Cornell Cooperative Extension
Eastern NY Commercial Horticulture Program

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Vegetable News

True Armyworms Invading Sweet Corn!

Chuck Bornt, CCE ENYCHP

The last two weeks have had us finding some True Armyworm adult moths in our traps. These moths move up from southern overwintering sites on storm fronts. If you recall, we've had some issues with these buggers in the past and sweet corn isn't their only host as we've seen them attack several vegetable crops including sweet corn, brassicas, tomatoes, peppers and greens. Not only is their damage a problem, but on things like lettuce, the droppings can affect marketability of the crop.

Note the ragged feeding and dark colored frass. (Photo: Teresa Rusinek)

Armyworms, whether Fall or True, are very eager feeders and can do a lot of damage in a short time. Their feeding damage tends to appear ragged, with large holes eaten in the leaves and they leave lots and lots of sawdust looking frass (insect terminology for fecal matter). They tend to feed on the top sides of crops during the night and on the undersides or deeper into the plant during the day.

The adults are fairly large moths which are primarily nocturnal and have the ability to lay up to 2,000 eggs in their two week life. The eggs will hatch in 7 to 14 days and the larvae begin feeding immediately, going through seven stages of development over several weeks. The worms tend to be greenish brown (with some variations) with a pale white stripe on its back and an orange stripe on each side of the body. One other distinguishable feature is a dark brown to black triangle located on the outside of each of the four pairs of prologs found towards the hind end of the body.

Thresholds for when to treat corn have been established and should be treated when 25% of the plants are showing damage (Source: Integrated

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Pest Management Program, Missouri University). For sweet corn and leafy greens, best control is achieved when the larvae are small (1st and 2nd instar) and applied usually later in the evening when the larvae tend to be more active and feeding on the upper surfaces of the plants.

There are a number of insecticides labeled for leafy greens including these **organic** products: Pyganic (pyrethrin), Dipel (Bacillus thuringinensis, subsp. Kurstaki), Xentari ((Bacillus thuringiensis, var. aizawai), Aza-Direct (azadirachtin), Azera (pre-mix of azadirachtin and a pyrethroid) and Entrust (check the label for the labeled rates as formulations vary for these products). Again, these products are going to work best when applied to small larvae but if they get ahead of you, tank mixing a pyrethroid (Aza-Direct, Pyganic etc.) with a Bt (Dipel, Xentari etc) will improve performance. Repeat applications may also be necessary depending on how long the egg laying period and development conditions are.

Conventional insecticides labeled for armyworm control on sweet corn and leafy greens including Warrior II, Baythroid (both are recommended for 1st and 2nd instars), Coragen and Lannate. Ensure that you get thorough coverage, of the canopy with any of these products including the whorl in the case of sweet corn. Late evening applications also keep insecticides wet longer ensuring larval contact and ingestion of the insecticides. Other insecticides labeled for sweet corn include Asana XL (1st and 2nd instars), Mustang Max, Radiant SC and Blackhawk. Please check labels for rates.

Note the distinguishable orange stripe the runs the entire length of the body and the black triangles on the last 4 sets of pro-legs. (Photo: Teresa Rusinek)

Annual Weeds: Changing of the Guard

Justin O'Dea, formerly of CCE Ulster County

Late May to early June really marks when winter annual weeds are in their most alarming glory, and will soon largely bow out of center stage to a new flush of summer annual species. It is an excellent time to 1) take note of what winter annual species are problematic for you (as this is one of the easiest times to identify weed species) and to 2) heed the reminder to keep a tight rein on the next flush of summer annuals to follow. Weeds are unique in that when a problem is unchecked, the problem is almost always sure to compound many times over in the years that follow; this is sometimes, but not always the case with disease and insect pest pressures, which can sometimes be more transient (depending on weather and other factors).

Winter annual weed species most often germinate in fall (though some are also capable of early spring germination) and produce seed and die off by late spring. A good number of broadleaf winter annuals have a characteristic rosette (Figures 1a and 1c) that is resilient to the weight of winter snow and helps them to begin taking advantage of warming soil temperatures and sunlight as soon as snow clears. Rosettes are common to some biennials and perennials also (examples: dandelion, Canada thistle, common burdock, wild carrot), but you won't find rosettes on summer annuals, only winter annuals. In particular, winter annual brassica species (aka mustards, crucifers), which comprise a large percentage of all common winter annual weed species, often have rosettes. The flowering stems eventually emerge from the center of the rosette to flower and produce seed this time of year (Figures 1b and 1d).

Common winter annual brassica species found in northeastern croplands are shepherd's-purse (Figures 1a and 1b), field pennycress, wild mustard, yellow rocket, hairy bittercress, field pepperweed, wild radish, hedge mustard, and marsh yellowcress; some of these weeds have biennial and/or perennial species/subspecies and sometimes go by other common names. Other winter annual weeds common to northeastern croplands this time of year are prickly lettuce (Figures 1c and 1d), chickweeds (*Stellaria* species), field violet, chamomiles (*Anthemis* species and *Matricaria matricarioides*),

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common groundsel, annual sowthistle, corn cockle, white campion, henbit, catchweed bedstraw, and corn speedwell. Downy brome is a winter annual grassy weed that I am seeing more commonly this year. Other winter annual grassy weeds often originate from volunteer cover crops including feral rye and Italian/annual ryegrass. Feral vetches from cover crops can also become weedy winter annuals.

The above list can help you get a start by narrowing down the list of possible weeds you might be seeing going to seed in the field right now. Narrowing identification down to genus (as opposed to identifying down to species; common names of weeds often refer to a given genus, rather than specific species) is often adequate for informing how a given weed might be controlled. Multiple-university based websites offer tools for identification; northeastern based universities will offer the most regionally specific information but many, many, weeds are common to other areas of the US. Some northeastern-based resources are:

· http://extension.umass.edu/landscape/weed-herbarium

· http://extension.psu.edu/pests/weeds/weed-id

· http://njaes.rutgers.edu/weeds/

· https://www.canr.msu.edu/weeds/extension/michigan-s-worst-weeds

Watch out for seedlings of the oncoming summer annual species that more commonly plague principal vegetable crops grown in eastern NY. Cornell's list/descriptions of major weeds and some control measures (including non-chemical management) can be found on the Weed Ecology and Management Laboratory webpage:

· https://weedecology.css.cornell.edu/index.php

Importantly, because chemical weed control regulations vary by state, please consult the NYS IPM Weeds in Vegetables page at http://www.nysipm.cornell.edu/vegetables/weeds.asp

Specifically consult , the 2018 Integrated Crop & Pest Management Guidelines for Commercial Vegetable Production for current information on Cornell-trialed NYS-registered herbicides for specific crops- available for purchase here.

Having a print copy of *Weeds of the Northeast* on hand, and help from your local Extension office can also often help immensely when the process of identifying your weeds gets tedious and/or overwhelming.




Figure 1a. Shepherd's-purse rosette. *Image courtesy of OSU,* Figure 1b. Shepherd's purse going to seed. *Image courtesy of U Mass.,* Figure 1c. Prickly lettuce rosette. *Image courtesy of OSU,* Figure 1d. Prickly lettuce going to seed. *Image courtesy of OSU*

ENYCHP Veggie Pest Watch

Now Available!

This week– learn to identify the weeds emerging now in our region!

Visit: https://spark.adobe.com/video/BDWJicaNj72zc

How Copper Sprays Work and Avoiding Phytotoxicity

Teresa Rusinek, CCE ENYCHP

You may be considering a copper spray to control or prevent certain diseases, particularly bacterial diseases in your crops. Here's a quick review of how copper controls pathogens. Copper is usually applied in the "fixed form" which lowers its solubility in water. Fixed coppers include basic copper sulfate (e.g., Cuprofix Ultra Disperss), copper oxide (e.g., Nordox), copper hydroxide (e.g., Kocide, Champ), copper oxychloride sulfate (e.g., COCS), and copper ions linked to fatty acids or other organic molecules (e.g., Cueva). The spray solution is actually a suspension of copper particles, and those particles persist on plant surfaces after the spray dries. Copper ions are gradually released from these copper deposits each time the plant surface becomes wet. The gradual release of copper ions from the copper deposits provides residual protection against plant pathogens. The slow release of copper ions from these relatively insoluble copper deposits reduces risks of -phytotoxicity to plant tissues. Copper ions denature proteins, thereby destroying enzymes that are critical for cell functioning. Copper can kill pathogen cells on plant surfaces, but once a pathogen enters host tissue, it will no longer be susceptible to copper treatments. A copper spray acts as a protectant fungicide/bactericide treatment, but lacks post-infection activity.

Because copper products come in different formulations and have different properties, it is important to read all the information on the labels. Besides rates, you will want to know about compatibility with other pesticides, adjuvants, and fertilizers. Many growers are tank mixing biological fungicides and plant activators with coppers, while many are compatible, some are not, so make sure to check both labels for compatibility or call the manufacture/distributer for technical assistance.

The effectiveness of copper sprays has been correlated with the amount of elemental copper applied. The metallic copper content varies widely by product. Potency also varies by how the product is prepared. Finely ground copper products are more active than coarsely ground ones. Professor Emeritus Tom Zitter of Cornell University suggests that for vegetable crops "Begin by choosing a copper product with at least 20% or more copper as the active ingredient to insure the greatest release of copper ions".

There are several suggestions for avoiding phytotoxicity (plant injury) with copper sprays. Limit the copper ion concentration on plant surfaces by using copper products that are relatively insoluble in water, i.e. fixed copper. Copper can accumulate to high levels on plant tissue when sprayed repeatedly to cover new growth and there is no rain. In this situation, after a rain event, a large amount of copper ions may be released leading to phytotoxicity. Check the pH of your water source. Solubility of fixed coppers increases under acidic conditions. Copper sprays will become more phytotoxic if they are applied in an acidic solution. Most copper products are formulated to be almost insoluble in water at pH 7.0. As the pH of water decreases the solubility of the copper fungicides increases and more copper ions are released. If the water /solution in spray tank is too acidic (below pH 6.0-7.0, depending on the copper formulation) excessive amounts of copper ions could be produced which may cause damage to fruit and foliage. Formulations vary in solubility — hydroxides are more soluble than oxychlorides which are more soluble than tribasic copper sulphates and cuprous. Less soluble formulations are usually more persistent. Copper sprays generally cause more phytotoxicity when applied under slow drying conditions, such as when it's wet and cool. Always read the label and follow copper tank mix partner label instructions.

For a comprehensive list of Copper Products Used for Vegetable Disease Control see:

http://vegetablemdonline.ppath.cornell.edu/NewsArticles/CopperFungicides2012.pdf

and for specific information on copper fungicides in organic disease management see:

http://vegetablemdonline.ppath.cornell.edu/NewsArticles/Copper-Fungicides-Organic.pdf

Sources: Dr. T. A. Zitter, Cornell University and Dr. David A. Rosenberger, Cornell University

Intervale Community Farm, Burlington Vt.

Amy Ivy, CCE ENYCHP

On May 30 I attended a high tunnel field meeting at the Intervale Community Farm in Burlington Vermont. The discussion was led by Andy Jones, farm manager and Jill Rotondo, high tunnel manager at the farm. UVM folks who also spoke were Vern Grubinger, veg specialist; Ann Hazelrigg, plant pathologist and Cheryl Sullivan IPM bio-control specialist.

It is fascinating to see how many different approaches growers take and to hear their experiences trying out new methods, product and tools. I took a lot of notes and have included some highlights and photos below. For ease of reading I will stick to short sentences and bullet points as much as possible. This week I'll cover their tomato production, next week I'll share their comments about pest management and bio-control.

Tour focused on their 4 Harnois high tunnels, 32'x132', erected in 2012

- Harnois tunnels have bows 6' apart instead of the usual 4' which makes for fewer posts to drive in the ground.
- In 2012 these tunnels cost around $12,500 each for the metal, about $30,000 each when fully assembled.
- They wish they had installed more drainage along the outside walls on each side of the tunnels when constructing them.
- As plastic needs changing they are converting from a single layer to double layer inflated. Less flapping and wear on the plastic when inflated.
- They average 4-5 years from their plastic and saw a huge drop in light transmission in the 6th year. This is especially critical for winter production when light levels are already low.

Starting Tomatoes

- Start seeds 2nd week of March, do their own grafting.
- Geronimo and BeOrange are very vigorous varieties so they are grafted onto Estimo rootstock which is less vigorous.
- Margold and Marnero are less vigorous varieties so they're grafted onto Maxifort rootstock which is more vigorous.
- 7-10 days in the healing chamber.
- 7 weeks from seed to graft to planting out.
- Use bamboo stakes for early support.

Tomato Production

- Set out plants first week of May with no additional heat
- Single row, 24" apart, double leaders are spread perpendicular to row
- This allows 5 sq ft per leader (each leader considered a plant) which is an ideal density for air flow and production. (see photo)
- 4 lines drip per row, run about 10 mins/day
- They started with just one 1 line of drip years ago, but their soil is sandy and water didn't travel laterally enough. 4 lines works better for them.
- Use potassium sulfate and Epsom salts in the drip. Potassium sulfate can be hard to dissolve. Get the superfine grind. They mix it with boiling water in the stock bucket to help dissolve.
- We saw some 'bull growth' where plants put on dense growth and very thick stems in response to a surge of nitrogen, likely released in response to recent warm temps. Plants will even out in a few weeks.
- Jill likes the hands free pruning scissors from Johnny's. Fits like a ring on your finger.
- Jill uses stilts used by drywall hangers to work the plants once they get tall. Says it's very efficient for pruning and training, not so much for harvesting. I plan to return later this summer to see her in action!

Above: Super vigorous plants showing 'bullish' growth, just 30" tall here but with very thick stems and dense terminal foliage.

Onion Thrips Management Recommendations for 2018

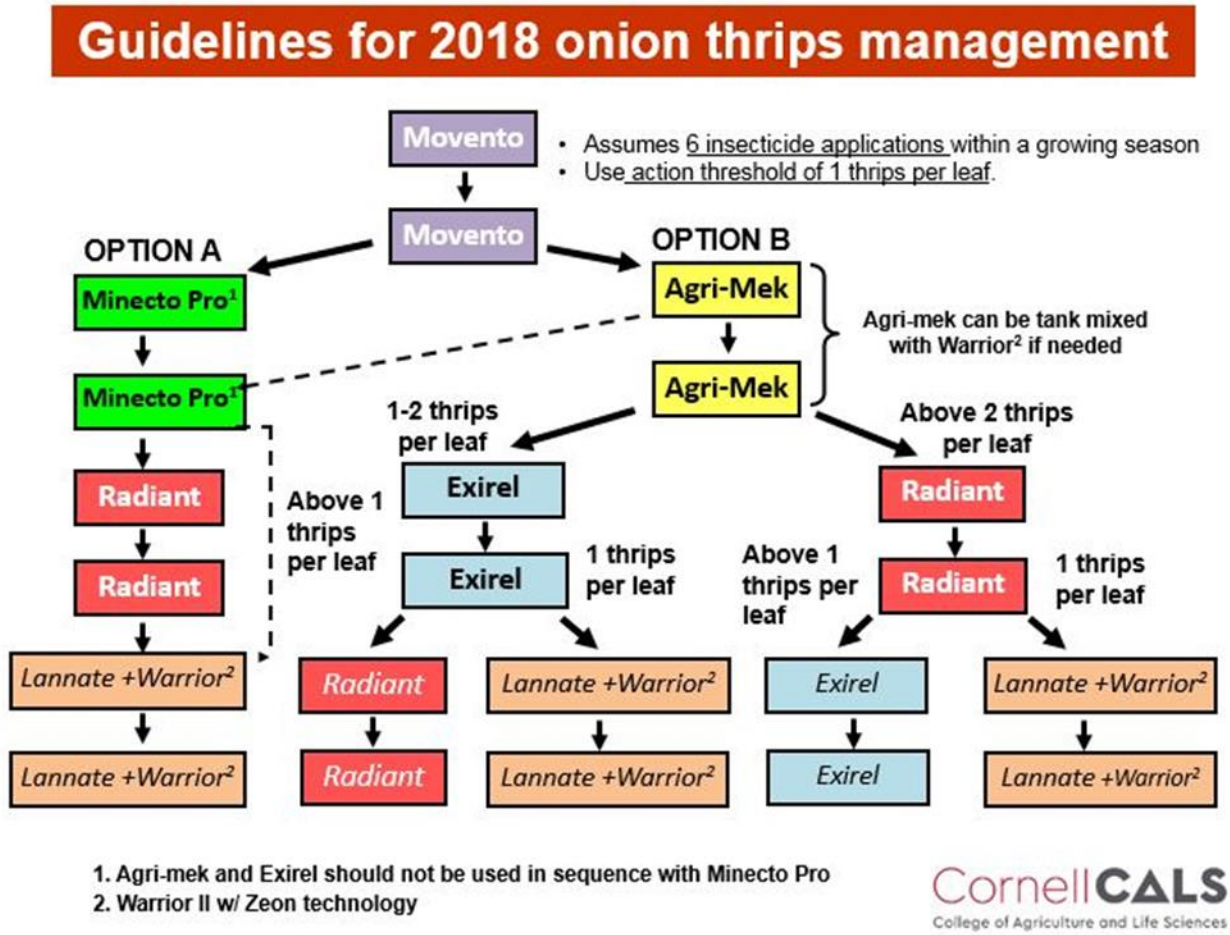
Ethan Grundberg, CCE ENYCHP

Most larger scale onion growers in the region are already familiar with Dr. Brian Nault's insecticide sequence recommendations for onion thrips management. However, more products have been registered in New York in the last few years that provide alternative options for conventional thrips management (specifically Exirel and Minecto Pro). It's worth keeping in mind that Dr. Nault's recommendations are based on two primary principles:

Scouting and only spraying at threshold: The days of calendar sprays are long gone. Given the cost of some of the newer chemistries used for thrips management, growers must scout fields and confirm that thrips populations have reached a level of at least an average of 1 thrips per leaf before spraying. Spraying before thresholds are reached not only weakens the resistance management strategy (see point 2), but also cuts into grower profits by unnecessarily increasing the number of insecticide applications each year.

Resistance management: Onion thrips produce multiple generations each year. They also develop resistance to insecticides more readily than other pests that reproduce more slowly. One of the goals of the recommended insecticide sequence is to avoid exposing multiple generations per year to the same insecticide. By avoiding the exposure of multiple thrips generations to the same active ingredients in the same year, growers can help preserve the useful life of insecticides that are effective at managing thrips.

The chart that follows outlines several different insecticide sequences developed by Dr. Nault for growers to follow depending upon the severity of thrips pressure in the field. It should be noted that, as indicated below, Minecto Pro is a pre-mix of the same active ingredients found in Agri-Mek and Exirel, so it should NOT be used in sequence with those products. Addtionally, almost all of the insecticides listed in the chart should be used with a non-ionic penetrating surfactant, such as Dyne-Amic or LI700. Only Warrior and Lannate are compatible with spreader-sticker type adjuvants. Since Bravo Weatherstik is formulated with a sticker, it should NOT be mixed with Movento, Minecto Pro, Radiant, Exirel, or Agri-Mek.



Leek Moth Larvae in Full Swing

Amy Ivy, CCE ENYCHP

If leek moth has arrived on your farm it should be pretty easy to find this week. As a leaf miner, you won't find it on the leaf surface but the damage it causes is characteristic and quite noticeable right now. In garlic it goes for the newest growth and emerging scape so look at the center of the plant. In onions it will be inside the hollow leaves, causing long white windowpanes as it feeds on the inner leaf tissue. When in doubt, split the leaf open and look for frass, debris and slender, creamy-yellow caterpillars. If the caterpillars have already left to pupate the debris inside the leaf is evidence enough.

Leek moth damage to newest garlic leaves and emerging scapes

leek moth damage to onion leaves. The larvae are safe inside the hollow leaf.

Organic garlic growers might get control with an Entrust or Bt application made to the center of the plant this week, but no later since larvae are about ready to pupate. Conventional growers can use Warrior II with Zeon, Lannate, or Radiant SC this week as well.

I am very interested to know of new infestations so if you think you have leek moth this year, please let me know – text, email or phone call. Thanks! (adi2@cornell.edu 518-570-5991)

Right: Split onion leaves open to reveal debris and caterpillars

This season, CCE ENYCHP will be offering text updates straight to your phone! Being informed is the first step in the success of your farm! Our texts will get you the information you need in the fastest and most concise way possible!

Only the most important crop alerts will be sent ("Late Blight found in N.Columbia County", for example), and you can choose to receive updates on whichever commodities you wish- Vegetables, Berries, Grapes, or Ag. Business.

Ag. Business Alerts will include: funding opportunities, due dates for programs (ag district inclusion, tax deadlines, crop insurance etc…), & market opportunities (farmers markets looking for vendors, buyers looking for product)

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https://mailchi.mp/7a7cc033546c/k24yc2ayt1

20 Minute Ag Manager

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For more information:
Contact Liz Higgins at emh56@cornell.edu

To register, go to https://tinyurl.com/y9gfqbmx.

Registering once gives you access to the series.

June: Zoning and Land Use

- June 12—Local Zoning 101
- June 19—NYS Ag Districts 101
- June 26—Using On-line Data and Maps to Assess a Property Remotely

July: Managerial Accounting

- July 3—Budgeting 101
- July 10—Assessing a Capitol Investment
- July 17—Relevant Information and Sensitivity Analysis
- July 24—Pricing for Profit
- July 31—Know When to Hold'em, Know When to Fold'em (assessing performance)

July 12, 2018 – FSMA Training
Cornell Cooperative Extension, Albany County – Voorheesville, NY.
More information at https://enych.cce.cornell.edu/event.php?id=951

FDA FOOD SAFETY MODERNIZATION ACT

July 18, 2018 - New York Soil Health Summit
Empire State Plaza, Downtown Albany, NY. For more information at this time, contact David Wolfe (dww5@cornell.edu) or Aaron Ristow (ajr229@cornell.edu).

July 31st, 2018– Reduced Tillage in Organic Systems Field Day 9am—3pm Cornell Willsboro Research Farm, free and open to the public, for question s call Amy Ivy at 518-570-5991 or adi2@cornell.edu

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