Cornell Cooperative Extension

Eastern NY Commercial Horticulture Program

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Vegetable News

Early Season Brassica Caterpillars Teresa Rusinek, CCE Eastern NY Commercial Horticulture

Right now, you may be seeing Imported Cabbageworm or possibly Diamondback moth caterpillars in the field. Imported cabbageworm moths have been active for several weeks in the more southern region of NY. They do overwinter in NY and are the most common caterpillar pest on brassica crops grown in NY. Adults are easy to spot in the field. These are the white butterflies with 1 or 2 spots on the wings that you see flying during the day from plant to plant where they're laying bullet shaped eggs singularly on the underside of leaves. The larvae that hatch out of the eggs start out as small velvety green caterpillars and after feeding for a few weeks turn a darker green with a light yellow stripe down their back.

Diamond back moths are also active at this time. DBM overwinter in warmer areas of the state such as Long Island. Mustards and collards are preferred egg-laying sites so you may want to check those crops first if you are growing them. You probably won't notice the adult DBM because they're active from dusk trough nighttime. Eggs of the DBM are small round, yellowish-white, and laid singly or in groups of two or three on the underside of lower leaves or on stalks. DMB larvae can be distinguished from other young pest species by their habit of actively wriggling or dropping from the leaf on a silken thread when disturbed. The pupa develops within a delicate, loosely spun, open lacework cocoon that is attached to the leaves and stems of the plant.



Cabbage Loppers (CL), another major caterpillar pest of brassica, will be out a little later in the season.

Finally, a new addition to these wellknown brassica pests is the cross-striped cabbage worm (CSCW). Previously only active further south, CSCW has emerged as a pest capable of seriously damaging crops, particularly later in the season. In the northeast 2-3 generations may occur

Cross-Striped Cabbage Worm Larvae in cauliflower curds. Photo: T. Rusinek

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Imported Cabbageworm and adult butterfly. Photo: Dan Gilrein, Cornell University



Cabbage Lopper and Moth. Photo: Alton Sparks, University of Georgia.

during the season. Look for the white and black stripe pattern on its back that makes it easy to distinguish from the other brassica worms. Also, they lay their eggs in a small flat, yellow cluster under the leaf. Because CSCW eggs are laid in clusters, unlike DBM, CL and ICW, you will find several caterpillars in clusters on infested plants. Right now we are seeing small larvae from the first generation and the stripes may be difficult to see without a 10 x handlens. This past week I found up to 7 larvae, deep in cauliflower curds. Bt products such as XenTari , Dipel or other chemistries such as Azera can be used for management in organic production. Avaunt or Proclaim can be used in conventional production. Many of the labeled insecticides work on multiple pests, though DBM are likely resistant to pyrethroids. If you're going to use a Bt, you really want to make sure you're getting good coverage especially if you're dealing with DBM larvae which like to feed under leaves. You can get better coverage by adjusting application speed, pressure, using higher rates, more gallons to the acre and with shorter application intervals to get as good coverage under leaves and as possible. Include a sticker or wetting agent when applying pesticides on waxy foliage which often improves control as well. Go back into the field after a day or so when the pesticide reentry interval has passed to check plants very closely for expected results. If levels don't seem to be dropping, immediately rotate to other labeled materials. Also be aware that Bt materials are ineffective against flea beetles and aphids which you may be battling as well.

Regular scouting helps catch these pests early, before there's significant damage to the crop, and gives more options for effective control measures. Examine several plants at randomly selected sites throughout the field. Bring a hand lens along and carefully look for eggs as well as small caterpillars on the undersides of

leaves. Early detection is important because you want to control these pests before they make their way into the heads of cabbage,

broccoli or

cauliflower!



DBM pupa (left) and larvae (right). Note the forked tail on the larvae. Photo: Manitoba Agriculture, Food and Rural Initiatives.

Once they get into a protected environment they become very hard to control with products like Bt's and pyrethroids.

What's That Spot On My Onions? Maire Ullrich, CCE Eastern NY Commercial Horticulture

Spots on onion leaves are many and often look like one another, especially when they get big and coalesce into bigger tan/brown areas.

The most difficult to identify, I think, is Botrytis. The early lesions are a hazy, water-soaked, lesion with a tan dot in the middle. They are always small. They are $\frac{1}{2}$ inch and always oval. Then, as the lesion matures, the tan spot in the middle gets a bit bigger and, usually, develops a crack in the leaf at the center. This disease has been easy to manage for many years with modern fungicides but is always present at some low level so you can almost always find a few lesions on a plant. Look at the oldest leaves and on the tips of

leaves. The longer the leaf has been grown out, the more likely a spore has landed on it. Many years ago, when fields would get "blighted out" the lesions would completely cover areas causing great lightening of leaves and reduction in photosynthetic area, reducing production significantly. See below for lesion progression.



From left to right, Botrytis lesions as they mature. Photos: M. Ullrich

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The spot that can look most like a disease, especially when damage is light, is herbicide (Goal) damage. Herbicide burns can come in all size different locations. Both prefer to stay out of lesions and commonly cause twisting and puckering as healthy cells continue to grow in the vicinity of damaged cells. Subtle spattering can easily be confused for Botrytis immediately after damage occurs. Note that there are no halos to these spots and they come in a variety of sizes and shapes.



Sample of herbicide burns. Photo: M. Ullrich

The photo below shows a good example of hard rain/wind or hail damage (left, blue arrow) and herbicide burn (right, red arrow). You can see that the bruising that occurred from the hard rain or other leaves hitting this leaf results in the waxy coat lifting from the surface of the leaf, leaving these large hazy marks. And (purple arrow) where both are occurring in close proximity to one another.



Example of rain/wind or hail damage as well as herbicide burn. Photo: M. Ullrich

Two insects also cause damage that can be confused for disease too. Thrips and spider mites cause similar damage but usually in of the light of day so thrips hide in the center of the neck, where the new leaves are emerging, unless their populations are exploding. Then you can find them all over the leaf or even on you if the infestation is bad enough. At night, they travel up and down the leaves feeding (green arrow). Spider mites tend to hide in the bends of leaves (white arrow pointing directly at Two-Spotted Spider Mite). In that bend you might see their webbing but you will likely need a lens to see them as they are quite small. Both do a similar lightening/ yellowing of the leaves since they remove the juices and take the chlorophyll out. Both thrive in hot dry weather but read pesticide labels closely as most chemicals control one or the other, not both, since they are very unrelated pests.

It is fairly common to find all of these spots on the same plant and certainly in the same field on most days this far in the season. If



you are concerned about a spot, call us our or take a picture and send it along so the proper management practice can be applied for best results.

The Root of the Problem

Maire Ullrich, CCE Eastern NY Commercial Horticulture

Why do these onions have tipburn? They are well-fed, well-watered and should be in great condition, but are not thriving. In fact, they look like they are shrinking before my eyes....

Pull one up.

There's the culprit. Pink Root.

And its appearance and severity seems to be getting worse over the years....

The disease that causes Pink Root is Phoma terrestris and is considered everywhere onion production occurs. Rotation out of onions for 5 years can be helpful in reducing populations to where infections are rare but it will not eliminate the disease. Management options are few but you can 1) select resistant or tolerant varieties and 2) if you're buying in transplants, inspect before planting. Because there are genetic variations in Pink Root, matching the resistant varieties to the disease is important. Also, bringing in plants from other areas that are infected might be increasing the different Pink Root variations we have in the soil.

Heavy infections on susceptible varieties, especially if other stresses are present, can reduce yields more than 20%. There is no economic room for 20% losses. Plan your strategy to control and discuss resistant options with your seed supplier.

I Cannot Believe I'm Saying This: "Cucurbit Downy Mildew Confirmed in Western NY!" Chuck Bornt, CCE Eastern NY Commercial Horticulture

If you listened to last week's podcast, you heard me say that we do not have any confirmed cases of Cucurbit Downy Mildew_(CDM) in Eastern NY – and I'm still happy to say that we don't as of today, July 7th. However, over the weekend we were alerted that several fields in Erie County were confirmed to have CDM! The showers last week and into the weekend have me a bit nervous that we might have some spores that made it over this way – however, the CDM forecasting system did not have us in a high-risk region. However, this morning I received another note from our pathologist Meg McGrath that there is confirmed CDM in northern NJ (Salem County) and unconfirmed CDM in Southeast PA, all in cucumbers that could be sources for inoculum here in eastern NY!

Now for even more bad news! According to today's forecast (see below), our counties in the southern part of the Eastern NY Commercial Horticulture region are under a "Moderate Risk" for CDM. <u>This means any cucumbers that have not had a protective</u> <u>spray applied should have a protective spray applied plus a systemic</u> <u>such as Ranman or Orondis applied as soon as possible. For organic</u> <u>growers, labeled biopesticide such as Regalia or at minimum a</u> <u>copper application</u>. I'm concerned that with the heat and humidity forecasted for this week, thunderstorms may provide the means to spread and give the pathogen the means necessary to establish and spread here in the region

From the Cucurbit Downy Mildew Forecasting Program: OUTLOOK: Epidemic spread likely in the South (Editor's note:

meaning Florida, Georgia, North Carolina etc.). The most favorable weather early this week will be found in the Southeast and the risk predictions reflect this. Transport events out of the southern sources exhibit a variety of directions, impacting inland areas of the Southeast as well as locales near the Gulf and Atlantic coasts. Epidemic spread is quite possible elsewhere along the Atlantic



Coast, from NC northward through southern New England.

FORECAST: HIGH Risk for cucurbits in the FL panhandle, southern AL, southern and east-central GA, SC, and southeast and southcentral NC. <u>Moderate Risk for east-central and northeast NC,</u> <u>southeast VA, eastern PA, NJ, northern DE, southeast NY, Long</u> <u>Island, MA, CT, RI, and southern VT and NH</u>. Low Risk for cucurbits in southern MI, far southern ON, southern DE, eastern MD, northcentral and western NC, eastern TN, northern and west-central GA, and the FL peninsula. **Minimal Risk elsewhere.**

Besides putting out a fungicide, the next thing you need to do is

make sure you are signed up to receive the updates from the Curcubit Downy Mildew Forecasting website. If you have had an account before, they made some changes and you need to re-signup. The address is www.//cdm.ipmpipe.org You can receive email or text alerts based on how far away or I guess how close you want to know where CDM is. I have mine set for a 500-mile radius. Again, most of the CDM detected so far has been on cucumbers as is typical. This is important to know as we have two different 'clades' of the pathogen which can impact different crops. The first one is what I call the cucumber strain and is the one that we have been dealing with here the last 10 - 12 years. It really hits cucumbers hard at any stage in their development from seedlings to mature cukes. Next in line are melons for this strain. Pumpkins and winter squash seem to be last in line for this strain. The second strain is what is more of a cucurbit generalist and from my observations it effects all the cucurbits pretty much equally. This is the one that we see about every 7 years or so and is devastating as it can take out a full size pumpkin plant in a couple days given the right conditions.

I also cannot stress the fact that you will need to get out there and start scouting your cucumbers. When scouting look for yellow spots on the upper sides of the leaves. When turned over, especially in the morning when there is dew present or damp conditions, you should be able to see a grayish/purply fuzzy growth opposite where the yellow spots are. CDM prefers cool, damp conditions - but with the possibility of all kinds of frequent showers popping up all over the region, the moisture and delivery of the spores will possibly be enough to get it started. According to our plant pathologist Meg McGrath, "Start with protectant fungicides alone when there is a risk of downy mildew for the specific crop based on the forecasting program. Include targeted fungicides when downy mildew is present." Protectant fungicides include chlorothalonil (Bravo Weatherstik, Praiz etc.) and mancozeb (Roper DF, Dithane etc.). Remember that any of the mancozeb products generally have a long pre-harvest interval and should probably be used on early stages of crop growth so you can avoid long delays in harvesting crops that are or will be ready. Targeted labeled materials include Ranman, Orondis Ultra, Orondis Opti, Omega, Zampro and should be combined with protectants and not used alone. For organic growers, Regalia plus copper or Actinovate is labeled for control but you must have the products on prior to the disease getting started. Below is a table with rates, REI's, PHI's, Fungicide Resistance Action Committee codes (FRAC) to help you rotate the different families of fungicides and notes about certain products etc. Remember to pay attention to the FRAC (Fungicide Resistance Action Committee) codes or the numbers that we include in the tables and that are on all the labels. Try to rotate or use the different codes to slow the onset of CDM resistance to these products.

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For more information on Cucurbit Downy Mildew from Dr. McGrath, visit: <u>https://www.vegetables.cornell.edu/crops/cucurbits/downy-mildew-of-cucurbits/</u>. To visit and sign up for the Cucurbit Downy Mildew Forecast Program, go to: <u>https://cdm.ipmpipe.org/</u>

Please note we are no longer recommending the use of Presidio, Revus or Previcur Flex for CDM control, especially in cucumbers!

Table 1: Fungicides labeled for Cucurbit Downy Mildew. Most also labeled for Phytophthora Blight Control in cucurbits. Products in RED are labeled for organic use but you should check with your certifying agency to be sure. More organic controls can be found at: https://www.vegetables.cornell.edu/crops/cucurbits/downy-mildew-of-cucurbits/list-of-biopesticides-for-organic-production/								
Fungicide	FRAC Code	Recommended Rate/Acre	REI	PHI	Seasonal Limits	Adjuvant Recommendations		
Chlorothalonil (Bravo Weather Stik, Praiz etc.)	M5	1.5 -2 pints*	12 hours	See label	21 pints per acre	Please note the "Special Eye Irritation Provisions" on the labels. *When using in combination with a Powdery Mildew material, 2-3 pints should be used.		
Ranman 400 SC ¹ (cyazofamid)	21	2.75 fluid ounces	12 hours	0 days	6 sprays	Organosilicone or non-ionic surfactant. No more than 3 consecutive applications		
Mancozeb (Dithane DF, Roper DF etc.)	M3	See your specific p	See your specific product label for this information.					
Orondis Ultra ¹ (oxathiapiptplin + mandipropamid)	49 + 40	5.5 – 8.0 fluid ounces	4 hours	0 days	See label for special notes	non-ionic or organosilicone surfactant. Should al be mixed with a copper fungicide. 4 sprays or 33 of all applications containing Orondis products		
Orondis Opti (oxathiapiptplin + chlorothalonil)	49+M5	1.75 – 2.5 pt	12 hours	0 days		4 sprays or 33% of all applications containing Orondis products Orondis Opti is not labeled for Phytophora blight		
Tanos 50 DF ¹ (cymoxanil + famoxadone)	27 + 11	8 ounces	12 hours	3 days	4 sprays			
Omega 500 SC ¹ (fluazinam)	29	0.75 – 1.5 pt	12 hours	See notes	No more than 7.5 pints per acre or 4 applications	PHI – 7 days pumpkins, cucumbers, squash; 30 days melons and watermelons. Omega is more expensive than other fungicides.		
Curzate 60 DF ¹ (cymoxanil)	27	5 ounces	12 hours	3 days	9 sprays	Include with one of the other materials listed if DM is detected because this product has a very short residual but has exhibited some burnout activity. Not labeled for Phytophora blight		
Zampro ¹ (ametoctradin + dimethomorph)	40 + 45	14 fluid ounces	12 hours	0 days	3 sprays	Do not apply more than 2 consecutive applications before switching to a fungicide with different FRAC code.		
Zing! (zoxamide + chlorothalonil)	22 + M5	36 fluid ounces	12 hours	0 days	8 sprays	Actual rate of chlorothalonil is below the recommended rate to control CDM or Powdery Mildew. Add 0.43 – 1.43 pints Bravo WeatherStik to the tank to achieve the rate of chlorothanonil required to control these diseases. Not labeled for Phytophora blight		
Phostrol, ProPhyt, Fosphite (phosphorus acid containing products)	P 07	2.5-5.0 pints*	4 hours	0 days	7 sprays	*Rates vary depending on product used. Please review the label for the correct rates.		

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Copper—Various formulations please see labels for more information								
Regalia Biofungicide	NA	1—4 quarts	4 hours	0 days	NA	Should be applied with copper fungicide		
Serenade ASO Bacillus subtilis str QST 713)	NA	2—6 quarts – see label for rates.	4 hours	0 days	NA	Only labeled for <i>Phytophthora parasitica</i> so knowing which species you have is important!		
Actinovate AG (Streptomyces Iydicus WYEC 108)	NA	3 –12 fluid ounces	1 hour or until dry	0 days	NA			

¹ Should mix with a protectant partner such as chlorothalonil.

None of the above fungicides will control Powdery Mildew with the exception of fungicides with chlorothalonil or copper, Regalia Biofungicide, Serenade ASO and Actinovate AG.

More organic controls can be found at: https://www.vegetables.cornell.edu/crops/cucurbits/downy-mildew-of-cucurbits/list-ofbiopesticides-for-organic-production/

Reminder on Calculating Fertigation Rates for Plastic Mulches Chuck Bornt, CCE Eastern NY Commercial Horticulture

Every year about this time of year, I start to get the question about fertigating vegetables being grown in plastic. I thought it might be time to dust off an old article on figuring out the correct amounts of fertilizer we need to be using, especially on our plastic mulched crops. Fertigating or the injecting of fertilizers into drip irrigation water with crops grown on plastic mulches is a very common and simple practice these days, however achieving the right balance can be tricky. Too much fertility at the wrong time and you could end up with a beautiful plant and no fruit which can happen in tomatoes and peppers or too little and you might not have achieved the optimal yields or quality you were looking for. Below are some general "rule of thumb" reminders when using fertigation:

- As mentioned above, some crops given too much fertility at the wrong time can result in excess vegetative growth. Peppers, eggplant and tomatoes in particular are susceptible to overfertilization, especially in their early growth stages. For these crops I recommend that fertigation be held back a little bit until you start to see fruit set – after this stage is reached, the chances of over fertilizing and sending the plant into vegetative mode is greatly reduced.
- We tend to concentrate on nitrogen for fertigation, but don't forget that potassium is a key component in many vegetable crops and is critical for optimum growth but also is responsible for flavor and improved fruit quality including shelf life and storability. You calculate potassium rates just like you do nitrogen.
- Calculating fertilizer needs on plastic mulches with drip irrigation: The key thing to remember, when trying to figure out how much fertilizer to dissolve in your bucket for a crop planted into plastic mulch is, it is <u>not</u> the same as a "field acre". You should only calculate the fertilizer needs for what is covered by the mulch.

- a. Determine what your bed top width is or the area across that your mulch covers. For example, if you are using a Rain-Flo raised bed maker, a typical bed top width might be 30 inches or about 2.5 feet. There are other machines and other systems that might use a different width so you need to go out and measure it.
- b. Take this value and multiply it by the row length and finally multiply that by the number of rows per section that you irrigate at one time or "zones".

i. For example, if my bed width is 2.5 feet, my rows are 345 feet long and I have 5 rows per section then my total acreage would be (2.5 x 345 x 5) divided by 43,560 (number of square feet in an acre) which would be 0.1 acres!

- 4. Determining fertilizer needs: When we talk fertilizers we usually say something like, "I should give that field 7 lbs. of nitrogen". That means 7 lbs. of what we call "actual" nitrogen. If you had a fertilizer that was 100% nitrogen, then you would use 7 lbs. of that fertilizer to treat an acre. However, most of our fertilizers do not have a 100% analysis and may be a blend with an analysis of 20% nitrogen, 20% phosphorous and 10% potassium or a 20-20-10 analysis. The other way to look at it is because these are percentages, there would be 20 lbs. of nitrogen, 20 lbs. of phosphorus and 10 lbs. of potassium in every hundred pounds of the fertilizer product.
 - a. If I need to apply 7 pounds of actual nitrogen (per field acre) and the analysis of my nitrogen source is 20% nitrogen, I divide 7 pounds by 0.20. Where did I come up with .20? Again, because fertilizer is usually expressed as a percentage, you need to express it as a decimal in order to do the math. One way I remember this is "what I need" divided by "what I've got" or 7 lbs. nitrogen/0.20 lbs. actual in my analysis

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which is 35lbs of 20-20-10 to get 7 actual lbs. of nitrogen from the fertilizer I've chosen.

- 5. STOP! This is where it gets tricky: That means for one <u>field</u> <u>acre</u> I would need 35 pounds of this fertilizer. BUT, because I'm only treating the acreage that is covered by the mulch, I actually only need to dissolve 3.5 pounds of this fertilizer to get my 7 pounds of nitrogen per acre. Why? I only have 0.1 acres to actually treat (the value we determined in step 1) so if you need to multiply your actual acreage (0.1 acres) x the amount of fertilizer needed for an entire acre (35 pounds) = 3.5 pounds of actual 20-20-10 to dissolve in solution. If you didn't use 0.1 acres as your treated area, you would be putting on almost 10 times the rate that you needed!
- **6. Putting it all together:** Let's do one quick situation that might be the easiest to follow:
 - a. I have 25 rows, 190 feet long covered with plastic mulch. My top bed width is 2.5' wide. The acreage I want to fertigate then is 25 x 190' x 2.5' = 11,875 square feet. 11,875 sq. feet /43,560 sq. ft. =0.27 acres of mulched beds to be fertigated.
 - b. My fertilizer is Urea which is 46-0-0 or 46%. I want to supply my tomatoes with 15 pounds of actual nitrogen: 15(what I need) divided by 0.46(what I've got) = 33 lbs. of Urea.
 - c. What to dissolve in my bucket: Remember 33 lbs. would be if I was treating an entire acre – I'm not – we are only treating what is covered under the plastic or what we determined in calculation a: 0.27 acres. So, the total amount of urea I need to dissolve is 33 lbs. per acre x 0.27 acres = 9.0 lbs. of urea!

Some other things to remember:

 Before you go through all the work to plumb in a fertigation unit on your drip system, make sure that the unit you purchase meets the required "gallons per minute" (GPM) needed otherwise it will not operate correctly! For example, if you purchase a Mazzi injector that needs 10 GPM and you are only irrigating a section at a time that is only using 8 GPM, there is not enough flow rate to syphon the fertilizer solution into the main line.

- 2. Make sure the system has been turned on long enough to pressurize it completely. Failure to do this will result in all of your fertilizer solution getting sucked up all at once and only going to a couple rows.
- 3. The longer the fertigation event can occur the better the distribution of fertilizer will be. That means if a typical irrigation event for you is 3 hours, then try to have the fertigation happen during the majority of this run time minus the full pressurization and time at the end to make sure the lines are flushed. Minimally I would like to see 15–25 gallons per acre of water used to dissolve your fertilizer to help ensure the best distribution of fertilizer. If you can use more, that's great!
- 4. Know your irrigation water pH: this is something that I know many of us do not do often enough and is a critical factor in nutrient uptake when fertigating. Most crops optimally mine most nutrients (in particular nitrogen and potassium) at a pH of 6.2—6.5. If your irrigation water is above that, you may not be getting the biggest bang for your buck with your fertigations. You can use either sulfuric acid or citric acid to help acidify your water and use the <u>online alkalinity calculator</u> to get your acid concentrations. Be sure to follow all directions on the calculator and pay careful attention to the pull down menus on the input side to get the correct recommendations.
- 5. Tissue testing: Many of the vegetable crops that we grow have established levels of what the plant should have. I think tissue testing should become a normal routine on many of our farms where we are just doing what we've always done. I know the few growers that have actually got on a tissue testing program have noticed the returns very quickly with not just yield, but overall quality of their fruit.

In my opinion, I think weekly fertigation (which some growers are doing) and spoon feeding our plants is a better way to go instead of applying a large dose of fertilizer a couple times a season. It might be that this constant feeding and watering, may improve not only yield but fruit quality as well. Large doses of fertility on certain crops may lead to issues such as fruit cracking (tomatoes) or excessive vegetative growth. If you need help calculating rates or have questions about these recommendations or need recommendations for other crops, please feel free to contact Chuck Bornt at 518-859-6213.

Midsummer Feeding Steve Reiners, Cornell AgriTech

Vegetables take up very few nutrients right after planting. If directseeded, they use the resources in the seed for the first two weeks. If transplanted, they use the nutrients in the starter solution you hopefully provided at planting. As the plants begin to grow rapidly, usually a few weeks after planting, their nutritional needs increase exponentially.

Typically, only nitrogen is supplied as a midseason sidedressing. There may be special circumstances when a complete fertilizer is warranted, especially when fertigation under plastic much is used (see Table 1). Unlike other soil nutrients, nitrogen can be lost through leaching (although not likely in this dry year) and volatilization. That's why we don't recommend adding all the nitrogen your crop needs first thing in spring. And annual plants like vegetables typically have a narrow window when soil N needs to be optimized.

Take sweet corn, for example. If we don't have nitrogen easily available in the soil at the right time, it yields poorly. That critical period is when the corn is about 6-10 inches tall. Once larger, all the fertilizer in the world won't make a difference.

How and when you sidedress depends on the crop and the equipment you have. For plasticulture grown plants, we typically fertigate with a soluble fertilizer through the trickle irrigation line. For row crops, application is typically made at the same time as cultivation, with the fertilizer placed in a band within 6 to 12 inches

of the row. Broadcast applications can also be made but can result in some leaf burn if granules remain on the foliage.

Ideally its best to sidedress in bare ground before a rain or irrigation as the water will move the nutrients to the roots. Some growers mistakenly believe that a liquid fertilizer will be more quickly available to a plant than a dry fertilizer. Not true. The small amount of water in the liquid fertilizer is inconsequential on a per acre basis.

What's the best fertilizers to use? You want one that is quickly available, which isn't an issue for most conventional fertilizers. Since plants prefer the nitrate form of N over the ammonium form, you may get a quicker response with a material like calcium nitrate than you would with ammonium sulfate, urea or anhydrous ammonia. Nitrate forms also help increase the uptake of calcium and potassium, which is very helpful for fruiting crops like tomatoes and eggplants. Unfortunately, nitrate forms are usually more expensive so you may want to save those for your highest valued crops. For organic growers, quick availability is also important. Although compost is a great preseason addition to the soil, midseason applications will take a bit more time to feed the plants, possibly missing that critical window. This is the time when your plants would benefit from more expensive but more quickly available sources of nitrogen like blood meal, soybean meal and fish meal or emulsions.

Of course, every growers should stay away from using manures for any sidedressing. You run the risk of contamination from human pathogens in the manure like Salmonella and E. coli.

Can you sidedress with a foliar feed? For micronutrients like boron, zinc and manganese, absolutely. You only need a pound or two of those nutrients per acre and that can easily be applied as a foliar solution. For nitrogen, you will not be able to provide enough to make a difference, maybe only 5 pounds of N/Acre per application. Applying more would likely burn the plants.

If foliar feeding, apply when plants are not drought stressed, preferably in the early morning or evening when humidity is higher. Temperatures should be below 80F, with optimum uptake at 72F.

Finally, don't overlook irrigation as part of your nutrition program. Obviously it's a key part of fertigation. But you're wasting your fertilizer dollars when soils are droughty. Water is needed to move the nutrients to, and into the roots.

 Table 1: Nitrogen sidedressing recommendations for New York grown

 vegetable crops (this assumes standard fertilizer applications were followed prior to and at planting).

Сгор	N (lbs./A)	Comments	
Beans	0	All fertilizer should have been applied at planting	
Beets	50/50	Apply 50 pounds 4 and 8 weeks after planting	
Crucifers - Cabbage, Broccoli, Cauliflower, etc.	40	Apply 4 weeks after planting	
Carrots	30	Apply 4-6 weeks after planting	
Cucurbits (bare ground)	40	Apply as plants begin to run	
Cucurbits (fertigation)	20/20	Fertigate 3 weeks after planting and again at fruit set	
Eggplant (bare ground)	50	Apply 3 weeks after planting	
Eggplant (fertigation)	20+	1 week after transplanting and every 2-3 weeks until harvest	
Lettuce	30	3 weeks after planting	
Onions	40	Mineral soils only, at 4-5 weeks	
Peas	0	All fertilizer should have been applied at planting	
Peppers (bare ground)	40/40	Apply at fruit set and when fruit are 1 inch in diameter	
Peppers (Fertigation)	15+	Apply 15 pounds 1 week after transplanting and every 3 weeks for 5 applications	
Potato	50	Apply when plants are 4-8 inches tall	
Sweet Corn	50	Apply when corn is 6-10 inches tall	
Tomato (bare ground)	50	Apply when first clusters set fruit	
Tomato (Fertigation)	20+	Apply 1 week after transplanting, again when fruit are 1" in size and again when first fruit turn color	

Considerations for Timing the Garlic Harvest Crystal Stewart Courtens, CCE Eastern NY Commercial Horticulture

Choosing a harvest date for garlic is key to ending up with a quality product. If you harvest too early the cloves don't fully fill the wrapper to bring whole plants into the drying area and maintain good air leaves and don't store well, but if you harvest too late the head pops, making it unmarketable and more susceptible to diseases. So, as we near harvest, how should a grower decide if the garlic is ready? The best answer is to pull a few plants, cut through the head sideways (so you cut through all the cloves), and see how well developed the cloves are (below). You can use the leaves as a guide to decide when to do this (lowest third or half of the leaves yellowing and dying is a good mark to start with), but looking at the cloves is the best way to know if the garlic is ready. Cloves should fill the wrappers—if they seem a little loose, the garlic has a little ways to grow. Note that in this last few weeks before harvest, it is very important to keep providing adequate moisture to the garlic! The equivalent of an inch of rain per week will optimize bulb expansion. Go ahead and stop watering a week before harvest. Hopefully the forecast cooperates with this recommendation.



On the left, the garlic is not yet mature. Notice the cloves are tight to the scape and do not have definition (bumps) along the outside of the bulb. Right, the garlic is mature. You can use a knife of fingernail to carefully peel back and count the wrapper leaves on the bulbs while examining cloves. Photo: C. Stewart Courtens

The other consideration with choosing a harvest date is the condition of the wrapper leaves. As each leaf on the garlic plant dies it immediately starts to break down (see arrow on image to the right indicating dead leaf). Note that a dead leaf is different than one with brown tips. Brown tips on a green leaf will not affect the quality of the wrapper leaf on the garlic. As you see in this image, the brown tips are pronounced but the bulb is healthy and growing. If your plants are truly dying down and the wrappers are starting to break down, you want to pull the crop regardless of maturity when there are a minimum of three leaves left. You can count the number of intact leaves at the same



time you are taking cross sections to check clove maturity.

Cutting the tops in the field: If you find that you do not have space circulation, cutting the tops off the garlic may help reduce problems. Cutting the tops leaves significant amounts of moisture in the fields rather than bringing all that lush, green growth into the drying area. Tops can be cut as close to ground level as you can get if using a sickle bar mower, or you can cut them by hand at 1.5" to 6" long. Our trials have shown that there is no increase in disease incidence even when cutting the garlic down to its final length as you bring it into the drying area.

Field grading: Hopefully you have been removing sick and damaged plants each time you weeded the garlic, so there won't be many left. Harvest is one last chance to clean up your crop before you bring it into tight quarters where disease can spread like wildfire. Remove any garlic that doesn't look great and set it aside rather than bringing it in and finding it later. You might also consider selecting your seed garlic at the same time. Save out the best garlic as your own seed to maximize next year's crop. You also don't need to clean your own seed of dirt or remove roots, which will save you labor if you set it aside now.

To wash or not to wash? Generally, you want to clean your garlic in the most gentle way possible. Most of the time this can be done dry. You can gently rub most of the dirt off of the garlic while harvesting, then remove a little more as you transfer from the wagon to your drying area. The one exception to this rule might be if you have to harvest garlic from muddy soils. In that case, washing may be warranted, but do it right away while the dirt is still mud on the bulbs, not after it has dried on them. You want to avoid wetting and drying the garlic over and over. Regardless of method, do not bang heads to remove dirt, gently remove excess by hand. The more garlic is banged during the process, the more it will bruise and the worse it will store.

Move your garlic from the field into the drying area relatively quickly—most people harvest during the morning and have garlic in the barn, high-tunnel, or shed by mid-day. Garlic can be dried in a variety of ways, as long as a few fundamental ideas are followed. First, you want to have good airflow over the garlic to move moisture away. This means not having garlic packed too tightly into the drying area. Each layer of garlic should have good air movement, whether hanging in rafters or sitting on benches. If there are parts of the drying area that are stagnant and wet, you need to remove some top growth and throw it away, reduce density of plants in the area, or increase air movement. Next, you want to choose an area that gets hot, but not too hot. Garlic will dry well at 110 degrees, but we try not to go much above that because at 120 degrees waxy breakdown, a physiological disorder, starts to occur. This temperature can be reached in a barn, shed, or high tunnel. Make sure you have the temperature in your drying area well controlled, so that you do not overshoot that target.

Show Me the COVID-19 Money—PPP is Back!

Elizabeth Higgins, CCE Eastern NY Commercial Horticulture

The PPP (Paycheck Protection Program) is back and better than ever! The program has just been extended from June 30, 2020 to August 8,2020. The Paycheck Protection Program Flexibility Act of 2020, which became law on June 5th, made achieving 100% loan forgiveness much more accessible to businesses. It might make the PPP worth another look if you didn't feel like you could meet the original terms. It extended the covered period of loan forgiveness from 8 weeks to 24 weeks after the date of loan disbursement. Businesses with PPP funds can opt to use the 8-week period or spend the funds over a 24-week period. The Act also reduced the forgivable amount that needed to be used for payroll to 60% of the loan (from 75%). This increases the forgivable amount that can be used for other allowable non-payroll purposes (rent, utilities, and mortgage interest) from 25% to 40%. SBA has a new forgiveness application available. For most farms, I would recommend using the EZ form rather than the other form as it is much easier to fill out. SBA does not indicate that one form is preferred over the other or required – it is up to your lender to make that determination.

There is some flexibility in what non-payroll expenses can be forgiven. For example, SBA indicated that non-payroll costs are eligible if they were paid during the covered period <u>or</u> incurred during the covered period and paid on or before the next regular billing date, even if the billing date is after the covered period.

Example: A borrower's covered period begins on June 1 and ends on July 26. The borrower pays its May and June electricity bill during the covered period and pays its July electricity bill on August 10, which is the next regular billing date. The borrower may seek loan forgiveness for its May and June electricity bills, because they were paid during the covered period. In addition, the borrower may seek loan forgiveness for the portion of its July electricity bill through July 26 (the end of the covered period), because it was incurred during the covered period and paid on the next regular billing date. The exception is that the CARES Act specifically prohibits using the funds for pre-payments of mortgage interest.

Even if you spend your PPP loan within the appropriate time frame and within the allowable percentages, there are some things that could reduce the amount of the loan that is forgiven.

- 1. If you received an EIDL Advance, your loan forgiveness will be reduced by that amount.
- 2. In general, a reduction in full-time equivalent (FTE) employees during the covered period or the alternative payroll covered period also reduces the loan forgiveness amount by the same percentage as the percentage reduction in FTE employees.

To calculate whether the borrower meets the FTE requirement, the borrower must first select a reference period and calculate the number of FTE employees they had during that time:

- i) February 15, 2019 through June 30, 2019;
- ii) January 1, 2020 through February 29, 2020; or
- iii) In the case of a seasonal employer, either of the two preceding methods or a consecutive 12-week period between May 1, 2019 and September 15, 2019.

Then, if the average number of FTE employees during the covered period (8 or 24 weeks) is less than during the reference period, the total eligible expenses available for forgiveness is reduced proportionally by the percentage reduction in FTE employees. SBA finally has defined FTE as 40 hours per week, so 2 part time workers, averaging 20 hrs. per week, is 1 FTE.

SBA does give some leeway in the amount that it would reduce loan forgiveness for documented good faith efforts on the part of employers to meet the FTE requirements. For example, the employees you laid off but then you offered to rehire are generally exempt from the CARES Act's loan forgiveness reduction calculation, even if they refused to come back to work. This exemption is also available if a borrower previously reduced the hours of an employee and offered to restore the employee's hours at the same salary or wages. Finally, FTE is not reduced if your workers have requested reduced hours or have quit or been terminated for cause or if you are seasonal, tried to hire and did not have enough applicants. You do need to document these events in writing.

If you received PPP funding, you are now moving into the loan forgiveness portion of the program. According to SBA, you need to apply for loan forgiveness within 10 months after the last day of the covered period (the 8- or 24-week period during which spending PPP dollars is forgivable). At this point, the PPP loan is no longer deferred, and the borrower must begin paying principal and interest.

PPP loan forgiveness has been a moving target, and because of this it has been prudent to take a wait and see approach within the 10 month period of loan payment deferral, before applying for forgiveness, especially if don't meet the conditions to have your loan 100% forgiven (use PPP funds within 8/24 weeks, 75%/60% for payroll and 25%/40% rent, utilities and mortgage interest). Make sure you

(Continued on page 11)

document all of your allowable expenses for loan forgiveness – payroll and non-payroll until you apply for forgiveness. It is always possible that the number of weeks or the percentage ratio of non-payroll to payroll or the formula for FTE employees could change to your benefit.

Finally, some farmers were worried that they would be asked to pay back their PPP loan if they ended up having a good season. One concern we heard from growers was "How will SBA review borrowers' required good-faith certification concerning the necessity of their loan request?" If your PPP loan was for less than \$2 million, you do not need to worry about this In their FAQ dated June 25, SBA said that any borrower that received PPP loans with an original principal amount of less than \$2 million will be deemed to have made the required certification concerning the necessity of the loan request in good faith. SBA has determined that this is appropriate because borrowers with loans below this threshold are generally less likely to have had access to adequate sources of liquidity in the current economic environment than borrowers that obtained larger loans and they feel that it is more appropriate to audit larger loans. Given on-going economic uncertainty, this makes a lot of sense.



Events & Updates

Managing Humidity and Condensation in Coolers July 29, 2020—5:00pm-7:00pm Zoom webinar

Please join us for a virtual twilight meeting on how to manage humidity and condensation in coolers to increase shelf life and prevent food-borne illness.

Our speakers will include Chris Callahan and Andy Chamberlain from UVM's Ag Engineering program, Mary Choate, from UNH Extension's Food Safety Team, and Paul Franklin from Riverview Farm in Plainfield, NH.

Register in advance for this meeting: <u>https://bit.ly/7-29VirtualTwilight</u>

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Corn Trap Counts

County	ECB-E	ECB-Z	FAW	WBC	CEW
Albany	0	0	0	0	1
Clinton 1	0	0	0	0	1
Clinton 2	0	0	0	0	0
Columbia	0	0	0	0	15
Dutchess	0	0	N/A	N/A	6
Essex	0	0	0	1	0
Orange	0	1	N/A	N/A	14
Rensselaer	0	1	0	0	1
Ulster 1	0	0	N/A	N/A	9
Ulster 2	2	1	0	0	2
Ulster 3	0	0	N/A	N/A	N/A
Washington	0	0	0	0	1