



# VEGEEdge

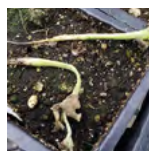
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## Infrequently Discussed Crops: Radish, Rhubarb, and Asparagus

Robert Hadad, Cornell Cooperative Extension, Cornell Vegetable Program

Over the years, we have quickly jumped into the major vegetable crops grown in WNY. It might be time to bring a few of the other early spring crops that deserve a little more attention.



### RADISH

The radish is one of those crops that have always been there and often grown but not talked about much. In some of the marketplaces, there seems to be a bit more interest in the common radish. Fancier varieties with striking colors are catching the consumer's eye. Let's go over some of the basic production points.

#### Fertility

The pH should be around 6.0 - 6.5 but not high. Boron could be added at 2lb/A. Radish isn't a big N user. 50lbs/A is sufficient. More attention needs to be paid to P and K where a soil test will recommend 50lbs/A (or none at all) if the readings are in the high range. For medium range, 75LBs/A and with a low reading, add as much as 100-150lbs/A. Keep soils with a consistent water supply not letting them dry out. Weed management is critical to avoid competition for water. Drier soils will affect the quality of the flavor of the root.

#### Harvest

Read the seed package label. Note the days to maturity. If a radish is in the ground even just a few days too long when the temperature is warm with cause the roots to be pithy. Keeping tops on after harvest will dry out the root making it limp and rubbery. Store in cooler at 32-35F.

#### Insects

Root maggots and flea beetles are major concerns. The cost of chemical controls might make their use not economical. Exclusion with netting or row cover for early plantings might be a better investment. These tools can be used for other crops later. Timing of planting could impact severity of these pests. Later spring plantings could help avoid infestations.

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## About VegEdge

VegEdge newsletter is exclusively for enrollees in the Cornell Vegetable Program, a Cornell Cooperative Extension partnership between Cornell University and CCE Associations in 14 counties.



The newsletter is a service to our enrollees and is intended for educational purposes, strengthening the relationship between our enrollees, the Cornell Vegetable Program team, and Cornell University.

We're interested in your comments. Contact us at:  
CCE Cornell Vegetable Program  
480 North Main Street, Canandaigua, NY 14224  
Email: [cce-cvp@cornell.edu](mailto:cce-cvp@cornell.edu)  
Web address: [cvp.cce.cornell.edu](http://cvp.cce.cornell.edu)

### Contributing Writers

Elizabeth Buck  
Robert Hadad  
Christy Hoepting  
Esther Kibbe, CCE Harvest NY  
Margie Lund  
Julie Kikkert  
Judson Reid

### Publishing Specialist/Distribution/Sponsors

Angela Ochterski

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*This next issue of VegEdge newsletter will be produced on May 27, 2020.*



The NYS Dept. of Ag and Markets has partnered with Cornell Cooperative Extension to distribute free hand sanitizer (1 gallon or 2 oz bottles) and cloth face masks to agricultural producers and operations. The distributions are already taking place with each county Cornell Cooperative Extension handling their distribution to their county's farms differently. If you have not already taken advantage of this opportunity, please contact the Cornell Cooperative Extension office in your home county to determine if they have supplies left and how they are being distributed. There may be additional opportunities in the coming weeks, so make sure you are on their list. You will need to provide farm name and location, type of operation, and number of employees. ●



## RHUBARB



Not all rhubarb varieties are the same. Know what you are purchasing. Some produce many seed stalks rather quickly in the spring (also known as bolting) reducing the yield potential of the crop.

### Fertility

Rhubarb responds well to compost or well-rotted manure added or being grown in high organic soils with a pH in the 6.0-6.8 range. Add the compost in the late fall. Phosphorus should be preplant at 50-75lbs/A while K can be as high as 150lbs/A based on soil test results. Rhubarb requires a well-drained soil but irrigation should be used during drought conditions.

### Weed Management

Being a perennial crop, long-term weed management strategies are critical. Using straw mulch or landscape fabric topped with straw might be a reasonable investment. Otherwise, a timely herbicide routine will be needed.

### Harvest

No harvesting should be done in the first year and only 2-4 stalks taken the second year. Allowing stalks with leaves during this time period will give the plant plenty of time to develop a strong crown and root system. The third year, harvest can go bigger but to make sure enough stalks and leaves are left for the plant to replenish itself. It is best to leave about 2/3 of the stalks after each cutting. To avoid rot diseases, avoid cutting stalks. The remnants left can become infected and allow rot into the crown. To harvest, grab a new but full sized stalk and pull upward with a quick twist like peeling a celery stalk from its base.



Seed stalk on rhubarb.

## ASPARAGUS



Asparagus is another perennial crop that requires a good deal of planning before establishing a planting. Refer to the Cornell 2020 Vegetable Crop Guidelines chapter 12 for more details on bed creation.

### Fertility

Asparagus likes soil more on the acid side, ranging from 6.0-6.5. For asparagus beds in production, apply fertilizer early in the spring before spear emergence. N at 50lbs/A with P between 25-75lbs/A and K at 40-80lb/A based on soil test results.

### Harvesting

Like rhubarb, the asparagus crowns need to become established over several years of growth. No harvests should occur in the first year with small harvests for the next 2-3 years. The fronds need care after harvest in order to replenish the roots for the next year's growth. When the temperatures are warm, harvest needs to be daily since spears can grow fast. Large spears can become tough which is a real turn-off for customers.

### Asparagus Beetles

These pests will quickly spread eggs which hatch into hungry larvae that can surprisingly defoliate asparagus fronds quickly. Beneficial parasitoid wasps can reduce their populations but a number of pesticides might reduce the wasps populations when used elsewhere on the farm. Entrust SC, Radiant Sc, Lannate LV and Perm-Up 3.2 EC are all labeled for use in NY. Read labels carefully. ●



Common asparagus beetle eggs (left) and larvae (right).  
Photo from Michigan State University.

## Rhizoctonia on Cucurbit Transplants

Judson Reid, Cornell Cooperative Extension, Cornell Vegetable Program

Root rots and damping off caused by Rhizoctonia fungi cause wilting and eventually collapse of young seedlings. Although there are fungicides to treat this disease, prevention is the best option, since the symptoms often are the beginning of the end for transplants. Sanitation practices including the use of new trays and treating greenhouse surfaces with a sterilant such as Oxidate should be annual Standard Operating Procedures. Another



Root rot and crown infection of watermelon seedlings in a poorly ventilated greenhouse. The green algal growth on the potting soil surface is a clue that moisture levels in the pot and greenhouse air are too high. These conditions favor Rhizoctonia infections. Photo by Judson Reid, CCE Cornell Vegetable Program

important preventative step is daily greenhouse ventilation. With cool cloudy days, many growers are loathe to open vents, as fuel will be spent to heat the fresh air. However, the colder outside air has lower relative humidity and higher CO<sub>2</sub>. By readjusting both these parameters, plants are able to transpire more which keeps the roots actively pulling moisture from the potting soil, instead of stagnating, which presents an opportunity for Rhizoctonia infections to occur in the roots and crown.

### ORGANIC MATERIALS

Note that the OMRI listed materials are intended as preventative treatments. There are also potting-mixes available that are pre-inoculated with these.

- Companion (*Bacillus subtilis* GB03)
- Cease (*Bacillus subtilis* MB1 600)
- Rootshield and Rootshield Plus (*Trichoderma harzianum* and *T. virens*)
- Obtego (*Trichoderma asperellum* and *T. gamsii*)
- Mycostop (*Streptomyces* spp)
- Actinovate (*Streptomyces lydicus* WYEC)

### CONVENTIONAL FUNGICIDES

If more than one application is made be sure to rotate between groups. Also bear in mind what outdoor crop protectants will be used later in the season to prevent fungicide resistance.

- Heritage (Azoxytrobins group 11) - note there are resistance concerns with this active ingredient which is also common for Powdery Mildew management
- Spirato (Fludioxinil group 12) - note this is for indoor use only
- Nufarm T-Methyl SPC 4.5F (Thiophanate-methyl group 1) ●

## Onion Update, 5/13/20

Christy Hoepting, Cornell Cooperative Extension, Cornell Vegetable Program

This is the slowest I have ever seen onions grow! Earliest direct seeded fields that were planted first week of April are only in loop-stage (Fig. 1), just as they were last week! Fields planted during third week of April are just barely starting to poke through. Direct seeding and transplanting is nearing completion, if not done already.



Figure 1. Despite slow growth, onion stands are excellent. Photo by Christy Hoepting, CCE Cornell Vegetable Program

Barley windbreaks are growing slow and have been nipped by frost (Fig. 2). Barley should be actively growing when barley-kill herbicides are applied and will not work as well when the barley is suffering from frost injury. Earliest transplants are at 3-leaf stage and have been nipped by frost. Stand establishment is excellent, except where wind erosion and blow-outs/drifts have been an issue. The weather is supposed to warm up on the weekend and this crop wants to grow – can't wait! See article on use of Buctril, Outlook and Prowl for their strategic use during the first two herbicide applications. Will add Chateau to the mix in an upcoming issue. Many growers have left experimental plots where they turned off the in-furrow drench so that they can go back and evaluate whether mancozeb, mefenoxam (Ridomil) and Lorsban are needed with FI500 + EverGol Prime seed treatment – looking forward to hearing what you learned with respect to stand, onion smut and onion maggot control. ●



Figure 2. Barley nurse crop with frost injury (right) compared to healthy barely on right. Barley-kill herbicides will not work as well when barley is suffering from frost injury, it should be actively growing. Photo by C. Hoepting, CCE CVP





## Assessing Cold Damage on Berries

*Esther Kibbe, Cornell Cooperative Extension, Harvest NY*

This past week has seen multiple nights at or below freezing, depending on location. This unseasonably cold weather has been stressful for berry growers. Those who are set up to do frost protection with overhead sprinklers have had many sleepless nights and very wet fields to contend with. Some who use row covers have been fighting the high winds to keep those covers on, and are sometimes still seeing damage, where the buds have advanced to bloom and were too sensitive for the conditions, even with covers. Probably the vast majority of small growers were not set up to do anything for frost protection, and have been trusting that the cold spring has held the plants back enough that the buds would tolerate some degree of frost.

The truth of that is yet to be seen as we move into bloom, but I expect that almost all fields will have some level of damage from the cold. Most strawberries and blueberries that I have seen in Western New York were still at a stage that should theoretically survive a frost, even down to 25°-26°F, but these were especially difficult conditions, with rain, snow and wind, which may have aggravated the simple temperature effects. Now that the cold nights are past, you can get out and start estimating the amount of damage. Cutting buds is a familiar activity for tree fruit growers, but it works for berries too. You

need a razor blade or a sharp knife and preferably something hard to cut against. Select the most advanced bud(s) that you can find, then slice across the fattest part of the bud. If the tissue inside is green and firm, then the bud is probably fine. If the center of the bud is black or clear and soggy, then it has been damaged and will not produce a berry. If you are finding black buds, sample more, of different stages and from different parts of the field. There may be more damage in a particularly windy area, or a low spot where the cold settled. In strawberries, often only the 'king' flower (the first to emerge) will be killed, and the secondary ones will be fine. That primary flower produces the largest berry, so your fruit size might be down a bit, but there should still be plenty of medium sized berries to pick. Blueberries may lose entire early clusters to frost, but again, unless you were at or close to full bloom, the chances of a complete crop loss are low.

Sometimes frost won't kill the bud, but damage it enough that pollination and fruit set are reduced. This might be the year to bring in bees (or extra hives) to make sure that the flowers you do have get pollinated. With the forecast for next week predicting a quick warm-up, the bloom period may be quite short, making pollinators even more critical.



Many strawberries are at tight bud or just past, pushing flower trusses out of the crown.



Use a sharp blade to cut across the widest part of the bud.



A black center like this means that the bud was killed by the cold.



The bud on the left is healthy, while the one on the right was killed.

*Photos by Esther Kibbe, CCE Harvest NY* ●

## Updated Fact Sheet for EIDL Loan Program Available for Farms: What You Need To Know to Apply

On Monday, May 4, 2020, the Small Business Association (SBA) application portal for the Economic Injury Disaster Loan (EIDL) program opened again, for farms only. Farm Business Management Specialists from Cornell Cooperative Extension have updated their EIDL Loan Program Fact Sheet (#5). This sheet goes into more detail about the EIDL. It also covers the reduction in EIDL cap to \$150,000 and the fact that EIDL Advance will reduce Paycheck Protection Program (PPP) loan forgiveness.

For the Paycheck Protection Program (PPP) it covers the fact that there is still funding available. It also covers some of the controversy over the requirement for 75% of the forgivable portion to go to payroll, the recent SBA change allowing seasonal businesses to use any consecutive 12-week period between May 1, 2019 and September 15, 2019 for determining its maximum loan amount – which may make the program more useful for NYS fruit and veg farms. It also touches on the recent IRS guidance about taxability and deductibility of PPP loan expenses.

The [complete fact sheet](https://bit.ly/3fHwjzG) is available at: <https://bit.ly/3fHwjzG>. If you need a printed copy, please contact your local Cornell Cooperative Extension Association. ●

# How to Take a Photo for Crop Diagnostics

Elizabeth Buck, Cornell Cooperative Extension, Cornell Vegetable Program

**Capturing diagnostically useful images is not as simple as snapping a picture of cute children or animals.**

With the current push to work remotely, using pictures to quickly address production questions has a lot of appeal and utility. I love the idea of using grower-captured photos to hasten the trouble-shooting process, especially since it isn't always possible to make prompt farm visits. But in practice it can be quite tough to work out a problem using photos because of poor image quality.

High quality diagnostic photos absolutely can allow us (and other ag professionals) to make pretty confident IDs and assessments of what is going wrong. I frequently send diagnostic images to our plant pathologists for a preliminary read on the situation, it works great. Examples of high quality diagnostic images are regularly published in our pest/disease/weed management articles.

## WHAT MAKES A HIGH QUALITY IMAGE?

A high quality image has 3 key components:

1. The image matches exactly what you are seeing. Same colors, same level of detail.
2. The image is well focused on the intended subject (is "sharp").
3. The image captures the correct part of the field, plant, bug, etc to make an ID.

In practice, meeting these three criteria takes some time. I typically spend 3-5 minutes capturing a series of high quality images to use in VegEdge or to send off to our plant pathologists or entomologists.

## THINGS YOU SHOULD KNOW

### Cameras sense a lot more light than our eyes can.

Our eyes saturate with light and stop perceiving increased light well below the level of light that a camera (and plants) can perceive. This is why images taken in a sunny field tend to be over exposed and look washed out relative to what your eye perceives. The camera is showing you how much more light there is than you can physically realize. In a way, the camera is better than our eyes at showing us the relative amount of light a plant "sees".

### So much of diagnostics relies on picking out slight color differences in plant tissue.

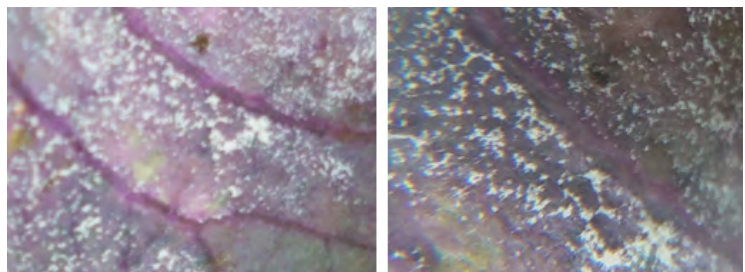
Sunglasses alter how colors look. Something that stands out well with sunglasses on may not be as distinct with them off. I cannot pick out the slight yellow checkerboard of early stage cucurbit downy mildew when I scout with my sunglasses on because my shades filter out light in a way that changes the appearance of yellow objects. Cameras don't filter light and color the same way as your sunglasses do. It is difficult to get the photo to capture exactly what someone wearing sunglasses perceives – far easier to take shades off.

### Making an ID usually takes at several photos.

This number changes based on the problem. Insects can be done in as little as 1 or 2 high quality pictures. Weeds and feeding damage on crops usually require 2-3 good images. Plant diseases and mystery problems are almost always 3-5 photos. Remember that disease symptoms can vary from the upper and lower sides of leaves and images of both can be helpful.

## DIFFERENT PROBLEMS NEED DIFFERENT IMAGES

- For insects you see, take a focused close-up of the pest. A couple images showing feeding damage, any frass, and where on the plant you're finding the damage can ID pests you don't see.
- To ID caterpillars, a top shot showing its head and a side shot of its pattern are really useful.
- For broadleaf weeds, take photos of the overall growth habit, a detail shot of some middle aged leaves, and one showing flowers or any other distinctive features like spines or rosettes.
- For grasses, a picture of the growth habit and a close-up, a focused image showing where the leaf meets the stem while you gently tug on the leaf blade will work well.
- For diseases causing foliar symptoms, include the overall plant, the portion of the plant showing symptoms but not yet fully destroyed, and a focused close up of the symptom. For example with septoria of tomatoes, I'd take pictures of a couple of staked plants showing that the problem is worst lower on the plant and that there is mud splashed up on the lower leaves. The next photo would be of a mid-aged leaf that is starting to yellow and is showing lesions. The last photo would be a close up of a mature lesion showing the surrounding tissue and a pale lesion with black specks in the center.
- For diseases causing root symptoms, abiotic issues, or mysteries take a picture of the field where the problem is occurring, a whole plant above-ground photo, pictures any above ground symptoms on the foliage, a shot of what the roots look like, and an image of the crown sliced open vertically. For example, if I'm diagnosing sad transplants, I take a photo of the greenhouse area with bad flats, a picture of the condition of the flat showing the soil and tops of the healthy and affected plants, a close-up of a sad plant focused at the lower stem, and a shot of a sick seedling's roots.



### Need a close up shot of some mold? Take photo through a hand lens.

Left: Zoomed in image vaguely shows downy mildew sporulation on a brassica seedling. Right: By taking the image through a hand lens, greater detail including the separation of individual mold colonies and the structural shape of the sporulation can be seen. Note image is clear near the central leaf vein and blurry on the edges due to the effect of the hand lens.

*continued on next page*



## STEPS FOR TAKING A HIGH QUALITY IMAGE

1. Clean off the lens of your camera before taking an image.
2. Clean up the area around the subject. Push unwanted leaves out of the way, pull up weeds. This will help the camera isolate the subject from the background and improve the sharpness.
3. Take off your sunglasses so you can match the image exactly to what you see.
4. On bright days, hold your ball cap bill over the phone to shade the lens & reduce oversaturation.
5. Stabilize the camera. Prop your elbow on your knee, ribs, the ground, stakes, etc.
6. Center the focal point on the subject.
7. Zooming in too far blurs an image. Better to adjust your distance from the subject first, then zoom so you maintain sharpness and level of detail.
8. Adjust the lighting (white balance) of your image before taking the photo! This is the last thing you do before taking an image. Many phones have a little sun icon that you can slide higher or lower. Make the colors match what your eye sees.

## PRO TIPS

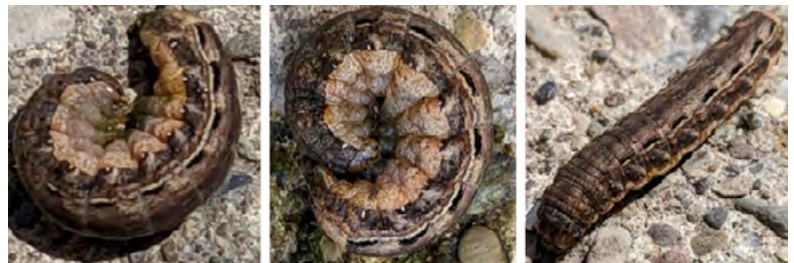
- **Windy day?** Take leaves off plants, especially for shots of feeding damage and diseases. Place on any non-reflective surface like the ground, a truck seat, or even your pant leg.
- **Really tiny bug or something you saw with a hand lens?** Hold the scouting lens up to the camera lens. Move closer or further from the subject to take macro shots, don't zoom. The hand lens will distort the edges of the image, so make sure the subject is in the center.
- **Bugs moving around too much?** Catch them and toss them in the freezer over lunch. They'll be dead or very slow at the end of lunch and they'll still have all their original coloring.
- **Having trouble focusing sharply on the subject instead of the background?** Try using portrait mode on your phone. Or, put your hand directly behind the subject to obscure the background and refocus your image. Once it refocuses, remove your hand and quickly take the picture. This requires one-handed picture taking so be sure to stabilize the camera.



**Adjust the lighting setting.** Left: Overexposed image captured by just snapping a photo. Right: Same seedling, with white balance adjusted on phone so screen display matches what the eye sees; clearly shows the outline and wide range of discoloration (tan, bronze, yellow), which allows for a downy mildew diagnosis. The same diagnosis cannot be made from the image on the left.



**Correct focus point.** Pepper seedlings with discoloration on the cotyledons. Left: Camera focused on leaves behind the scarring, leaving the lesion blurry and small. Too much extra foliage in the image. Right: Brought camera closer to subject, re-set the focus on the lesion, and stabilized the camera. These three actions yielded a sharper image that shows two different injury patterns – coppery sunken tissue in the center with no yellow margins and reddish-brown lesions with yellow margins moving in from the edge of the leaf.



**Caterpillar ID.** Left: Blurry, curled up caterpillar, zoomed in on worm's side marking pattern. Center: Sharper view of same caterpillar taken by shifting camera angle, placing subject and camera lens in the shade of a ball cap to remove the shadow, and bringing the lens closer to avoid distortion caused by zooming. Right: Caterpillar glamour shot showing both top and side patterns, useful for ID.



**Use the portrait mode.** Left: Necrotic leaf is blurry while the background soil is in focus. Right: By using portrait mode, the downy mildew infected leaf becomes sharp and isolated from the background soil. The added sharpness reveals the darkening lines and veins in the chlorotic upper left part of the leaf, despite the right image being taken from a greater lens distance than the image on the left.

# PRE-Emergent Herbicide Options in Muck-Grown Direct-Seeded Onion: Many Ways to “Play Your Hand”

Christy Hoepting, Cornell Cooperative Extension, Cornell Vegetable Program

## COLD, WET SOIL INCREASES RISK OF PRE-EMERGENT HERBICIDE INJURY

Cool and wet conditions favor injury from pre-emergent herbicides, Outlook, Prowl and Buctril, especially when seedlings are close to the surface or exposed from wind erosion. Outlook is a shoot inhibitor and Prowl is a root inhibitor. When shallow-planted seedlings are close to or even within the herbicide layer, they are at higher risk of taking up these herbicides. Because they are barely growing in cold soil, their ability to metabolize the herbicides into inactive metabolites is compromised. Herbicide injury from Outlook and Prowl can include stunting and reduced stand, the risk of which increases with higher rates and tank mixes. Buctril is a photosynthetic inhibitor with contact activity and in wet conditions could be in water solution and more readily contact and kill the tender tissue of emerging seedlings. If all of exposed green tissue is burned off, the seedling may not recover. **Under these risky conditions, growers have been cautious by avoiding high rates and potent tank mixes for the first herbicide application timed at first sign of onion emergence.**

## YOUR “CARDS”

Table 1 highlights the **relative weed control of pre-emergent herbicides of common weeds in muck onion production**, which is a summary of multiple muck herbicide trials from 2015-2019. Control ratings were taken approximately 5 weeks after the first application was made at first sign of onion emergence. Every herbicide has its strengths and weaknesses - “know your cards”:

1. Outlook is the only herbicide with activity on yellow nutsedge (YNS). Absolute best control of YNS is achieved when it is applied prior to onion emergence. If this application is delayed, YNS will have already emerged.
2. Prowl has the best efficacy on Lamb’s quarters, while Outlook and Buctril are weak on this weed.
3. Buctril has the best efficacy on ragweed, but still needs the little bit of help that it can get from Prowl and/or Outlook.
4. All herbicides have activity on mustards, which can vary by species (e.g. Shepherd’s purse vs. marsh yellowcress), but best control is generally achieved with tank mixes.
5. Buctril is weak on pigweed, while Prowl and Outlook can have good activity especially when they are tank mixed and when high rates are used.
6. Buctril and Prowl H2O are the safest on onions, while high rates of Prowl EC and Outlook are the riskiest for onion injury.
7. Buctril has the shortest residual and is out of gas after 5 weeks.

**Table 1. Pre-Emergent Herbicides in Muck-Grown Onion: Relative Weed Control ~ 5 weeks post treatment.**

Pre-Emergent Herbicide	WSSA Group	Pigweed	Lady’s Thumb	Mustards (mostly MYC)	Lamb’s Quarters	Ragweed	Annual Grasses	Yellow Nutsedge
Outlook	15	VG	G	G-VG	G	P	E	G
Prowl	3	G-VG	VG-E	VG	E	P-Fail	E	None
Buctril	6	P-Fail	P-Fail	P-Fail	P	G	None	None

**Green** 90% or better weed control. **Weed Control Rating:** E – Excellent; VG – Very Good; G – Good; F – Fair; P – Poor; Fail. When ratings are hyphenated, the first value is the strongest. For example, F-P is more fair than poor and P-F is more poor than fair.

**Yellow** 50% or less weed control.

**Table 2. Efficacy of pre-emergence herbicides applied to direct seeded onion pre-emergent to onion and at barley kill (fb. 10 days), Oswego, 2019.**

No.	Pre-Emergent Herbicide (Rate/A)			Weed Control 39 DAT <sup>1</sup>			39 DAT
	Buctril 2EC	Outlook	Prowl	Marsh Yellowcress	Lady’s Thumb	Ragweed	% Visual Onion Injury
1	1.5 pt	11 fl oz	EC 2 pt	92%	F-G	VG	8.3%
2	1.5 pt	11 fl oz	H2O 2 pt	95%	F-P	F-G	2.7%
3	12 fl oz	12 fl oz	EC 12 fl oz	83%	Fail-P	Fail	5%
4	12 fl oz	12 fl oz	EC 1.5 pt	89%	P-F	P-F	0.7%
5	12 fl oz	12 fl oz	EC 12 fl oz Fb. EC 1.5 pt 10 days	87%	G-VG	VG	7.3%
6	12 fl oz	12 fl oz	None Fb. EC 1 pt + Goal 2XL 0.5 fl oz 10 days	91%	VG	F	5.8%
7	1.5 pt	11 fl oz	None Fb. EC 2 pt 10 days	96%	E	G	7%
8	1.5 pt	11 fl oz	EC 2 pt Fb. EC 4.6 pt 10 days	99%	E	VG-E	15.7% (-1.4”)

<sup>1</sup>DAT: Days after treatment (pre-emergent to onion app). **Weed Control Rating:** E – Excellent; VG – Very Good; G – Good; F – Fair; P – Poor; Fail. When ratings are hyphenated, the first value is the strongest.

**Green** 90% or better weed control.

**Yellow** 50% or less weed control, or greater than 10% onion injury

continued on next page



### PROWL EC vs. H2O

Despite being labeled on onion in New York since 2003, Prowl H2O has only recently been adopted by muck onion growers. Its primary use has been as a safe tank mix partner with Chateau at 1-4 leaf stage, since Prowl EC + Chateau causes excessive injury to onion. In head-to-head comparisons between the EC and H2O formulations of Prowl for weed control, in about 3 out of 5 cases, the EC formulation results in better weed control, especially for marsh yellowcress (MYC) and when soil conditions are moist (Fig. 1). The H2O formulation requires a wetting and drying cycle for it to be activated properly. For example, no difference occurred between EC and H2O on pigweed in 2018 trial (normal spring), but EC worked better than H2O on MYC in 2017 and 2019 (wet spring). Prowl H2O has consistently resulted in less onion injury than Prowl EC.

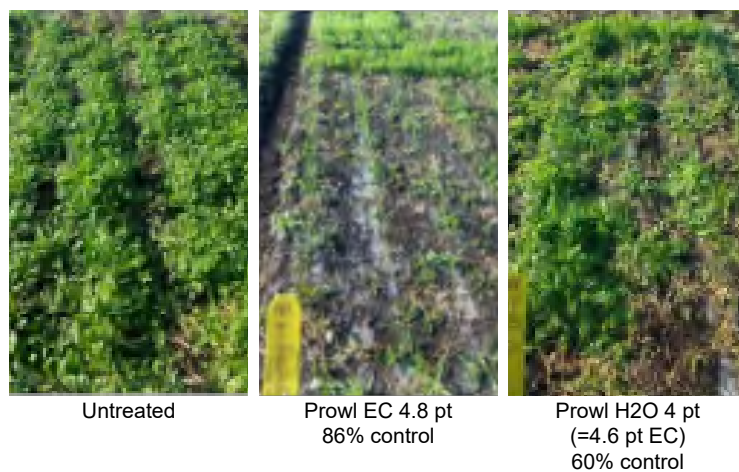


Figure 1. Head to head comparison between EC and H2O formulation of Prowl for control of marsh yellowcress 39 DAT, Oswego, 2017 (Hoepting).

### MANY WAYS TO “PLAY YOUR HAND” WITH PRE-EMERGENT HERBICIDES

Table 2 includes results from 2019 pre-emergent herbicide trial in Oswego for treatments that focused on pre-emergent application combinations for the first and second pre-emergent sprays. The first spray was applied at first sign of onion emergence and the second with barley-kill herbicide 10 days after first spray. Typically, a second application of Outlook and additional applications of Prowl are made after barley-kill. In this trial, we studied different strategies/“ways to play your hand” for the first two pre-emergent herbicide applications. Keep in mind that 2019 was a very wet spring; in fact, this trial was under water at the Oswego Onion Twilight Meeting on June 20th.

- Treatments 1-4 are single “first spray only” applications that included each of Buctril, Outlook and Prowl
  - All resulted in acceptable onion injury (>10%) and greater than 80% control of MYC – impressive!
- By comparison, treatments with Prowl alone resulted in much less MYC control (Prowl EC 4.8 pt - 63%; Prowl H2O 4 pt – 17%) – data not shown.
- Buctril 2EC 12 fl oz + Outlook 12 fl oz + Prowl EC 12 fl oz (No. 3: “12-12-12”) had poorest weed control of these four treatments.
- **Doubling rate of Buctril 2EC to 1.5 pt (No. 4)** improved control of Lady’s thumb (LT) and ragweed (RW) and was just as safe as 12 fl oz rate.
- **Following up with a second application of Prowl EC 1.5 pt 10 days later (No. 5)** was much more effective for achieving desirable control of LT and RW.
- Increasing rate of Buctril and addition of Prowl did not improve MYC control beyond that of 12-12-12 in this study.
- **Higher rates of Buctril 2EC (1.5 pt) and Prowl EC (2 pt) with Outlook 11 fl oz (No. 1)** improved control of MYC by 10% to 92% with similar RW control and crop safety as No. 5, but slightly less LT control.
- **Switching out Prowl EC 2 pt (No. 1) for H2O 2 pt (No. 2)** had notably improved crop safety with no difference in MYC control, but less LT and RW control.
- **Best control was achieved when Buctril 2EC 1.5 pt + Prowl EC 2pt + Outlook 11 fl oz (No. 1) was followed by Prowl EC 4.8 pt with barley kill (No. 8)**, which only left a couple of RW escapes.
  - In the cool wet conditions of 2019, this heavy-handed treatment resulted in 1.4”stunting injury (= 10%), which may or may not be worth the excellent weed control.
- **Another strategy that was almost as effective as Trt. No. 8**, because it was not quite as good on RW, but had much improved crop safety was to **pull Prowl out of the first spray and then apply EC 2pt at barley kill (No. 7)**.
- **A similar strategy which pulled Prowl out of first spray and then applied EC 1 pt with Goal 2XL 0.5 pt at barley kill (No. 6)** resulted in almost as good control as No. 8 and better control than 12-12-12 (No. 1), because the Goal burned off the weeds that escaped the 12-12.

Effects of **multiple pre-emergent herbicide applications are cumulative when they are applied within 14 days** of each other. Reduced weed control with a safer-to-the-onion application (e.g. lower rates and/or fewer products) made pre-emergent to onion can be made up for with the barley-kill application. Ideally, you want to get ahead of problem weeds in the first application. For example, Outlook should be in the first application for best YNS control. Knowing the strengths and weaknesses of Outlook, Prowl and Buctril and your weed pressure will help you strategize how to “play your hand”. ●

# Black Cutworm and True Armyworm Moths Have Arrived in New York

Julie Kikkert, CCE Cornell Vegetable Program, and Brian Nault, Cornell

Last June there was significant feeding by cutworms in vegetable crops across our region, resulting in some serious crop loss in a couple of cases before the grower was aware of the problem. Our field crops counterparts trap these insects starting in early April and have reported that despite the cooler than usual weather there have been significant flights of black cutworm and common armyworm moths in our region in recent weeks (NWNY Team Crop Alert, May 11, 2020). This means that once the weather warms up and we reach roughly 300 degree-days (base 50°F), black cutworm larvae will be large enough to begin clipping young vegetable plants. We will keep track of degree-day accumulations each week and along with the field crops teams, scout fields and report when you should be monitoring your fields more closely. According to Mike Stanyard of the CCE NWNY Field Crops Team, there are no real degree-day thresholds for monitoring common armyworm. It will be roughly 100 degree-days to egg hatch. Read below for additional information on these pests along with control measures.

## BLACK CUTWORM (*AGROTIS IPSILON*)

The larvae feed on newly emerged vegetable crops and often clip many young plants at or below the soil line each night. Crops grown from seed are more prone to damage than transplants. According to R. Groves, Univ. of Wisconsin-Madison, susceptible crops include beets, carrots, cucumber, leafy greens, melons, peas, potato, pumpkin, snap beans, squash, and sweet corn.

Scout fields near any woods or weedy hedgerows that border fields. Look closely for plants that have been sheared off at ground level or areas where plants are not emerging well. There may or may not be cut leaves laying nearby. Cutworms sever young plants near the soil line and pull the plant into the ground as they feed. Severely infested fields last year had beautiful stands of beets that seemed to disappear overnight! If you dig up the cut off plants, you will likely find cutworms in the soil near the base of the plant or just underground. You may also see holes where the worms come in and out of the soil. The larvae are nocturnal feeders, but on rainy days you may see them coming out of their holes and feeding during the day. The larvae curl into a characteristic C-shape when disturbed.

Black cutworm moths fly up from the south and lay their eggs on weeds near field borders. The larvae then crawl to the crop field. Thus, damage can typically be seen near field borders. The best control is to apply an insecticide along the edges of the field where the caterpillars are feeding. It is usually not worthwhile spraying the entire field; however, if cutworm damage is detected deeper within fields, then the entire field could be treated. In a perfect world, insecticides would be applied in late evening or at night so that the chemical would directly contact the caterpillars.

Economic treatment thresholds for black cutworms have been developed for the following crops (Univ. of Wisconsin)

- Snap bean= 2 larvae/row foot
- Potatoes= 4 larvae/row foot
- Sweet Corn= >5% of plants damaged
- Leafy greens= <3% of the stand affected

Several pyrethroid products are labelled in New York for the control of cutworms. Please check the label for your specific crop. For organically grown crops, our current best thinking is that a mixture of azadirachtin and pyrethrin provides the best chance of control. Contacting the caterpillars with the spray might improve efficacy, so spraying in the late evening or night might be beneficial. While Bt's (*Bacillus thuringiensis*) are labeled, the caterpillars must ingest the product and it may not be very effective on large caterpillars.

For more information on black cutworm biology and management: <http://labs.russell.wisc.edu/vegento/pests/black-cutworm/>

## COMMON "TRUE" ARMYWORM (*PSEUDALETIA UNIPUNCTA*) (Information from the NYS IPM program, edited by J. Kikkert)

These insects do not overwinter in New York, rather the moths migrate from the south in the spring. The migrations are sporadic and often difficult to predict from year to year. True armyworms prefer to feed on plants in the grass family such as corn, small grains, pastures and lawns. However, when populations are large and their food is limited, they will feed on legumes and other plants. This was the case with huge populations in 2001 and 2008, with the caterpillars were seen "marching" from field to field and sometimes across roads.

Armyworm moths lay their eggs on weeds or grasses along field margins, corn leaves, or small grains. Larvae hatch about a week later and develop for about three weeks. They feed mostly at night. True armyworm larvae range in size from 1/8 inch to 1.5 inches long. Small larvae appear smooth, cylindrical, and are pale green to brownish. Mature larvae are smooth and marked with two orange and white-bordered strips on each side. The larvae spend their time above ground on foliage, unlike cutworms which spend most of their time underground.

Larvae typically feed on leaves, stripping them down to the midrib. Feeding is generally the worst on field edges or in areas where grassy weeds are prevalent. Many pyrethroids are labeled for control. Caterpillars that are over 3/4 to 1-1/4 inches long are getting ready to pupate and will stop feeding and causing damage. At this point, an insecticide application is not likely to provide much benefit. Subsequent generations are rarely a problem because crops will be larger and not vulnerable to the armyworms.

Recommended economic thresholds for corn:

- seedling: 10 percent or more plants show damage and larvae are still present.
- whorl-stage: apply an insecticide when there are three or more larvae per plant.

More information on true armyworms: <http://blogs.cornell.edu/ipmwpr/true-armyworm-aka-common-armyworm-pseudaletia-unipuncta-in-field-corn/> ●



## Weather Charts

John Gibbons, CCE Cornell Vegetable Program

### WEEKLY WEATHER SUMMARY: 5/5/20 - 5/11/2020

Location**	Rainfall (inch)		Temperature (°F)	
	Week	Month May	Max	Min
Albion	0	0	56	29
Arkport	0	0	56	22
Bergen	0	1	59	27
Brocton	0	0	57	30
Buffalo*	0	0	56	30
Burt	0	0	56	31
Ceres	0	0	58	23
Elba	0	0	56	28
Fairville	0	0	57	29
Farmington	1	1	57	27
Fulton*	0	1	58	30
Geneva	0	0	57	28
Hammondsport	0	0	57	26
Hanover	0	0	57	30
Lodi	0	0	57	26
Niagara Falls*	0	0	58	29
Penn Yan*	0	0	57	28
Rochester*	0	0	58	29
Sodus	0	0	60	29
South Bristol	0	0	56	26
Varick	NA	NA	58	28
Versailles	0	0	58	27
Williamson	0	0	57	30

### ACCUMULATED GROWING DEGREE DAYS (AGDD)

BASE 50°F: APRIL 1 — MAY 11, 2020

Location	2020	2019	2018
Albion	29	74	132
Arkport	19	94	157
Bergen	27	88	123
Brocton	34	111	NA
Buffalo*	29	82	143
Burt	27	56	106
Ceres	17	142	124
Elba	24	77	NA
Fairville	31	80	134
Farmington	31	82	137
Fulton*	35	89	142
Geneva	33	90	143
Hammondsport	30	95	138
Hanover	30	107	139
Lodi	35	107	159
Niagara Falls*	19	61	148
Penn Yan*	34	109	152
Rochester*	32	115	152
Sodus	32	80	132
South Bristol	31	99	150
Varick	38	109	156
Versailles	27	121	135
Williamson	33	70	121

\*Airport stations

\*\* For other locations: <http://newa.cornell.edu>

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# Cornell Cooperative Extension Cornell Vegetable Program

480 North Main Street  
Canandaigua, NY 14424



VegEdge is the highly regarded newsletter produced by the Cornell Vegetable Program. It provides readers with information on upcoming meetings, pesticide updates, pest management strategies, cultural practices, marketing ideas and research results from Cornell University and Cornell Cooperative Extension. VegEdge is produced every few weeks, with frequency increasing leading up to and during the growing season.

## VEGETABLE SPECIALISTS

**Elizabeth Buck** | 585-406-3419 cell | [emb273@cornell.edu](mailto:emb273@cornell.edu)  
fresh market vegetables, weed management, soil health

**Robert Hadad** | 585-739-4065 cell | [rgh26@cornell.edu](mailto:rgh26@cornell.edu)  
farm food safety, organic, business & marketing, fresh market vegetables

**Christy Hoepting** | 585-721-6953 cell | [cah59@cornell.edu](mailto:cah59@cornell.edu)  
onions, cabbage, broccoli, garlic, pesticide management

**Julie Kikkert, Team Leader** | 585-313-8160 cell | [jrk2@cornell.edu](mailto:jrk2@cornell.edu)  
processing crops (table beets, carrots, peas, snap beans, sweet corn)

**Margie Lund** | 607-377-9109 cell | [mel296@cornell.edu](mailto:mel296@cornell.edu)  
potatoes, dry beans, and post-harvest handling and storage

**Judson Reid** | 585-313-8912 cell | [jer11@cornell.edu](mailto:jer11@cornell.edu)  
greenhouses/high tunnels, small farming operations, fresh market vegs

## PRECISION AG SPECIALIST

**Ali Nafchi** | 585-313-6197 cell | [anafchi@cornell.edu](mailto:anafchi@cornell.edu)

## PROGRAM ASSISTANTS

John Gibbons | [jpg10@cornell.edu](mailto:jpg10@cornell.edu)

Angela Ochterski | 585-394-3977 x426

Caitlin Tucker | [cv275@cornell.edu](mailto:cv275@cornell.edu)

Sarah Vande Brake | [sv483@cornell.edu](mailto:sv483@cornell.edu)

Emma van der Heide | [ev247@cornell.edu](mailto:ev247@cornell.edu)

## ADMINISTRATION

Peter Landre | [ptl2@cornell.edu](mailto:ptl2@cornell.edu)

Steve Reiners | [sr43@cornell.edu](mailto:sr43@cornell.edu)

**Cornell Cooperative Extension  
Cornell Vegetable Program**

For more information about our program, email [cce-cvp@cornell.edu](mailto:cce-cvp@cornell.edu) or visit [CVP.CCE.CORNELL.EDU](http://CVP.CCE.CORNELL.EDU)



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