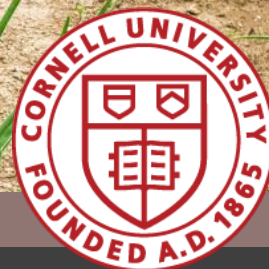


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# Vegetable News



## Angular Leaf Spot: A Perennial Problem of Cucurbits

*Teresa Rusinek, CCE Eastern NY Commercial Horticulture*

Already this season we are seeing symptoms of angular leaf spot (ALS) in winter squash seedlings. The seedlings were still in the greenhouse when symptoms first appeared on one variety about a week ago. Symptoms have since spread to other varieties. ALS is typically the first disease we see in cucurbits. In the field we often find it on summer squash grown under row covers and when it's seed-borne, it may show up in the greenhouse during transplant production.

Angular leaf spot is a bacterial disease caused by *Pseudomonas syringae*. Initially leaf symptoms appear as small, irregularly shaped, water-soaked lesions. The spots expand until they are limited by larger veins, giving them the angular appearance which the disease is named for. Under humid conditions, the water-soaked spots can be covered by a bacterial ooze, which can dry and give the leaf area near the spot a crusty appearance. This can also happen on the underside of the leaf. As the spots dry, they shrink and tear away from the healthy tissue leaving large, irregular holes and giving the leaf a ragged appearance. Squash and watermelon leaf lesions are more variable in size than cucumber lesions which are usually smaller. The squash and melon lesions can be surrounded by a yellow halo. Lesions can appear on the fruit as well, but will be more circular and are smaller than on the leaf. If left untreated, the ALS lesions will crack open, allowing secondary fungi and bacteria to invade, possibly resulting in a slimy, foul-smelling fruit rot.



The *Pseudomonas* bacterium is a seed-borne pathogen, but it can also overwinter in infested crop residues. The disease is widespread and is especially damaging when there are extended and frequent summer rains when daily temperatures range between 75 and 82° F. The warm, moist conditions under row covers tend to be perfect for disease development. Dry conditions, caused by

*Squash transplants with ALS symptoms.  
Photo: T. Rusinek*

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either dry weather or the removal of row cover, tend to slow or stop the disease, once it's present. Of course, prevention is the best cure.

Purchase seed that has been tested for bacterial pathogens. There are resistant cucumber varieties, but no squash or melons are resistant. When growing transplants, provide separation when possible, such as alternating rows of cucurbits trays with trays of other vegetables to minimize opportunity for spread. Keep humidity in the greenhouse below 80%. Water in the morning when leaves are dry and conditions facilitate fast drying. This is important when growing transplants and also in the field where preferred drip irrigation is not feasible. Avoid planting multiple cucurbit crops together. Check plants routinely for symptoms. Rogueing individual affected plants when detected early is worthwhile, especially when found in trays. Do not work in fields when leaves are wet because equipment and workers brushing against leaves that are infected and then healthy can move bacteria. Copper combined with mancozeb has been the only fungicide option until recently. It is most effective when applications start before or at very first symptoms. There is concern of bacteria developing resistance to copper. Actigard is labeled for angular leaf spot as well as bacterial leaf spot; plant activators need to be applied before infection to be effective. Labeled biopesticides include Cease and Serenade



Left: Zucchini with lower leaves infected. Right: close-up of disease symptoms.  
Photos: C. Born

AOS. Other biopesticides labeled generally for managing bacterial diseases include BacStop, KeyPlex 350, Procidic, and Timorex Gold. Both bacterial pathogens can survive in crop debris, therefore it is important to promptly incorporate crop debris after harvest and to rotate fields where cucurbit crops are grown with at least 2 years between cucurbit crops.

Sources: <http://blogs.cornell.edu/livepath/gallery/cucurbits/angular-leaf-spot-on-cucurbits/>

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## Managing Cucurbit Powdery Mildew Successfully in 2020

**Margaret Tuttle McGrath, Plant Pathology and Plant-Microbe Biology Section, SIPS, Cornell University**

Effectively managing powdery mildew is essential for producing a high-quality cucurbit crop. This foliar, fungal disease is common wherever cucurbits are grown, including in the northeastern U.S. This is because the pathogen produces an abundance of asexual spores (the powdery growth) easily dispersed by wind, thus it can spread widely, and the pathogen can produce a sexual spore in fall that enables it to survive over winter. Leaves affected by powdery mildew die prematurely, which results in fewer fruit and/or fruit of low quality (prone to sunscald, poor flavor, poor storability).

Powdery mildew is managed with resistant varieties and fungicides. An integrated program with both management tools is the best approach for achieving effective control because the pathogen is adept at evolving new strains resistant to individual tools such as resistant varieties or a specific conventional fungicide. It is more difficult for new pathogen strains to develop when an integrated program is used, and effective control is more likely. Powdery mildew management program often needs adjustments as the pathogen and management tools change.

**Resistant varieties** are now available in most crop groups with new varieties released most years. Resistance in cucumber is standard in modern varieties and is so strong it is easy to forget this cucurbit type is susceptible until an Heirloom type is grown. Watermelon is

infrequently affected in the northeast. Resistance in other cucurbit types is not adequate used alone (without fungicide applications) to prevent impact of powdery mildew on yield. Tables of resistant varieties are at <http://vegetablemdonline.ppath.cornell.edu/Tables/TableList.htm>.

**Fungicide program.** The most important component of an effective management program for powdery mildew is an effective fungicide program. The challenge is getting fungicide to the lower surface of leaves where the pathogen develops best. Most fungicides approved for organic production have contact activity. Sulfur and oil have demonstrated some ability to control powdery mildew on the lower surface indicating some ability to redistribute. Sulfur is volatile. For conventionally managed crops there are mobile fungicides able to move through leaves with targeted activity for powdery mildew. Because these fungicides have targeted activity, they are prone to resistance development and additional fungicides must be added to the program when there is a need to manage other diseases such as downy mildew and Phytophthora blight.

For conventionally managed crops, alternate among targeted, mobile fungicides and apply them with a protectant fungicide to

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manage resistance development and avoid control failure if resistance occurs, and also to comply with label use restrictions (most mobile fungicides are not permitted used exclusively). The powdery mildew pathogen has a long history of developing resistance to fungicides (it was the first occurrence of resistance in the U.S.), thus a diversified fungicide program applied to resistant varieties when possible is critical for success. Always implement a resistance management program; do not wait until there is a problem. The goal is to delay development of resistance, not manage resistant strains afterwards.

**When to apply fungicides.** The action threshold for starting applications is one leaf with symptoms out of 50 older leaves examined. Examine both surfaces of leaves. Starting treatment after this point will compromise control and promotes resistance development. Powdery mildew usually begins to develop around the start of fruit production. Protectant fungicides applied before detection will slow initial development. After detection, continue applying fungicides weekly. Conditions are favorable for powdery mildew throughout the growing season; this pathogen does not need a period of leaf wetness to infect.

**Recommended targeted fungicides.** Alternate among targeted, mobile fungicides primarily in the following three chemical groups, plus apply with protectant fungicide to manage resistance development and avoid control failure if resistance occurs, and also to comply with label use restrictions. All targeted fungicides are at risk of resistance developing; FRAC Code 50 and U13 are the only chemistries that resistance has not yet been detected to. Labels are available at: <http://www.cdms.net/Label-Database>.

Vivando (FRAC Code 50, formerly U8) has exhibited excellent control in fungicide evaluations. Activity is limited to powdery mildew. It is recommended used with a silicon adjuvant. Do not mix with horticultural oils. It can be applied three times per year with no more than two consecutive applications. REI is 12 hr. PHI is 0 days. Proливо is a new fungicide with a new active ingredient in this FRAC group registered in NY April 2018. It was not as effective as Quintec for managing powdery mildew on lower leaf surfaces in a fungicide evaluation conducted at LIHREC in 2016 in which Vivando was not included.

DMI fungicides (FRAC Code 3) include Proline\*, Procure, Luna Experience\*, and Rhyme\*† (these considered most effective) plus Aprovia Top\*, Inspire Super\*, Mettle, and Rally. Resistance is quantitative. Highest label rate is recommended because the pathogen has become less sensitive to this chemistry. Efficacy has varied in fungicide evaluations. Proline is thought to have the greatest inherent activity. Procure applied at its highest label rate provides a higher dose of active ingredient than the other Code 3 fungicides. Five applications can be made at this rate. REI is 12 hr for DMI fungicides. PHI is 0 days for some including Procure; 7 days for others including Proline. Inspire Super (FRAC Code 3 and 9) is recommended for other labeled diseases. It is expected to provide some control of powdery mildew. but there are other FRAC 3 fungicides with greater intrinsic activity for powdery mildew that

are better choices when this is the only disease developing. TopGuard is labeled but not recommended because it has Code 11 ingredient plus same DMI ingredient in Rhyme. \*Fungicides labeled for additional cucurbit diseases; see section on other diseases.

Gatten (Code U13) is the newest fungicide; it was introduced in 2018. REI is 12 hr. PHI is 0 days. Activity is limited to powdery mildew. It can be applied five times. It was as effective as Vivando for managing powdery mildew on lower leaf surfaces in a fungicide evaluation conducted at LIHREC in 2019 but not in 2018.

Recommended used sparingly:

Quintec (FRAC Code 13) was consistently effective in fungicide evaluations conducted on Long Island until 2019 when it was significantly less effective than Vivando for the first time in the fungicide evaluation conducted annually on Long Island. This was not surprising because insensitivity to a high concentration of Quintec (similar to the dose when applied in the field) has been detected in some pathogen isolates collected from commercial fields and/or fungicide-treated research fields at the end of the growing season on Long Island since 2015. Resistant isolates evidently were sufficiently uncommon most of the season in 2015-2018 not to impact Quintec efficacy. Because resistance has developed, Quintec is now recommended to be used less than the label permits, which is a crop maximum of four applications. Apply no more than twice consecutively. Activity is limited to powdery mildew. It is the only mobile fungicide that does not move into leaves: it redistributes to foliage where spray was not directly deposited, including the underside of leaves, through diffusion and a continual process of absorption and desorption in the cuticular waxes of foliage. Labeled for use on non-edible peel crops: melons, pumpkin, and winter squash. REI is 12 hr. PHI is 3 days.

Carboxamide aka SDHI fungicides (FRAC Code 7) include Luna fungicides, Aprovia Top, Miravis Prime, Fontelis, Endura, Pristine, and Merivon. Last two also contain the same QoI fungicide (Code 11), which is no longer effective for powdery mildew. Resistance to boscalid, the FRAC Code 7 active ingredient in Endura and Pristine has been detected routinely on Long Island since 2009 and likely is the reason their efficacy has varied in fungicide evaluations. Full cross resistance was documented between several carboxamides, including those in Pristine, Merivon and also Fontelis, but not Luna fungicides, through laboratory assays conducted with pathogen isolates resistant and sensitive to boscalid. However, Luna Sensation has exhibited limited control in fungicide evaluations conducted in 2017-2019 at LIHREC. Luna Experience is the best choice because it also contains tebuconazole (Code 3), which needs to be considered when developing an alternation program. Luna Sensation is not recommended because it also contains trifloxystrobin (Code 11); resistance to this chemistry is very common. Aprovia Top, Luna Experience, and Miravis Prime are the only Code 7 fungicides recommended. Limit use. Aprovia Top and Luna Experience have the advantage that they contain a second active ingredient with activity for powdery mildew (Code 3). All

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have 12 hr REI. PHI is 0, 7, and 1 day respectively. Maximum number of applications is 2-5, depending on product and rate. Low rate isn't recommended.

Recommended used sparingly if at all:

**Torino** (FRAC Code U6) exhibited excellent control in fungicide evaluations until recently. It failed in an experiment in North Carolina in 2016 and at LIHREC in 2017, where resistance to Torino was detected in pathogen isolates. Torino resistance was also detected in 2018. Activity is limited to powdery mildew. It can only be applied twice to a field in a 12-mo period. Consecutive applications are not recommended. REI is 4 hr. PHI is 0 days.

**No longer recommended.** Resistant pathogen strains are sufficiently common to render the following fungicides ineffective: Topsin M (FRAC Code 1; MBC fungicide), QoI fungicides (Code 11), which include Quadris, Cabrio and Flint, and SDHI fungicides (Code 7) containing boscalid (Endura and Pristine) or an active ingredient that has exhibited full cross resistance in laboratory testing of pathogen isolates (Merivon). Resistant strains continue to be detected very commonly every year on Long Island where monitoring is being conducted.

**Recommended protectant fungicides.** Many fungicides have contact activity for powdery mildew; mancozeb is an exception. They include chlorothalonil, sulfur, copper, mineral oil, and several biopesticides. Sulfur is one of the most effective and least expensive products. Its activity is limited to powdery mildew, thus it is especially useful early in disease development when other diseases are not a concern, including as a preventive application. Microencapsulated formulations are recommended. Melons are sensitive to sulfur especially when hot; there are tolerant varieties.

## Fungicides Labeled for Other Diseases in Addition to Powdery Mildew.

Proline (FRAC 3). Fusarium blight and gummy stem blight.

Rhyme (FRAC 3). Gummy stem blight.

Luna Experience (FRAC 3 and 7). Alternaria leaf spot, anthracnose, gummy stem blight, and belly rot.

Aprovia Top (FRAC 3 and 7). Anthracnose, Alternaria leaf blight, gummy stem blight, and Plectosporium blight.

Inspire Super (FRAC 3 and 9). Alternaria leaf blight, anthracnose, gummy stem blight, Plectosporium blight, and Septoria leaf spot

Miravis Prime (FRAC 3 and 12). Alternaria leaf blight and spot, gummy stem blight, and scab.

**In summary, to manage powdery mildew effectively in cucurbit crops:** 1) select resistant varieties, 2) inspect crops routinely for symptoms beginning at the start of fruit development, and 3) apply targeted fungicides weekly with protectant fungicides and alternate amongst available chemistry based on FRAC Group code, starting at the action threshold of 1 affected leaf out of 50 older leaves. Add new fungicides to the program when they become available; substitute new for older product if they are in the same FRAC group.

*Please Note: The specific directions on fungicide labels must be adhered to -- they supersede these recommendations, if there is a conflict. Check labels for use restrictions. Any reference to commercial products, trade or brand names is for information only; no endorsement is intended.*

## Colorado Potato Beetle Management

**Chuck Bornt, CCE Eastern NY Commercial Horticulture**

Late last week I started to see the emergence of Colorado potato beetle (CPB) adults locally in the Capital District and know they have probably been active in our southern region for over a week or so. These adults have pretty much one thing on their mind and that is to mate and start laying eggs (Figure 1). While scouting last week I only found a few egg masses, but with the heat this week I know that those numbers dramatically increased since then and I'm sure down south they are readily hatching. Now is the time to concentrate controlling them when they are small larvae. Don't forget that eggplant and tomatoes are just as susceptible to CPB feeding damage so be sure to scout and treat these as needed as well!

CPB is notorious for developing resistance to insecticides so anything we can do to extend the usefulness of these materials is important. The basic principal of resistance management of CPB is to "expose only 1 generation out of every 4 generations on a farm to a particular class of chemistry". This is achieved by only using a particular class of insecticides one time within a 2-year timeframe

and aligning the applications based on whether or not in-furrow planting treatments/seed treatments were used and the maturity type of the potatoes being grown. We try to help you out by giving you the IRAC (Insecticide Resistance Action Committee) codes to help you choose the right materials (Table 1). The materials with the same IRAC code means the chemicals are all in the same family and have the same or similar modes of action. Exposing CPB to the same IRAC code only increases the chances of them becoming tolerant or resistant to the chemistry. Figure 2 also gives you some

*Figure 1: Colorado Potato Beetle adults mating and laying egg masses found last week on potatoes. Photos: C. Bornt*





Colorado Potato Beetle Management Hypothetical 2-Year Rotation Program		
CPB Generation	Year 1	Year 2
First	CruiserMaxx, Admire, etc.	Verimark, Benevia, Coragen or Voliam Xpress
	Neonicotinoid	Anthranilic Diamide
	MoA Group – 4A	MoA Group – 28
Second	Radiant SC or Blackhawk	Agri-Mek or Avaunt
	Spinosyn	Avermectin or Oxadiazine
	MoA Group – 5	MoA Group – 6 or 22

Figure 2: Hypothetical two-year insecticide rotational program that should provide excellent season-long control of Colorado potato beetles and also slow down the evolution of resistance to any of these products. (Source: Dr. Brian Nault, Cornell University).

examples of how to rotate the different classes of chemistry to help you achieve this goal as well.

Long Island growers have had very good luck using Rimon, which has a FIFRA Section 24C Special Local Need registration for NYS. Rimon should be applied when most of the population is at egg hatch to second instar then followed by a second application 7 days later used at the 12 oz/A rate. Do not use Rimon against adults and in accordance to resistance management protocol, do not apply to successive generations and do not use more than 3 applications or exceed 24 fl oz per acre per season rate.

When you scout, I suggest that you take a handful of flags along with you and as you find some egg masses, put a flag next to them so you

can find them again in the following days. Check the egg masses daily so you will know when they have hatched so you know when to start your insecticide applications.

#### Scout fields & use action thresholds:

For Avaunt, Rimon, Trigard and Neem:

- Sample 10 vines at 5 locations within a field
- Treat only when threshold exceeded
  - Egg masses: 4 per 50 vines (with at least 25% hatching)
  - Small larvae: 75 per 50 vines
  - Large larvae: 30 per 50 vines

For all other products:

- Small larvae: 200 per 50 vines
- Large larvae: 75 per 50 vines
- Adults: 25 per 50 vines

There are of course a couple general rules of thumb:

- ◊ If you used an in-furrow or seed piece application of a neonicotinoid (Group 4: Admire Pro, Tops-MZ-Gaicho, Cruiser or Cruiser Maxx, Platinum) do not use a Group 4 insecticide for foliar control of CPB. There are other options that can be found in Table 3.
- ◊ Most controls should be focused on very small larvae as larger larvae become more difficult to control. Do not focus your efforts on adults this time of year – larvae should be your focus!
- ◊ When possible, use the IRAC Group Codes given to you in Table 1 and in the Cornell Vegetable Guidelines to choose the correct rotational materials.

**Table 1: Selected Foliar Insecticides for Controlling Colorado Potato Beetle.** This table is not meant to replace reading of the product labels—Please read the insecticide labels prior to application:

Product Name	IRAC Group	Rate per Acre	Comments
Coragen	28	3.5-5.0 fl. oz	Do not apply within 100 feet of a water body, allow a minimum interval of 5 days between applications
Voliam Xpress	28	6.0-9.0 fl oz	Do not apply within 100 feet of a water body, allow a minimum interval of 5 days between applications, do not exceed 27 fl oz/acre per season
Agri-Mek SC	6	1.75-3.5 fl oz	Must be mixed with a non-ionic activator type wetting, spreading and/or penetrating adjuvant, best if used on small larvae (50% egg hatch) , do not exceed more than 2 applications per acre
Assail 30 SG	4A	1.5-4.0 oz	<b>Do not use on fields that received a in-furrow planting or seed piece treatment of another Group 4 or 4A insecticide</b> (see note above), do not exceed 4 applications per season or a total of 16 oz per acre, read label for more information

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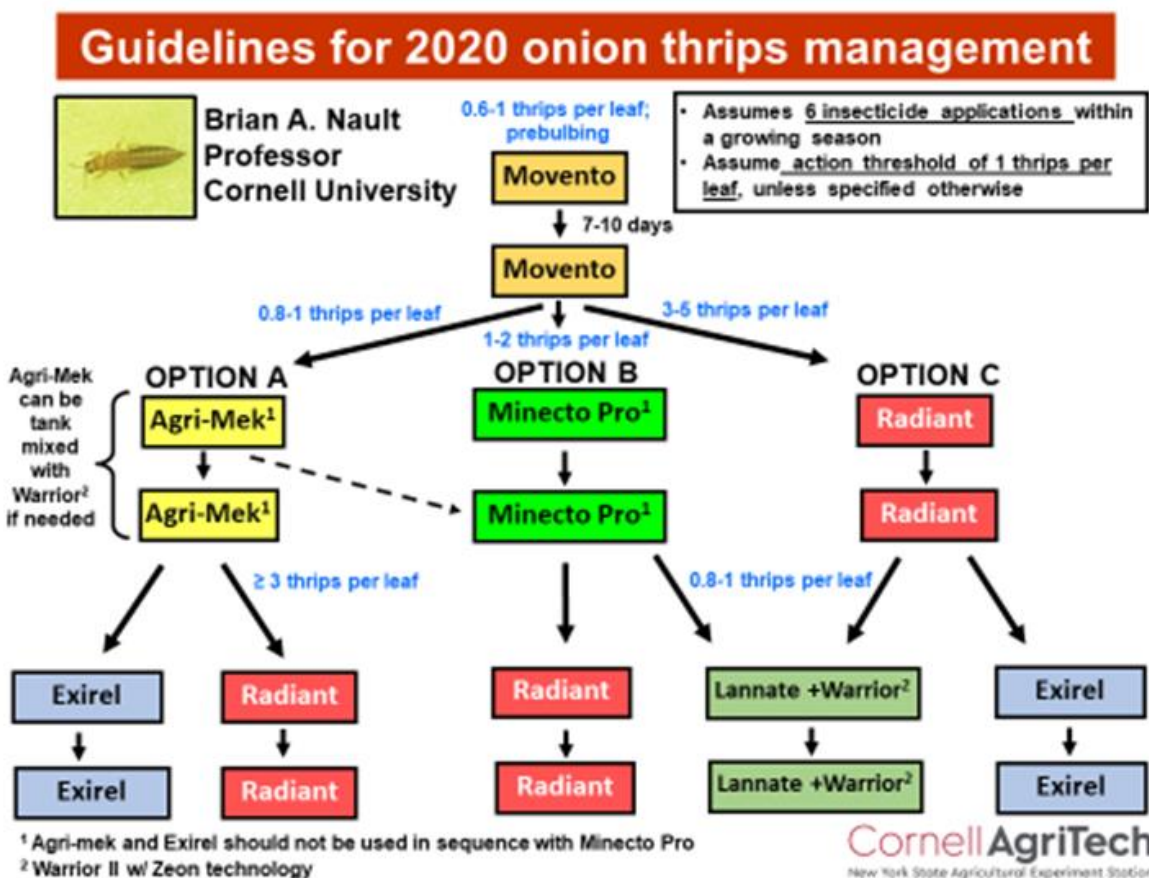
Provado 1.6F, Nuprid 1.6F, Prey, Pasada	4A	3.75 fl oz	<b>Do not use on fields that received a in-furrow planting or seed piece treatment of another Group 4 or 4A insecticide</b> (see note above), do not exceed 15 fl oz per season per acre, read individual product labels for more information
Leverage 360	4A + 3A	2.8 fl oz	<b>Do not use on fields that received an in-furrow planting or seed piece treatment of another Group 4 or 4A insecticide</b> (see note above), do not exceed 12.8 fl oz per season per acre
Actara	4A	1.5 –3.0 fl oz	<b>Do not use on fields that received an in-furrow planting or seed piece treatment of another Group 4 or 4A insecticide</b> (see note above), do not exceed 6.0 fl oz per season per acre, read individual product labels for more information
Endigo ZC	4A + 3A	2.5-6.0 fl oz	<b>Do not use on fields that received an in-furrow planting or seed piece treatment of another Group 4 or 4A insecticide</b> (see note above), do not exceed 10 fl oz per season per acre, read individual product labels for more information
Radiant SC	5	6-8 fl oz	Best against smaller larvae, but will also work on larger larvae
Blackhawk	5	1.7-3.3 oz	Do not make more than 2 applications per season
Rimon	15	6-12 fl oz	FIFRA Section 24C Special Local Need registration: Apply when most of the population is at egg hatch to second instar, do not use against adults, do not apply to successive generations, do not apply more than 3 applications and do not exceed 24 fl oz per acre per season. Best results are when applications are timed with egg hatch and then followed by a second application 7 days later used at the 12 oz/A rate (but no less than 9 oz/A.
Trigard	17	2.7-5.3 oz	Best if used on 1st and 2nd instar larvae, ineffective on adults
Kryocide or Prokil Cryolite	UN	10-12 lbs	For use against small to medium sized larvae, minimum 7 day intervals, these materials are insoluble in water and should have constant agitation, they are abrasive to roller type pumps and nozzles—use ceramic or stainless steel nozzles. For best results residues should not be subjected to rainfall or irrigation for at least 24 hours after application.
<b>Organic Options for Colorado Potato Beetles: For more products and information <a href="#">click here</a></b>			
Entrust Naturalyte	5	1-2 ounces	Do not exceed two consecutive applications of Group 5 insecticides. Do not apply Entrust to consecutive generations of Colorado potato beetle and do not make more than two applications per single generation of Colorado potato beetle. Do not make applications less than 7 days apart. Use a higher rate in the rate range for larger larvae or heavier infestations. Do not apply within 7 days of harvest. Do not apply more than a total of 6.5 oz of Entrust per crop and do not make more than four applications per crop.
Azera ( azadirachtin + pyrethrin)	UN + 3A	1.0-3.5 pints	Most effective on small larvae, initiate application when 25% of the initial egg masses have hatched or more than 200 small larvae are found on 25 vines, continue to scout and apply at 5 to 7 day intervals during the egg hatching period, allowed for organic production if allowed by sanctioning body.
Aza-Direct, Neemix 4.5, Ecozin Plus etc. (many products containing the active ingredient azadirachtin)	UN	Please see labels – rates vary depending on product used	Most effective on small larvae, initiate application when 25% of the initial egg masses have hatched or more than 200 small larvae are found on 25 vines, continue to scout and apply at 5 to 7 day intervals during the egg hatching period, allowed for organic production if allowed by sanctioning body. Best control is achieved at the upper end of the use range. Does not provide immediate mortality. Intoxicated nymphs and larvae die at their next molt. Foliage contact and coverage extremely important.

## Managing Onion Thrips in 2020

Ethan Grundberg, CCE Eastern NY Commercial Horticulture

The warm and dry weather that most of the Eastern NY region has experienced over the last few weeks has resulted in onion thrips (*Thrips tabaci*) populations reaching action thresholds in some fields of early transplanted onions. The June 3<sup>rd</sup> edition of the Eastern NY Vegetable News Podcast covered the subject of onion thrips management in some detail (listen at <https://soundcloud.com/easternnewyorkvegnews/2020-biweekly-vegetable-news-podcast-episode-4-6320> starting at minute 19:23), but here are some additional considerations on the topic:

- ✓ Heavy rain or overhead irrigation can wash larval stage thrips off of plants and help reduce populations to below action threshold levels. Be sure to re-scout fields after severe storms to evaluate thrips population levels as they may have dropped below action thresholds thanks to precipitation.
- ✓ Avoid tank mixing translaminar and systemic insecticides with aggressive sticker adjuvants like Nu-Film 17 or fungicides formulated with stickers like Bravo Weatherstik. The stickers in those products have been shown to reduce plant uptake of the active ingredients in the insecticides and, therefore, reduce their efficacy.
- ✓ Movento (IRAC group 23, spirotetramat) is most effective on larval stage thrips (smaller and yellow to lime green in color compared to darker brown to black adults) and more effective when applied prior to bulb initiation.
- ✓ Neither Agri-Mek (IRAC group 6, abamectin) nor Exirel (IRAC group 28, cyantraniliprole) should be used in sequence before or after two applications of the pre-mix product Minecto Pro, which contains the active ingredients of both Agri-Mek and Exirel. By avoiding the exposure of multiple thrips generations to the same active ingredients in the same year, growers can delay resistance to help preserve the useful life of insecticides that are effective at managing thrips.
- ✓ HOWEVER, as illustrated in Dr. Brian Nault's diagram, growers can consider starting an insecticide sequence with Agri-Mek and following it with Minecto Pro if thrips populations grow beyond the 0.8-1 thrips per leaf threshold to 1-2 thrips per leaf in the 7-10 days after the first Agri-Mek application.
- ✓ Onion thrips populations in large onion growing areas of the state are largely resistant to IRAC group 3 insecticides like Warrior II and Lamcap (both contain the synthetic pyrethroid Lambda-cyhalothrin). Use pyrethroids only as a last resort on onion thrips populations and tank mix with another mode of action, such as Lannate (IRAC group 1A, methomyl).
- ✓ Organic growers should be careful not to mix aggressive sticker adjuvants like Nu-Film P with Entrust (IRAC group 5, spinosad). Research by Dr. Lindsay Iglesias in Dr. Nault's lab has shown that Entrust is more effective at reducing thrips populations when mixed with the insecticidal soap M-Pede (potassium salts of fatty acids) at a 1% v/v concentration. Be aware that insecticidal soaps and oils can increase the risk of phytotoxicity, though.





## Slugs and Snails Attacking Various Crops

Laura McDermott and Crystal Stewart-Courtens, CCE Eastern NY Commercial Horticulture

Even though it's been really dry, slug and snail feeding is fairly severe in some areas. This may be because populations were high last fall, and irrigated crops are now the best environment these little guys can find. If you have large, rounded holes appearing on leaves and can't find the culprit (i.e. have eliminated lepidopteran pests), consider that these might be your problem. Both slugs and snails are most active at night and during cool, wet weather and populations are highest in areas that are mulched – making June bearing strawberry fields ideal conditions for these creatures. They also can be found underneath black plastic mulch, near the plant holes. Both slugs and snails can leave silver to whitish slime trails which can be visible on damaged plant parts and plastic mulches. Sometimes the “slime trail” is the diagnostic tool used to identify what happened to the crop.

**Cultural management:** There are no scouting thresholds as numbers seem to go from 1 to 1 million almost overnight. There are also no known resistant cultivars. Overhead irrigation creates the conditions that these mollusks love, so using overhead sprinklers only when absolutely necessary is a good protocol. Try to irrigate in the morning so that foliage will have a chance to dry before night falls. If you're using plastic, this is more reason to use the drip irrigation system.

**Chemical control:** There are two products that are labeled for use on slugs and the same ones are also appropriate for snails. **Deadline Bullets** are a metaldehyde bait which is both a slug attract and a poison. There are a lot of vegetables and small fruit on this label, but double check the label to make sure that the crop you want to use this material on is labeled. The rate is 20 - 40 pounds per acre and can be either broadcast or banded between the rows. However, if edible portions of the crop are visible, it can only be banded between the rows (see label for specific instructions). Evening applications are preferred as that is when the slugs are beginning to feed. This product should not be applied to dry soil, rather apply after irrigation or a rain event. Irrigation should not be applied for 48 hours after banding. You can also apply the bait in a band around the perimeter of the field. Do not exceed 4.5 lbs of AI/A (129 lbs of product/A) per growing season. Caution should be exercised if your U-Pick operation gets a lot of children and/or animals.

An organic product is iron phosphate, **Sluggo AG**. Spread bait around perimeter of field and then between the furrows near the base of plants. If the area is heavily watered, use the highest labeled rate. Reapply as the bait is consumed or at least every 2 weeks. Like the metaldehyde product, the soil must be wet for best activity. This product has been quite effective for organic berry growers. Slugs and snails lay eggs in early fall, so using chemical control products in mid-September might help curb next year's population. Sluggo has also been reported to be effective on sow bugs as well.

For more on slugs/snails check out the fact sheets here:

<http://www.fruit.cornell.edu/Berries/genipm.html>

<http://www.ahdb.org.uk/slugcontrol/HDC%20Factsheet%20-%20slug%20control%20in%20field%20vegetables%2005%20Aug%202010.pdf>



*Slug feeding has girdled this tomato seedling.*

*Photo: Laura McDermott*



## The COVID-19 Corner—NY Forward Business Plans, PPP Loan Forgiveness Update and NYS CFAP Survey for Nursery and Cut Flower Losses

*Elizabeth Higgins, CCE Eastern NY Commercial Horticulture*

Greetings – this week's COVID-19 update has a little something for everyone. Summer is arriving and New Yorkers are starting to emerge from their COVID-19 lairs. As the state reopens in stages, one key requirement for EVERY BUSINESS is **NY Forward Business Plans**.

You may ask yourself “why should I have to do a plan? I’m an exempt farm business who has been operating all along.” Your farm’s NY Forward Business Plan simply documents how your farm business will keep your employees and customers safe by implementing best practices already required in the many executive orders and NYS Ag and Markets guidance documents that have come out in the past few months. These plans are more important now, because many of you were not fully operating at peak levels during February, March and April. Much of your seasonal workforce had not yet arrived and most fruit and vegetable farms were not at peak production and sales activity. Now that we are moving into the summer, having these practices in place will help you reduce your risks. NYS is not requiring that you submit your plan to anyone, but you are required to certify that you have done one. Should a COVID-19 outbreak be traced back to your farm, it is likely that you will be asked for your plan.

CCE has been working to make this planning process easier for you. Cornell Cooperative Extension and Cornell Agricultural Workforce Development are offering a “NY Forward Business Safety Plan Support” webinar series, with specialized webinars for Dairy/Livestock/Crop Farms, Fruit/Vegetable Farms, Retail Farms, Equine Farms and Greenhouse/Landscaping/Ornamental Farms.

- Business Safety Plan Support for Dairy/Livestock/Crop Farms Wednesday, June 10, from 7:30 – 8:30 p.m. <https://bit.ly/CCENYFwdDairy>
- Business Safety Plan Support for Fruit/Vegetable Farms Thursday, June 11, from 12:00 – 1:00 p.m. <https://bit.ly/CCENYFwdVeg>
- Business Safety Plan Support for Retail Farms Thursday, June 11, from 7:00 – 8:00 p.m. <https://bit.ly/CCENYFwdRetail>
- Business Safety Plan Support for Greenhouse/Landscaping/Ornamental Farms Monday, June 15, from 7:00 – 8:00 p.m. <https://bit.ly/CCENYFwdNursery>
- Business Safety Plan Support for Equine Farms Wednesday, June 17, from 7:00 – 9:00 p.m. <https://bit.ly/CCENYFwdHorse>

The free webinars, led by extension specialists, will walk farmers through the need for and process to complete a safety plan as is required by all businesses for compliance with NY Forward and demonstrate project tools developed by extension to write and complete a plan. If you miss a webinar, it will be posted on the Cornell Agricultural Workforce Development NY Forward Business Safety Plans page <https://bit.ly/CCENYFwd>

### PPP Loan Forgiveness Changes (and Other Tweaks)

If you received a Paycheck Protection Program (PPP) loan you may have seen that the paperwork is now available for loan forgiveness. If you fully meet the terms for loan forgiveness under the program (used at least 75% of the loan for payroll in the first 8 weeks after receiving the loan, kept salaries and staffing at the same levels as last year) then you should go ahead and apply for forgiveness now. But if you don't fully qualify for loan forgiveness under the old rules, just wait! As of June 5<sup>th</sup>, there are important changes to loan forgiveness you should be aware of:

Legislation signed June 5 lowered to 60% from 75% the minimum percentage of PPP funds borrowers have to spend on payroll costs to have the loans forgiven. But while the original PPP rules allowed for partial loan forgiveness under the 75% basement, the new bill passed by Congress had language that could be interpreted as saying that if the borrower did not spend at least 60% of the PPP funds on payroll costs, none of the loan would be forgiven. But a joint statement Monday from SBA Administrator Jovita Carranza and Treasury Secretary Steven Mnuchin clarified that partial loan forgiveness will also be available under the 60% threshold.

Based on the press release issued by the SBA and Department of Treasury, <https://home.treasury.gov/news/press-releases/sm1026> New rules for the program will:

- Extend the covered period for loan forgiveness from eight weeks after the date of loan disbursement to 24 weeks after the date of loan disbursement, providing substantially greater flexibility for borrowers to qualify for loan forgiveness. Borrowers that have already received PPP loans retain the option to use an eight-week covered period.
- Provide a safe harbor from reductions in loan forgiveness based on reductions in full-time-equivalent (FTE) employees for borrowers that are unable to return to the same level of business activity the business was operating at before Feb. 15, 2020, due to compliance with requirements or guidance issued between March 1, 2020, and Dec. 31, 2020, by the secretary of Health and Human Services, the

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director of the Centers for Disease Control and Prevention, or the Occupational Safety and Health Administration related to worker or customer safety requirements related to COVID-19.

- Provide a safe harbor from reductions in loan forgiveness based on reductions in FTE employees, to provide protections for borrowers that are both unable to rehire individuals who were employees of the borrower on Feb. 15, 2020, and unable to hire similarly qualified employees for unfilled positions by Dec. 31, 2020. This would be for workers who were laid off, were offered their job back, and refused to come back to work.
- Increase to five years the maturity of PPP loans that are approved by the SBA (based on the date the SBA assigns a loan number) on or after June 5, 2020.
- Extend the deferral period for borrower payments of principal, interest, and fees on PPP loans to the date that the SBA remits the borrower's loan forgiveness amount to the lender (or, if the borrower does not apply for loan forgiveness, 10 months after the end of the borrower's loan forgiveness covered period).

These changes should make loan forgiveness much easier to achieve. The new application forms aren't up yet but should be soon according to the SBA website.

#### **And finally, CFAP data collection effort to benefit Nursery/Greenhouse and Cut Flower Growers affected by COVID-19 market losses.**

If you are a nursery/greenhouse or cut flower grower you are probably aware that those industries were completely left out of USDA's CFAP payment program for farmers. According to USDA this was due to a lack of data about those industries and their losses. USDA is collecting information to determine if these industries were affected by COVID-19 market impacts. If you are a nursery/greenhouse grower or cut flower grower and lost sales, saw price declines or had to dispose of plant inventory due to loss of contracts or sales, you can respond directly to the USDA. Go to [regulations.gov](https://www.regulations.gov) and search for [Docket ID FSA-2020-0004](#) and follow the instructions for submitting comments. You can also send your comments by mail to: Director, SND, FSA, US Department of Agriculture, 1400 Independence Avenue SW, Stop 0522, Washington, DC 20250-0522. You should read the factsheet on considering other crops for CFAP before you comment so that you have a better idea of what data USDA is looking for [https://www.farmers.gov/sites/default/files/documents/FSA\\_CFAP\\_Additional-Commodities\\_Fact-Sheet.pdf](https://www.farmers.gov/sites/default/files/documents/FSA_CFAP_Additional-Commodities_Fact-Sheet.pdf)

We know that the federal process is asking a lot of growers during a busy time and might not seem worth it even if you did have losses. To help compile data, Cornell and Farm Bureau are also working together to help collect data to help support NYS flower, nursery and greenhouse operations that were affected. You can complete the survey here: <https://bit.ly/CFAPSurvey>. This more general data will be used to estimate losses and determine if there are specific segments of the nursery, greenhouse and cut flower sector that could qualify for COVID-19 assistance. No individual data will be shared. You can contact me at [emh56@cornell.edu](mailto:emh56@cornell.edu) if you would like more information.

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## **Food Safety News**

***Elisabeth Hodgdon, CCE Eastern NY Commercial Horticulture***

### **FSMA Inspections, On-Farm Readiness Reviews Still on "Pause"**

In response to the COVID-19 pandemic, the FDA released a partial stop work order earlier this spring that placed a temporary hold on FSMA inspections and On-Farm Readiness Reviews. Recently, the Association of Food and Drug Officials released a guidance document that outlines safety measures for inspections to move forward. There is no date yet for resuming inspections in New York State. However, ENYCHP specialists are available to help farms with food safety issues, such as water testing, sanitizer use, worker training, food safety plan writing, and more.

### **New Worker Training Videos Available Online**

A series of five online videos produced by Robert Hadad and Caitlin Tucker of the Cornell Vegetable Program are now available to assist farms with training workers on key food safety concepts, including material required by FSMA:

1. Creating a Worker Training Program (for farm managers and crew leaders)
2. Food Safety and Why it Matters (for farm employees)
3. Everyday Practices to Prevent Foodborne Illness (for farm employees)
4. Reducing Food Safety Risks on the Farm (for farm employees)
5. Spot the Risk: A Series of Case Studies (for farm employees)

You can find the video playlist on the CVP Youtube Page: [https://www.youtube.com/playlist?list=PLMxaHBxUI9qb58ZrNMMyf5Lg\\_ZqD-ajJrf](https://www.youtube.com/playlist?list=PLMxaHBxUI9qb58ZrNMMyf5Lg_ZqD-ajJrf)

### **New Changes to FSMA Produce Safety Rule Qualified Exemption Requirements**

Last month, the FDA announced new changes to sales requirements

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to meet qualified exemption status during 2020, or during calendar years when the pandemic is ongoing. To accommodate affected supply chains and the need for growers to alter distribution channels due to the pandemic, the requirement that a majority of sales be made to “qualified end users” is waived for the year 2020. Previously, growers were eligible for qualified exemption from FSMA’s Produce Safety Rule if they sold less than \$500,000 worth of food (including all produce, baked goods, milk, meat, animal feed, and all other food products) and sold a majority of their product to “qualified end users.” These monetary amounts are calculated as three-year rolling averages, and adjusted for inflation. Qualified end users are defined as: 1) Consumers of the food; and 2) Restaurants and retail food establishments located within the same state or

Indian reservation, or located within 275 miles from the farm. The waiver of the qualified end user sales requirement does not retroactively impact exemption status for previous calendar years, nor does it impact the overall \$500,000 food sales requirement; farms subject to the Produce Safety Rule that sell over \$500,000 worth of food are not eligible for the qualified exemption.

For more information on qualified exemption status during the pandemic, see the FDA’s guidance for industry on the temporary policy regarding qualified exemptions:

[https://www.fda.gov/media/138316/download?fbclid=IwAR2UJPI6QXxU\\_WKO7mE1jRN5fQBjwSxIhH2QvuniTI34-LoJQIFn707\\_eOc](https://www.fda.gov/media/138316/download?fbclid=IwAR2UJPI6QXxU_WKO7mE1jRN5fQBjwSxIhH2QvuniTI34-LoJQIFn707_eOc)

A graphic for a webinar series. The left side has a dark red background with white text. The right side shows a photograph of a tree with red apples. A Cornell University seal is in the center. A hand icon points to a link at the bottom right.

**ALERT:**  
**WEBINAR SERIES-**  
**NYS Business**  
**Safety Plan Resources-**  
**ALL BUSINESSES**  
**MUST COMPLETE!**

See **industry specific** resources & tips for completing your farms plan NOW!

**Click the Link to Register TODAY**

Does your produce farm have a COVID-19 safety plan? Join CCE specialists to learn more about how to write your plan using new resources available for farms. Industry-specific webinars are scheduled this week and next.

**Fruit & Vegetables: June 11 at 12pm**

**Retail: June 11 at 7pm**

**Ornamentals: June 15 at 7pm**

Register now at <https://agworkforce.cals.cornell.edu/ny-forward-business-safety-plan/>

# Events & Updates

## Food Safety and Wash/Pack Facilities Training

June 15, 2020—Zoom webinar

This virtual training, presented by Robert Hadad and Caitlin Tucker from the CCE Cornell Vegetable Program, will help farmers and workers understand the concepts of food safety from harvest to packing. This training will also cover facility design, operation for washing produce and cleaning/sanitizing to minimize the risk of possible microbial contamination. Topics will include:

- The Basics: Understand what is contamination, why do we care, and where does it come from?
- Identify sources and routes of contamination from field to Wash/Pack line - what to do about it
- Demonstrate the process of proper handwashing, and recognizing signs and symptoms of illness and injuries
- Understand the importance of prioritizing Wash/Pack design and function
- Review cleaning and sanitizing procedures for facilities and basic wash lines
- Review cleaning and sanitizing procedures for Wash/Pack equipment

This online Zoom webinar is FREE! For more information and registration, email Robert Hadad at [rgh26@cornell.edu](mailto:rgh26@cornell.edu) or call 585-739-4065.

## COVID-19 and Animals

Source: Michael Westendorf, Rutgers Cooperative Extension, Plant and Pest Advisory, May 22, 2020

Currently, there is no evidence that animals play a significant role in spreading SARS-CoV-2, the virus that causes COVID-19. Based on the limited data available, the risk of animals spreading COVID-19 to people is low. In some rare situations, people may be able to spread the virus to animals. Further studies are needed to understand if and how different animals could be affected by the virus, and the role animals may play in the spread of COVID-19. The clinical spectrum of illness for the SARS-CoV-2 virus remains largely undefined in animals. Animals may present with respiratory or gastrointestinal clinical signs based on the presentation of other coronaviruses more commonly found in animals as well as other emerging coronaviruses, including SARS-CoV-1 infection. Clinical signs expected to be compatible with possible SARS-CoV-2 infection in mammalian animals may include fever, coughing, difficulty breathing or shortness of breath, lethargy, sneezing, nasal/ocular discharge, vomiting, and diarrhea.

Although there have been limited reports of domestic companion animals testing positive for COVID-19, the risk of transmission from animals to humans is thought to be low. Routine COVID-19 testing is not recommended.

Please see the following factsheet from the State Department of Agriculture Division of Animal Health: [COVID-19 and Animals](#).

## Corn Trap Counts

County	ECB-E	ECB-Z	FAW	WBC	CEW
Albany	0	1	0	0	N/A
Clinton 1	0	0	0	0	0
Clinton 2	0	0	0	0	0
Essex 1	0	0	0	0	0
Orange	0	0	N/A	N/A	0
Ulster 1	0	0	N/A	N/A	5
Ulster 2	35	9	0	0	2

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