showed that inversions can begin hours before sunset, their presence and duration are dependent on local conditions such as topography and windbreaks, and recognition of telltale signs of inversions such as lack of windspeed are important for accurate local assessments.

Figure 3: Morning ground fog in Australia (picture provided to author).

Use Mesonets if you have them. Mesonets are networks of weather stations, and they can add valuable information. For example, North Dakota has an extensive network of about 130 weather stations that, among other things, measures and reports temperature inversions. NDAWN (ndawn.ndsu.nodak.edu) reports temperatures at 3 m and 1 m, and issues warnings of temperature inversions as they develop at a specific location. NDAWN information is available as an app. North Dakota isn't the only place to have a public mesonet, check to see what's available in your area. The added information is worth subscribing to.

Know the volatility of the product. Some pesticide active ingredients are volatile. This means they can evaporate from a wet or dry deposit during and after application (more here). Dicamba is a prominent example, but there are others, like trifluralin and ethalfluralin, 2,4-D and MCPA ester, and clomazone. Formulation can affect volatility, and the use of lower volatile esters of 2,4-D and better salts of dicamba have helped. Microencapsulation has been used to reduce the problem with clomazone. Volatility is strongly affected by surface temperature, and volatile products should not be sprayed on hot days or when the forecast calls for hot days following application. Volatile products have been found to evaporate from dry deposits for several days after application, and their vapours move under inversion conditions, causing widespread damage.

Sun

The sun plays a large role in spraying. Plants' active growth improves herbicide translocation as well as activity in the photosystem, or in amino acid or fatty acid synthesis. The activity of herbicides has been shown to improve under sunny conditions for that reason.

Some herbicides, most notably diquat (Reglone), work too quickly when it's sunny, and improved performance can be gained by spraying under cloudy or low-light conditions. The lack of photosynthesis allows for some passive translocation before the product causes tissue necrosis.

Sunny conditions also increase thermal turbulence we mentioned earlier, which is useful for burning off morning inversions. But what usually follows a sunny day is a strong inversion as the sun sets and the clear sky facilitates the earth's rapid cooling. It would be possible to spray a bit later into the evening when it's cloudy.

Humidity

Since about 99% of the spray volume is comprised of water, evaporation of this water can have strong effects on droplet behaviour. Droplets begin to evaporate as soon as they leave the nozzle, becoming smaller and more drift-prone while still in flight. Higher booms and finer sprays increase the flight-time of droplets, and this increases the sensitivity to evaporation.

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Cover Crop Interseeder: Improving the Success in Corn

Prepared by Greg Roth, Bill Curran, John Wallace, Department of Plant Science, Penn State University, Matthew Ryan, Soil and Crop Sciences Section, Cornell University and Steven Mirsky, Sustainable Ag Systems Laboratory, USDA-ARS 5/8/2015

Interseeding cover crops in corn is a promising management practice that could improve the adoption of cover crops where they have not been feasible before.

Planting corn in an interseeded corn stubble field.

Interseeding cover crops in corn is a promising management practice that could improve the adoption of cover crops where they have not been feasible before. As with any new practice, to improve the odds of success, some attention to management is necessary. In this article, we share some of the practices that can improve the potential of interseeding cover crops based on our work and the observations in the literature.

Field Selection

Successful interseeding is a function of the relationship of the cover crop to the corn crop and its management. The ideal management probably varies a bit from region to region and field to field. The competitiveness of the corn crop and the degree of heat and drought stress in a region will impact the potential for success, fall biomass accumulation and potential interseeding management.

Our general recommendation is to target interseeding at the V5 to V7 stage of corn. At this stage, the potential for injury from short residual preemergence herbicides is reduced and the timing is good for sidedress N. Postemergent glyphosate or glufosinate (Liberty) could also be applied at this time if necessary to control escaped weeds prior to cover crop emergence. In most areas, we have been successful with this approach and have achieved respectable cover crop establishment. The amount of cover crop biomass accumulation in the fall will depend on a number of factors including cover crop species, corn hybrid maturity as well as planting and harvest dates, corn grain vs. silage, and soil fertility management.

The success of interseeding in our work and in others have shown that factors such as plant population, timing of interseeding and hybrid maturity can affect the successful establishment and cover crop growth in the fall. These factors should be adjusted if need be, to improve interseeding success in a particular area.

We have had reasonable success with corn populations up to 32,000 per acre with our typical recommendations. Others have found that reducing plant populations to 22,000 to 26,000 will improve establishment and increase the fall cover crop biomass. However, in most cases we don't want to be reducing corn populations to the extent that we will be impacting yield or profitability. Using hybrids or targeting fields where moderate corn populations would work is one management strategy to consider.

Earlier interseeding from V3-V5 has been successful in Canada and has increased establishment and cover crop biomass in the fall. This may be necessary in environments where the corn crop is too competitive for later interseeding. We have not evaluated interseeding prior to V5 corn and do have some concern for potential cover crop competition with corn. We suggest doing some experimentation on your farm in smaller fields or plots and testing which tactics work best for you. We have had some success with interseedings at later stages such as V8 but these are best targeted to fields with less competitive corn.

In more competitive environments, there could be benefit for earlier maturity hybrids. Often, these are shorter statured with earlier dry down and harvest. This will allow better light

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(Cover Crop - Continued from page 11)

penetration in early fall and promote cover crop growth and development. Changes in hybrid maturity should be considered only if they are part of a whole farm management plan and not if they impact profitability. Often reduced drying costs, earlier harvest, improved prices and residual effects of cover cropping can offset modest yield penalties associated with earlier hybrids.

Cover Crop Interseeder Herbicide/Weed Management Guidelines

Interseeding cover crops will impact the weed management strategies in a field since some herbicides can impact the establishment of the cover crops. Fields with lots of weeds or with certain herbicide resistant weeds may not be good candidates for interseeding as these may require longer residual herbicides or multiple postemergence applications.

Over the last five years, we have evaluated some residual broadleaf and grass herbicides in corn for use with interseeding. The following information is based on these observations and lists our current recommendations for some herbicides that 1.) Will likely be a problem; 2.) Some that can be problematic particularly at full rates; and 3.) Some that are compatible with interseeded cover crops. Our goal is to provide recommendations that carry minimal risk for cover crop herbicide injury.

Our basic approach with herbicides and interseeding has been to use a no or short residual burndown herbicide or tillage followed by a glyphosate or glufosinate (Liberty) application prior to interseeding. The ability to use residual herbicides is a function of the type of cover crop being interseeded. When interseeding multiple species that include grasses, legumes, and Brassicas such as forage radish, then residual herbicide options are fewer. Single species cover crop (e.g. grass or legume) can allow greater herbicide choice (Table 1).

For corn that is not Roundup Ready or Liberty Link, similar preemergence programs can be used, but POST herbicide options do not include glyphosate or Liberty. The herbicides listed in Table 2 have limited residual activity and/or tolerance to grasses, legumes or Brassica species. These foliar herbicides must be applied prior to interseeding when weeds are small. This will generally be 3 to 5 weeks after corn planting and a week or more prior to interseeding. In organic systems, a combination of tillage and cultivation is used for weed control and herbicide impacts on cover crops are not a concern. If grazing of the cover crop is planned, most corn herbicides allow grazing of corn stalks although there is nothing on the herbicide labels concerning interseeded cover crops. Table 2.2 -18 in the 2015/16 Penn State Agronomy Guide lists herbicide grazing restrictions for corn.

We have had limited experience and less success interseeding in soybean. Full-season soybean is very competitive and it is difficult for interseeded cover crops to survive the intense shading when soybeans develop a closed canopy. Planting shorter-season varieties that are not as tall, planting soybeans a little later in the season such as in June or as double-crop soybean after a winter cereal in regions where this is common can allow for greater interseeding success. Residual soybean herbicides present the same concern for the success of the cover crop as corn herbicides. We have not tested residual soybean herbicides and interseeded cover crops, but provide the following guidelines based on our herbicide experience (Table 3).

Species selection

The ideal species for interseeding are those that are cool season, somewhat drought and shade tolerant and relatively easy to establish. These have mostly included annual ryegrass, and red and crimson clovers (See Table 4).

Annual ryegrasses are available as true annuals or Italian ryegrasses. The annual ryegrass are less expensive, and sometimes produce a bit more biomass, but they can head out in the fall and are more subject to winterkill. The Italian ryegrasses don't head out and often have superior winter hardiness. Most of our research has utilized annual ryegrass and we have less experience with Italian ryegrass. We suggest seeding ryegrass at 15 to 20 pounds per acre as a single species or 10-15 pounds per acre in a mix with clover.

Of the clovers, medium red clover has been the most successful in our research. It is fairly shade tolerant, has good winter hardiness and is less expensive than some other clovers. Be sure to properly inoculate legumes. Seed medium red clover at 8 to 10 pounds per acre as a single species or 5-8 pounds per acre in a mix with ryegrass.

An alternative to medium red clover is crimson clover. It often produces a bit more biomass in the fall after interseeding, but is subject to winterkill in Pennsylvania and North. Seed

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(Cover Crops—Continued from page 12)

crimson clover at rates of 10-15 pounds per acre as a single species or 8-12 pounds per acre in a mix with ryegrass.

We have evaluated orchardgrass, Kentucky bluegrass, perennial ryegrass, tall fescue, and several other legumes such as hairy vetch, ladino clover, and yellow blossom sweet clover. Orchardgrass has worked fairly well and is more winter hardy than the ryegrass, while the other grasses have not been successful. We have had mixed results with hairy vetch and the other clovers have not been successful.

Another species we have evaluated is forage or Daikon radish. Seeding rates of 3 to 5 pounds with ryegrass have been effective. The radish will not produce the large roots in the interseeded crop situation but can produce some biomass and taproots to complement the grass. Often mixtures of the clovers and ryegrass do well and radish can be added to the mix. Mixtures provide diversity and the potential benefits that come along with multiple species. A typical ryegrass /clover/radish mixture would include about 12 pounds of ryegrass, 8 pounds of red clover and 3 pounds radish. We are using a mixture of annual ryegrass (10 lb) and orchardgrass (10 lb), radish (3 lb), plus or minus a red or crimson clover (5 lb) in some trials.

Fertilization

In general we have fertilized interseeded corn crops similarly to other corn crops. Concentrated applications of UAN dribbled over cover crop rows could cause some cover crop seedling mortality or stimulate the cover crops in some cases. Side dressing between every other

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Table 1. The likelihood of herbicide injury to grasses, legumes, brassica species or mixtures when interseeded 5 to 7 weeks after corn planting. Injury likely indicates these herbicides should not be used when interseeding sensitive cover crop species. Injury possible indicates that there is potential to use these herbicides, but some injury may occur. Use these herbicides as setup programs (1/2 - 2/3X) prior to post herbicides. Herbicides in the Injury unlikely category can be used at normal (1X) rates and should allow safe establishment of specified cover crop species. This table does not list all products that contain these active ingredients.

Cover Crop - Grass

INJURY LIKELY

Active Ingredient	Key Products
atrazine (>1lb)	Atrazine, others
nicosulfuron	Accent, Steadfast
pyroxasulfone	Zidua, Anthem
simazine	Simazine
s-metolachlor	Dual,others
tembotrione	Capreno/Laudis
topramezone	Armezon/Impact

INJURY POSSIBLE

Active Ingredient	Key Products
acetochlor	Harness, Degree
atrazine (<1 lb)	Atrazine
dimethenamid	Outlook
isoxaflutole	Balance, Corvus
metribuzin	Metribuzin
pendimethalin	Prowl

INJURY UNLIKELY

Active Ingredient	Key Products
clopyralid	Stinger, Hornet
dicamba	Banvel/Clarity
flumetsulam	Python, Hornet
halosulfuron	Permit
mesotrione	Callisto
rimsulfuron	Resolve, Basis
safluenacil	Sharpen

Cover Crop - Legume

INJURY LIKELY

Active Ingredient	Key Products
atrazine (>1lb)	Atrazine, others
clopyralid	Stinger, Hornet
Flumetsulam	Python, Hornet
Halosulfuron	Permit
Isoxaflutole	Corvus/Balance
Mesotrione	Callisto
pyoxasulfone	Zidua, Anthem
Simazine	Simazine
Tembotrione	Capreno/Laudis
Topramezone	Armezon/Impact

INJURY POSSIBLE

Active Ingredient	Key Products
acetochlor	Harness, Degree
atrazine (<1 lb)	Atrazine
dicamba (PRE)	Banvel/Clarity
dimethenamid	Outlook
metribuzin	Metribuzin
pendimethalin	Prowl
s-metolachlor	Dual,others

INJURY UNLIKELY

Active Ingredient	Key Products
rimsulfuron	Resolve, Basis
safluenacil	Sharpen

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row could exacerbate these effects and result in heavy cover crop growth in every other row, especially in a less competitive corn crop. Side dressing with the interseeder machine or another apparatus that could apply the N near the base of the corn plants could minimize these effects.

Harvesting Impacts

The silage harvest process can damage the interseeded cover crop but often it will quickly recover and within two weeks with good growing conditions, it should look good again. If conditions are wet at harvest with soil compaction from large trucks and choppers, some permanent damage can occur. When harvesting for grain, try to avoid tactics that would smother the cover crop. Operate the combine a bit higher to avoid shredding the stalks, while still harvesting the grain. Avoid mowing the corn stalks after harvest as this could smother the cover crop with corn stover. Instead consider leaving a high stubble in the field to reduce the stover on top of the cover crop.

Cover Crop Termination

Most cover crops are fairly easy to control in a burndown program as long as you pay attention to detail. There are a few species that may require special consideration. In general, most programs begin with glyphosate, which tends to be more consistent than paraquat (Gramoxone). Liberty has a narrow fit, mostly for horseweed/ marestail control, but does not add much for cover crops. Herbicide effectiveness ratings for some common cover crops are provided in Table 5.

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Table 2. Postemergence corn herbicides that have short residual activity or cover crop tolerance. Herbicides must be applied prior to interseeding cover crops

Tolerant cover crops	Active ingredient	Trade name
Grasses	bentazon	Basagran
Grasses	bromoxynil	Buctril
Grasses	carfentrazone	Aim
Grasses	dicamba	Clarity/Banvel/Status
Grasses	flumetsulam + clopyralid	Hornet
Grasses	fluthiacet	Cadet
Grasses	glufosinate	Liberty
Grasses	glyphosate	Roundup or other glyphosates
Grasses	halosulfuron	Permit
Grasses	halosulfuron + dicamba	Yukon
Grasses	mesotrione	Callisto
Grasses	rimsulfuron + thifensulfuron	Resolve Q
Grasses	thifensulfuron	Harmony
Legumes or Brassica species	bentazon	Basagran
Legumes or Brassica species	bromoxynil	Buctril
Legumes or Brassica species	carfentrazone	Aim
Legumes or Brassica species	fluthiacet	Cadet
Legumes or Brassica species	glufosinate	Liberty
Legumes or Brassica species	glyphosate	Roundup or other glyphosates
Legumes or Brassica species	thifensulfuron	Harmony
Grasses + Legumes or Brassica species	bentazon	Basagran
Grasses + Legumes or Brassica species	bromoxynil	Buctril
Grasses + Legumes or Brassica species	carfentrazone	Aim
Grasses + Legumes or Brassica species	fluthiacet	Cadet
Grasses + Legumes or Brassica species	glufosinate	Liberty
Grasses + Legumes or Brassica species	glyphosate	Roundup or other glyphosates
Grasses + Legumes or Brassica species	thifensulfuron	Harmony

(Cover Crop—Continued from page 14)

Here are some considerations as you get into the field this year.

Guidelines for glyphosate. All cover crops should be actively growing and capable of intercepting the herbicide spray (e.g. not covered with crop residue). Remember to use a sufficient rate, which generally ranges from 0.75 lb ae to 1.5 lb ae/acre. The 22 fl. oz rate of Roundup or 32 fl. oz rate of Credit, Rascal, Clearout, etc. = 0.75 lb. In general, application alone in good quality water along with appropriate adjuvants (surfactant + AMS) is best and reducing the carrier volume to 10 gal/acre can increase activity. Do not add 28 or 32% UAN or other fluid fertilizers to the spray tank. If the water source has a high pH (8 or greater), consider adding an acidifying agent to the spray solution. Avoid tank mixing with higher-rate (> 0.25 lb) clay -based herbicides (WDG, WG, DF, DG, F) like atrazine, simazine, and metribuzin. Other herbicides such as 2,4-D, dicamba, clopyralid, Balance or Corvus, Resolve or Basis Blend, etc. are OK.

Annual ryegrass

Annual ryegrass continues to be somewhat challenging to control. Glyphosate is the preferred herbicide and paraquat (Gramoxone) does not provide consistent control. Application during sunny warm days is best and cloudy weather will slow activity. Under cool conditions, it may take 2 to 3 weeks to kill the ryegrass and a second application may be necessary. Previous research suggests that small ryegrass is easier to control, but mild air temperatures 1 to 2 days before, during, and 1 to 2 days after application are likely more important. Apply

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Table 5. Effectiveness of herbicides for control of common cover crops (based on Penn State research or our best guess). Control ratings: 10 = 95-100%; 9 = 85-95%; 8 = 75-85%; 7 = 65-75%; 6 = 55-65%; and N = less than 55%.

	Rate* (lb/ acre)	Annual ryegrass	Winter rye	Winter wheat	Crimson clover	Red clover	White clover	Hairy vetch
2,4-D ester	0.5	N	N	N	7+	8	6	9
2,4-D ester	1	N	N	N	8	9	7	10
Atrazine	1.0	6	6	6	7	6	6	7
Atrazine	2.0	7	7	7	8	7	7	8
Clopyralid	0.25	N	N	N	7	9	9	9
Dicamba	0.5	N	N	N	7+	9	9	9
Glyphosate	0.75	8	9	9	8	7	6	7
Glyphosate	1.5	9	9	9	9	7+	7	8
Glyphosate +2,4-D ester	0.75 + 0.5	8	9	9	8+	8	8	10
Glyphosate +dicamba	0.75 + 0.5	8	9	9	8+	9	9	10
Paraquat	0.5	6	7	8	8	7	7	7
Paraquat	0.75	6	8	8+	8+	8	7	8
Paraquat + Atrazine or Metribuzin	0.5 + 1 or 0.25	7	8+	8+	9	8+	7	9

*0.75 lb Glyphosate = 32 fl. oz of a 41% glyphosate; 0.5 lb paraquat = 2 pt Gramoxone SL; Clopyralid is a component of Stinger, Hornet, and Surestart/Tripleflex.

Dicamba Tolerant Soybeans Without Dicamba

By Mike Hunter, CCE-North Country Regional Ag Team

June 4, 2020- On June 3, 2020 a federal court ruling vacated the registration of dicamba herbicides approved for use in dicamba tolerant or Xtend soybeans in New York. The herbicides named in the decision were XtendiMax, Engenia and FeXapan. This effectively stops the approved sale and use of these three dicamba herbicides for use on Xtend traited soybean in New York. However, Tavium Plus VaporGrip Technology (diglycolamine salt of dicamba + s-metolachlor premix) was not listed in the court ruling and remains an option for growers to use on dicamba tolerant soybeans.

Unless an appeal to the ruling or an emergency stay is granted by the court, this decision will certainly change many currently planned herbicide programs in place today. The question that will be asked by growers is "I've planted Xtend soybeans, now what are my options?". For soybean growers that have resistant tall waterhemp and palmer amaranth in soybeans there are other effective herbicide options available. For soybean growers that have multiple resistant marestail (Groups 2 and 9) in soybeans it will be more challenging.

The postemergence control of resistant tall waterhemp and palmer amaranth in *all* soybeans, including conventional, can be achieved by applying Reflex or Flexstar (fomesafen) or Prefix (s-metolachlor + fomesafen) or Warrant Ultra (acetochlor + fomesafen) before the weeds reach 3 inches tall. If necessary, a late rescue treatment of Cobra (lactofen) can be applied.

There are no effective postemergence herbicides to control multiple resistant marestail in glyphosate tolerant (Roundup Ready) or conventional soybeans. Postemergence applications of Reflex, Flexstar and Cobra, *will not* control marestail.

This court ruling comes at a very poor time during the growing season. There are still many unanswered questions about how this will affect any of these dicamba products that are already purchased and on the farm. The chemical companies will continue to provide updates on this court ruling and what it will mean to growers and retailers. In the meantime, make sure you have an alternative plan in place in case XtendiMax, Fexapan and Engenia herbicides are lost for the remainder of the growing season.

(Spraying Weather—Continued from page 10)

The most common measure of water in air is relative humidity (RH). RH doesn't tell the whole story, though, because the same RH at different temperatures results in two different rates of water evaporation. A better measure is wet bulb depression. Wet bulb depression is defines as the difference in temperature reported by a dry bulb vs. a wet bulb thermometer. Wet bulb depression has more recently been coined as "Delta T" in Australia. The Delta T value is directly related to water evaporation, and charts have been published showing acceptable values for spraying. A Delta T of >10 ºC is considered too high.

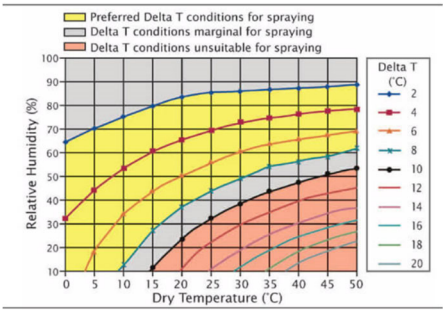

Figure 4: Delta T, also known as wet bulb depression, provides an indication of water evaporation rate.

After they deposit on a leaf, droplets can evaporate to dryness within seconds, and this can reduce uptake. In one study, a Group 2 herbicide was applied to weeds in a normal sized spray, and also as a fine mist, both under very dry conditions. Unlike the normally applied product, the finely misted herbicide had no effect on the weeds due to its rapid drying. Interestingly, the product began to work again when the plants were placed in a humid environment.

High humidity can also work against an application. Since humidity is often high during temperature inversions, droplets remain potent while they linger and drift over sensitive terrain. It would be better if they had evaporated and lost their effectiveness.

Some proponents of low water volumes and fine sprays have suggested oily formulations or adjuvants prevent evaporation. While this may, in fact, slow evaporation, it also creates a dangerous condition in which many small droplets remain aloft for a long time, with high activity on any target they may encounter. The bottom line: Don't spray low volumes with oily adjuvants.

The Perfect Day

We know that the ideal spray day is sunny, starts a few hours after sunrise once the dew has mostly burned off, and has consistent winds away from sensitive areas. Spraying should end well before sunset, before calm conditions signal the onset of the inversion.

But what to do when that day never happens? All too often, high winds persist day after day, and night spraying is the only alternative. In that case, do what you can to minimize potential damage. Survey downwind areas. Cloudy skies suppress inversions. Incoming weather systems are usually associated with consistent winds, and these may reduce inversion risk. If drift is a possibility, apply more water and use the coarser nozzles at your disposal to minimize it. And productivity will once again pay dividends, allowing you to get a greater proportion of your work done when conditions are better.

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glyphosate at 1.25 to 1.5 lb ae/acre following the guidelines provided previously.

Hairy vetch, red clover, and crimson clover

For control of clover or other legume cover crops, glyphosate alone will not kill most legumes, but it is useful in mixture with other herbicides. Gramoxone alone is also not very effective on legumes and should be mixed with atrazine or metribuzin for increased performance. Dicamba

(Continued on page 18)

Table 4. Suggested seeding rates for interseeding cover crops on a per acre basis. These are the species we have experience with. Other species may also be suitable, but we have not tested them.

Seeding Type	Species	Pounds/acre
Single Species	Annual ryegrass	15-20
Single Species	Other grasses (e.g. orchardgrass)	15-20
Single Species	Medium red clover	8-10
Single Species	Crimson clover	10-15
Single Species	Daikon radish	5
In Mixtures	Annual ryegrass	10-15
In Mixtures	Medium red clover	5-8
In Mixtures	Crimson clover	8-12
In Mixtures	Daikon radish	3-5

(USDA Details—Continued from page 3)

applied in the major commodity and disaster assistance programs administered by FSA, the total payment amount of CFAP payments attributed to an individual will be determined by taking into account the direct and indirect ownership interests of the individual in all legal entities participating in CFAP.

Different payment limits apply to LLC's, closely held corporations or limited partnerships. These entities may receive up to $750,000 based upon the number of owner-members (not to exceed three) who are contributing substantial labor or management with respect to the operation of the corporate entity.

Income Eligibility

As is true for many other USDA programs, persons or business entities that exceed certain income limits are ineligible for any payments.

A person (or legal entity), other than a joint venture or general partnership, is ineligible for payments if the person's or legal entity's average adjusted gross income (AGI), using the average of the adjusted gross incomes for the 2016, 2017 and 2018 tax years, is more than $900,000, unless at least 75%of that person's or legal entity's average AGI is derived from farming, ranching, or forestry-related activities. In other words, very large farm businesses are not eligible unless that farm business is the owners' primary source of income.

If at least 75%of the person's or legal entity's AGI is derived from farming, ranching, or forestry-related activities and the participant provides the required certification and documentation, the person or legal entity is eligible to receive CFAP payments up to the applicable payment limitation noted above.

With respect to joint ventures and general partnerships, this AGI provision will be applied to each member of the joint venture and general partnership.

Example Initial Benefit Calculations

Example 1

200 cows with 1,200,000 pounds of production in Q1, 2020
= ((12000cwt x $4.71) + (12000cwt x 1.014 x $1.47)) x 80%
= **$59,526**

Example 2

800 cows with 5,000,000 pounds of production in Q1, 2020
= ((50000cwt x $4.71) + (50000cwt x 1.014 x $1.47)) x 80%
= **$248,023**

Example 3

3000 cows with 19,500,000 pounds of production in Q1, 2020,
LLC with 3 materially involved shareholders
= ((195000x $4.71) + (195000cwt x 1.014 x $1.47)) x 80% = **$750,000**

BUT, this farm's payment will be capped at $250,000 per shareholder

Additional Questions

As is always true, the Farm Services Agency is the final arbiter of how this program works and how producers can apply. Any information provided here is our best effort to faithfully interpret the announced rules, but any discrepancy or misunderstanding is our error and in no way binding on USDA.

USDA will be providing a CFAP payment calculator with which producers and growers can estimate payments and pre-populate the application for payment—form AD-3314—once signup begins. Additional information, including a video preview of the payment calculator, is available at https://www.farmers.gov/cfap
To view this document online, visit https://nyfb.informz.net/NYFB/data/images/DMAP.pdf

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(Cover Crop—Continued from page 17)

(Banvel/Clarity) is one of the best herbicides for control of legume cover crops. It is often a necessary tank-mix partner with glyphosate for control of red or white clover. A 2,4-D ester formulation will effectively control hairy vetch and field peas. I am less familiar with crimson clover control and unsure if 2,4-D is adequate or dicamba is necessary. Both 2,4-D ester and dicamba can be tank-mixed with glyphosate without loss in activity and can be used in corn. Use a minimum of 12 fl. oz/acre of Banvel or Clarity or 2,4-D ester tank-mixed with glyphosate. For corn, apply dicamba or 2,4-D ester 7 to 14 days before planting or 3 to 5 days after planting for greater crop safety and plant corn at least 1.5 inches deep. Clopyralid is also effective on legumes and is a component of several corn herbicides. Dicamba and clopyralid are not suitable for soybean and 2,4-D ester (1 pt) must be applied at least 7 days ahead of soybean planting. Clopyralid can persist up to 12 months and injure legumes.

Nutrient Requirements of Succeeding Crop

We are still working to develop recommendations for corn following an interseeded crop. There should be some effect on the N requirement for corn following a well-established clover or clover grass cover crop. Following clover interseeded into wheat, this is often about 50 pounds per acre. Following a ryegrass crop, there could be some benefit if the grass was manured over the winter. Our recommendation in the Penn State Agronomy Guide is to increase the N contribution from an overwinter manure application from 20% of the manure N without a cover crop to 45% contribution with a cover crop not harvested for forage.

Without a manured cover crop, there is potential for some N immobilization from a grass cover crop like ryegrass and in this case, there may not be much N contribution from the cover crop to the succeeding corn crop. In the longer term, ryegrass should improve soil organic matter and reduce the need for N. In the short term, it may be good to maintain current N rates and also strive for some N at planting to offset any potential immobilization issues.

(Ecological Control of Pasture Flies—Continued from page 19)

Cornell's Veterinary Entomology Program
http://www.entomology.cornell.edu/Extension/Vet/index.html

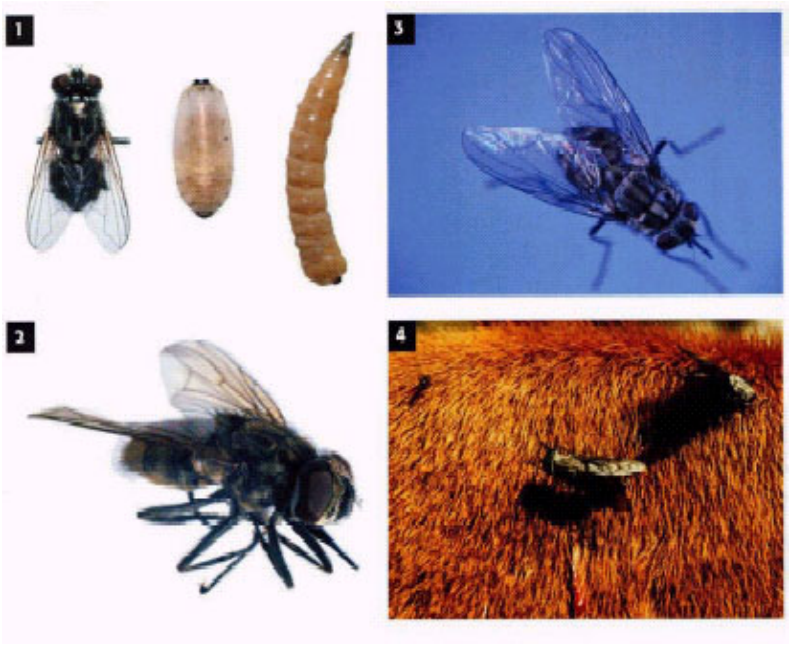
Image Captions

1. Face fly, similar to house fly.

2. Horn fly, 1/2 the size of face fly, wings held at 45 degrees.

3. Stable fly, similar size to face fly, has a spear-like mouthpart.

4. Horse fly, usually the size of a quarter or larger.



Orkin's Fly Blocker Designed for horn flies and face flies.

Ecological Control of Pasture Flies

By: Fay Benson – Cornell's South Central NY Dairy Team

Farmers that raise animals know that June is when flies start to be a nuisance, and by July, if a control program is not in place, production losses occur. The information from this pasture walk will help farmers put a fly control program into place.

Speaking at the pasture walk was Dr. Phil Kaufman, veterinary entomologist with Cornell University and Keith Waldron, NY Integrated Pest Management extension specialist. This team has been working together to present this topic for a number of years. Throughout the presentation, they repeated the need to clean up around the farm. Two of the three most common flies affecting animals on pasture, face fly and horn fly, breed in undisturbed manure piles. The third, stable flies, breed in moist rotting organic material, like moist straw bedding, the base of big bales stored on the ground, and poorly composted grass clippings. Dr. Kaufman stressed the importance of managing fly control ecologically since organic methods are not as effective against populations that are already out of control. Chemically, it takes large doses of chemicals and the results will be less and less successful as the flies become resistant to pesticides. By reducing breeding areas, populations will be decreased, reducing the need for insecticide use, which will improve the effectiveness of chemicals.

The following are ecological control methods and thresholds for when numbers of flies will affect production losses.

Face flies, found (you guessed it) on the face, would become a problem at 10 flies on the face at one time. The female face fly is the most commonly seen. She is there to feed on the protein that is in the mucus around the eyes and nose, which she uses for reproduction. If there is not enough mucus, she pokes around the eyes, irritating them and causing them to tear, which is what the fly is after. This feeding behavior is how pink-eye is spread.

Horn flies are found on the animal's back and belly areas. They become a problem when they reach 50 per side in dairy animals and 100 per side in beef animals. Both sexes have biting mouthparts that they use to pierce the skin to obtain blood meals. You may notice horn flies billowing up from the backs of cows as they enter the barn, since horn flies do not like dark areas. A number of non-chemical traps have been designed to take advantage of this behavior. Both the face and horn fly females lay eggs on undisturbed cattle dung. Female horn flies wait by the tail head or lower rear of the animal to await dung deposition so that they can lay their eggs on the dung within seconds of it landing on the ground.

Both of these flies affect only animals on pasture and are outdoor insects. Control of face flies is difficult if other animal owners in the area don't have a program in place, since the face fly females leave the host daily and can fly up to 5 miles to find animals the following day. Because horn flies stay with the animals, their movement between herds is more restricted than face fly movement.

The stable fly is a pest on pasture animals and will also attack animals in confinement. Found on the legs of cattle, they are considered to be an economic problem when there are an average of 10 or more flies per animal, counted on the legs of 15 animals. Like the horn fly, they are blood feeders. If you see your animals stomping or standing in water or muddy areas, it often means they are being bitten by stable flies. Ecological control of this pest requires cleaning up rotting organic material, such as silage left around the blower, calf hutches, or round bale feeders left in the same place for too long.

The group went out into Bill and Joanne's pasture to look at dung pats to see what interesting things we could find. Under the pats there were small holes that were made by a beetle that lays its eggs into dung balls and buries them in the ground. Dr. Kaufman said there were more than 125 different species that live part of their life cycle in the dung pat, of these, only three were considered pests. For this reason, he cautioned people not to disturb the manure pats as a way of controlling just the three pests.

One question that most farmers came with was, "What are those yellow fuzzy flies that are seen on cattle dung early in the spring and then later again in the fall?" This year, there seems to be more of them than usual, one producer felt that it might be a harbinger of fly problems to come. It turns out that they are Yellow Dung flies, a predator that sits on the dung pat and waits for flies to come along and pounces on them to eat. Parasitic wasps and other non-pest flies were also discussed at the pasture walk. It was stressed that the parasitic wasps are an important part of a successful fly control program, but only in confined systems.. The control program that was recommended was:

1. Cleaning up breeding areas
2. Identify pest, and know its life cycle
3. Monitor numbers, keep track of thresholds
4. Use organic chemical controls as last resort

The earlier your program is in place, the more success it will have.

Fly Control Web Sites

New York Livestock and Field Crop IPM Program

http://www.nysipm.cornell.edu/lfc

(Continued on page 18)

Cornell Cooperative Extension
South Central NY Dairy and Field Crops Program
60 Central Avenue • Cortland • 13045 • 607.391.2660 • http://scnydfc.cce.cornell.edu

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We firmly denounce the ways in which structural racism and white supremacy disproportionately and detrimentally impact the lives of Black members of our community. We also recognize the resulting racialized trauma that stifles dreams, smothers hope, and compromises our shared humanity across race...

We invite all members of the extension community to join our collective efforts to transform ourselves, our relationships, and our systems through critical self-reflection, courageous conversations, and bold actions. Our intentional efforts in doing so will lead us to a more just, healed, and thriving community for all.

—Chris Watkins, Director, Cornell Cooperative Extension