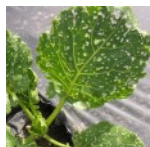




Learn more about Deer Damage Permits and how they may help in population management on your farm.

PAGE 1



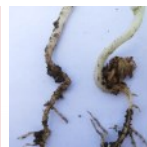
Here's a combination of practices organic crucifer farmers can use to minimize damage to your crops from flea beetles.

PAGE 3



Organic tunnel fertility can prove challenging. We've identified pre-plant and in-season organic nitrogen sources to help prevent mid-season deficiencies.

PAGE 6



The recent cool, wet weather has been conducive to seedcorn maggot feeding and, coupled with slow growth of the plants, has caused some significant crop damage.

PAGE 7

VEGEdge

YOUR TRUSTED SOURCE FOR RESEARCH-BASED KNOWLEDGE

Volume 13 | Issue 6 | May 10, 2017

Cornell University
Cooperative Extension
Cornell Vegetable Program

Radishes grown in greenhouse trays for early sales.
Photo: Judson Reid

Wildlife are Active

Darcy Telenko, CCE Cornell Vegetable Program

We are already hearing reports about deer damage to early planted crops. Keep in mind for deer one of the best tools available is population management. **Shooting** is appropriate for medium to large mammals, birds, reptiles, but requires training and skill and the most viable and cost-effective way to deal with wildlife conflict. Safety concerns and legal restrictions must be always be considered and local, state and federal regulations and ordinances must be followed. For example, in NY it is illegal to discharge a bow or firearm within 500 feet of a building without landowner permission.

Deer Damage Permits (DDPs) may be issued in situations where hunting does not reduce deer populations sufficiently to alleviate these negative impacts.



Evidence of deer damage in transplanted cabbage: reduced stand (left) and deer hoof print (right). Photos: Darcy Telenko, CCE Cornell Vegetable Program

continued on page 3



VegEdge newsletter is exclusively for enrollees in the Cornell Vegetable Program, a Cornell Cooperative Extension regional agriculture team, serving 13 counties in Western New York.

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:
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Help us serve you better by telling us what you think. Email us at cce-cvp@cornell.edu or write to us at Cornell Vegetable Program, 480 North Main Street, Canandaigua, NY 14424.



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Contents

Contact Us

Cornell Vegetable Program 12

Crops

Crop Insights – Our Observations and Recommendations from the Field 05

Crucifers: Managing Flea Beetles on Organic Farms 03

High Tunnels: Nitrogen Fertility Options for Organic High Tunnels 06

Onions: Highlights of Pre-Emergent Herbicide Trial in Direct Seeded Onions ... 08

General

Wildlife are Active 01

Cooperating Farms Wanted! 03

NRCS Soil and Water Conservation Assistance Round 1 Deadline 6/16/17 04

Seedcorn Maggot Feeding is Evident Now 07

Upcoming Events

Baskets or Pallets – Wholesale Market Field Day 10

Elba Muck Donut Hour Every Tuesday 10

Fresh Market Minutes – Every Other Tuesday in Eden Valley 10

Fresh Market Minutes – Every Other Tuesday in Niagara County 10

Baskets or Pallets – High Tunnel Field Day 10

2017 Oswego Muck Onion Twilight Meeting 10

2017 Fresh Market Vegetable Field Day 10

Weather Charts 11

The next issue of VegEdge will be May 24, 2017 and then we will produce weekly issues of VegEdge for the rest of the summer.



A Few Quick Facts about DDPs (source NYDEC <http://www.dec.ny.gov/animals/104956.html>)

- Applications are available to landowners, municipalities or resource management agencies from regional DEC Wildlife offices. Region 8 and Region 9 cover WNY (see below for contact information).
- Eligibility for permits is based on demonstrated impacts and the lack or failure of other practical alternatives to alleviate the problem.
- Permit may be limited to harassment techniques or allow the killing of deer through a variety of non-hunting techniques (e.g. shooting at night, use of bait, or capture-and-kill).
- Relocation of deer from problem areas is not allowed.
- **Taking by permittee and approved agents only.**
- Permits are generally issued for use **before or after open deer hunting seasons.**
- Usually for **antlerless deer only.**
- DEC issues **tags** to permittee for **a limited number of deer.**
- Permit activity limited to lands specified on the permit.
- **Permittee must report all deer taken to DEC.**
- No charge.
- **No application deadline; permit issued when damage warrants it.**

DEC Region 8 Offices

Serving Chemung, Genesee, Livingston, Monroe, Ontario, Orleans, Schuyler, Seneca, Steuben, Wayne and Yates counties

Avon Office: 6274 East Avon-Lima Rd. (Rtes. 5 and 20), Avon, NY 14414-9516
(585) 226-2466 Hours: 8:30-4:45 Monday through Friday

DEC Region 9 Offices

Serving Allegany, Cattaraugus, Chautauqua, Erie, Niagara and Wyoming Counties
NYSDEC Region 9 Main Office: 270 Michigan Avenue, Buffalo, NY 14203
(716) 851-7200

Office hours: 8:30 a.m. to 4:45 p.m., Monday through Friday

License sales: 9 a.m. to 4 p.m., Monday through Friday ●

Managing Crucifer Flea Beetles on Organic Farms

Abby Seaman, Vegetable IPM Coordinator, NYS IPM Program

Organic farmers don't need me to tell them that flea beetles are among the hardest insects to manage in an organic system. In this article I'll outline a combination of practices you can use to minimize damage to your crops.

BACKGROUND

One thing to keep in mind is that most flea beetles we deal with in vegetables feed on a specific crop family; the species that feed on crucifers are not the same ones that feed on eggplant and potato. In crucifer crops, there are two species that cause the most trouble: the crucifer flea beetle (*Phyllotreta cruciferae*) and the striped flea beetle (*Phyllotreta striolata*). Both species cause the same type of pitted or "shothole" feeding damage on the foliage. Both overwinter as adults near where they were feeding the previous fall. They become active when temperatures are above 50° and feed first on cruciferous weeds like yellow rocket or wild mustard. They're very mobile, and once crops are in the ground they can move in and cause damage quickly. Females lay eggs at the base of plants and larvae feed on the roots, producing 2-3 generations per year, with more generations in warmer seasons. Often, the first generation tends to be larger and causes the most damage. Recently we've been seeing significant populations later in the season. Direct seeded and newly transplanted crops are most vulnerable to damage.

Cooperating Farms Wanted!

We know wildlife has wreaked havoc in many crops.

We are still looking for a few more sites to run wildlife research trials. Ideal fields are those that experience yearly damage by birds early in the season (reduced plant populations) and will be planted to cucurbit crops this spring. If you think you have a site that fits and are willing to evaluate a few tools, please contact Darcy Telenko, 716-697-4965 or dep10@cornell.edu ●



Crucifer flea beetles are attracted to and stimulated to feed on plants by mustard oils, which means they are most attracted to spicy crucifers like arugula and mustard, making control on these crops especially difficult, but also offering the possibility of using a spicy crucifer as part of a management strategy. More on that later...

MANAGEMENT STRATEGIES

I think there are two general goals for managing flea beetles that require different approaches. **The first** is to get direct seeded or transplanted long season crops like broccoli or cabbage established and growing through the stage (approximately five leaf) after

which flea beetle feeding is less likely result in reduced yield. **The second** is to prevent feeding damage on leafy greens that makes them unmarketable. The amount of damage you can tolerate depends on your market, of course, but it can be hard to sell greens that are completely riddled with shot holes.

ROTATION

Because flea beetles are very mobile, and have weedy hosts, rotation can delay, but not prevent, flea beetles finding your crop. But consider planting late season crucifers together as a block and planting next season's early crucifers as far away as possible. This can be especially important when using row cover as a management strategy. You don't want overwintered flea beetles to emerge under the row cover!

PHYSICAL CONTROL

On smaller acreage farms row cover provides excellent flea beetle control. Cover as soon as the crop is seeded or planted and think ahead about how you'll manage weeds under the row cover. **Row cover is the only strategy that addresses the goal of preventing damage on leafy greens, especially those nice spicy ones.** Re-cover as soon as possible after harvesting. Row cover can be removed from longer season crops once they are well established.

TRAP CROPPING

As I hinted at earlier, the fact that crucifer flea beetles are more attracted to the spicy brassica crops can be exploited in a management strategy for the less attractive crops like cabbage and broccoli. **Trap crops are not grown for harvest. They're grown to attract flea beetles away from the main crop and concentrate them on a smaller area where they can be killed without spraying the entire crop.** We included glossy collards in a trial several years ago and found that damage was much higher compared with cabbage (see photos). Trap crops that other researchers have found successful include: Pacific Gold Mustard, Pac Choi, and Dwarf Essex Rape. Trap crops can either be planted around the perimeter of a field or at one edge if managing a known source of flea beetles.



Glossy collards (left), serving as a trap crop, showing much more flea beetle damage compared to adjacent plot of cabbage (right). Photos: Abby Seaman, NYS IPM Program

INSECTICIDES

Insecticides can be used to help crops get established or kill beetles on trap crops. They won't provide enough control to prevent damage on spicy leafy greens. We've tested a number of products against crucifer flea beetle on cabbage. Of those we've tested that have been effective, Entrust and Surround both have CFB on the label. Surround leaves a residue so should only be used early in the season and before heading. Products that have not been effective in our trials include Azera, Ecotec, and Neemix. Always use a spreader/sticker to help with coverage and adhesion on those waxy leaves. We use Nu-Film P in our trials.

Additional resources:

[Flea beetle pests of vegetables](http://hdl.handle.net/1813/43272) fact sheet (<http://hdl.handle.net/1813/43272>)

[Managing Cruciferous and Solanaceous Flea Beetles in Organic Farming Systems](http://articles.extension.org/pages/72972/managing-cruciferous-and-solanaceous-flea-beetles-in-organic-farming-systems) (<http://articles.extension.org/pages/72972/managing-cruciferous-and-solanaceous-flea-beetles-in-organic-farming-systems>) ●

NRCS Soil and Water Conservation Assistance Round 1 Deadline 6/16/17

John Whitney, District Conservationist, USDA NRCS; edited by D. Telenko, CCE CVP

The United States Department of Agriculture Natural Resources Conservation Service (NRCS), often in partnership with other agencies and organizations including Cornell Cooperative Extension, continues to provide a wide range of soil and water conservation planning and financial assistance opportunities both for established farming operations and for beginning and historically underserved farmers.

Conservation Technical Assistance (CTA) is available even if farms are not applying for financial assistance. This may include production of resource maps including aerial photography, soils, wetlands and topographic maps. Many farmers and other landowners request financial assistance through USDA Farm Bill programs including: **Environmental Quality Incentive Program (EQIP); Conservation Steward-**

ship Program (CSP or CStwP); Agricultural Conservation Easement Program (ACEP) – both Wetland Restoration and Farmland Protection options; **Conservation Reserve Program and Conservation Reserve Enhancement Program (CRP/CREP)** – administered by the Farm Service Agency with NRCS technical assistance; and Others.

continued on next page

Where to Start - Visiting with staff in the local NRCS office is a good place to start. The NRCS web pages can also be helpful in reviewing assistance opportunities and available practices and payment rates. Select “Programs” from the NRCS web for more details: www.nrcs.usda.gov or www.ny.nrcs.usda.gov.

Application deadlines vary by program and fiscal year (and State). In New York, the federal fiscal year 2018 round 1 ranking deadline for the Environmental Quality Incentives Program general signup will be much earlier than in prior years – **June 16, 2017**.

It is important to get started early both for assessment of resource concerns and to establish applicant eligibility. Local staff in both NRCS and FSA offices

are happy to help with the application process. Farms are also beginning to take advantage of the NRCS **Conservation Client Gateway** for assistance requests, applications, and even management of program contracts and payments once contracts are approved. See www.nrcs.usda.gov/clientgateway. Applications for most programs can be accepted at any time throughout the year. However, applications are typically grouped into different ranking periods with all applications received by published deadlines processed and ranked for funding consideration until available funds are expended before consideration of any applications received after the ranking period deadline. It is rare that NRCS in NY is able to fund “round 2” or later applications in any fiscal year.

In recent years, high tunnel systems have been a popular practice for many smaller operations including the growing number of urban farms in the region. NRCS practice payments rarely cover 100% of the cost and are instead usually around 75% of the regional contractor-assisted cost of practice implementation or Conservation Activity Plan development. Rates may be higher for beginning or historically underserved farmers.

Participation in all conservation programs is voluntary. Participant requirements and eligibility vary by program. Please visit your local NRCS office to help determine which programs may be right for you.

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young plants in attempts to keep from washing away. For those who haven't set out anything in the brassica family yet, be prepared to treat the transplants or seedlings often and with good coverage. If using exclusion netting or row cover, don't wait to cover the newly emerging seedling or transplants for very long. In fact, if transplanting, cover them up every row or half row during the transplant process to keep the beetles from getting on the plants. In one field, I observed FB jumping onto transplant trays that were sitting on the ground while the transplanter was in the field setting out.

ONIONS

Planting is behind schedule due to the region receiving 8-9 inches of rain since the beginning of April. Earliest transplanted onions are looking great at the 4-5 leaf stage and earliest direct seeded onions are at the loop-flag leaf stage. Many acres of onion ground are too wet to get equipment on them; growers are very concerned about getting pre-emergent and barley-kill herbicides on with some fields past due and weed escapes already rushing in.

Missing the first application of the pre-emergent (PRE) herbicide program, which is timed to just before the onions emerge, is fortunately only part of the overall PRE herbicide program. Usually, growers apply 1-2 applications of Outlook, 2-3 applications of Prowl and only 1 app of Buctril. Missing Buctril PRE is only one of the components for broadleaf weed control. In addition to controlling grasses, Prowl and Outlook also provide control of broadleaf weeds, and applications may be made until 45 and 30 days pre-harvest (PHI), respectively. Dual Magnum, is another PRE herbicide option for control of yellow nutsedge, annual grasses and selected broadleaf weeds, which may be applied at the 2-leaf stage until 60 days PHI. Also, Chateau, although typically used for post-emergent control, also provides very good PRE control of broadleaf weeds. Once growers are able to get onto their fields again, they will have to make decisions about which herbicides can/should be applied. For example, newly emerged onions may be too big for Buctril to be applied safely. See article on results highlights from 2016 PRE herbicide trial, page 8. Fortunately, I've (Hoepting) have made a lot of progress during the past couple of years with post-emergent (POST) weed control in my herbicide trials, especially regarding early application timings (onions flag t- 1-leaf), tank mixes and strategies – results highlights will be featured in next issue of VegEdge.

Today, May 10 marks the suggested last day to plant direct seeded onions in New York. Planting later increases the risks of delaying maturity into September, stand reduction due to heat stress when onions are in flag-leaf stage, and reduced bulb size and yield. How it all turns out is highly dependent on the weather and it is certainly possible to produce a decent crop when onions are direct seeded later than May 10th. This year, growers are going for it!

PEPPER/TOMATO

Thrips in transplants. Growers who growing transplants where there are ornamentals are being grown need to be on top of thrip management. If you are buying in transplants and don't know if the place where you are getting them also have ornamentals, assume then that the transplants do. Tomato and pepper seem to be the worst affected so far.

ASPARAGUS

I haven't seen any yet on local plantings though farms in Massachusetts have started seeing damage on spears due to asparagus beetles. Keep a look out for this pest and be on top of it quickly.

BRASSICAS

Flea beetles (FB) are on the rampage in brassicas. Kale, mustard greens, etc. are being hammered pretty hard. The FB seem to be handing on to the

Nitrogen Fertility Options for Organic High Tunnels

Cordelia Machanoff and Judson Reid, CCE Cornell Vegetable Program

It is transplant season for high tunnel tomatoes, particularly on farms that have just completed an early spring greens crop. Now is the time to plan for fertility for the longer season tomato crop. Conventional high tunnel growers can rely on soluble fertilizers which are injected through drip irrigation at a precise rate. However, organic tunnel fertility is more challenging, particularly in regards to long season nitrogen delivery. Most organic nitrogen sources are not injectable and must be applied prior to planting. These often come with unbalanced ratios of other nutrients such as phosphorus, calcium and magnesium. Several years of foliar sampling in high tunnel tomatoes throughout NYS has shown that organic high tunnel tomatoes generally start out with sufficient or even excess nitrogen, but go into a mid-season dive in foliar nitrogen levels.

Given the longer season and higher yields of tunnel tomatoes, a nitrogen fertilizer to inject or side-dress will help prevent mid-season deficiencies. We recommend 125-150 pounds of nitrogen per acre per season for high tunnel tomatoes, so a typical 3,000 ft² (0.07 acre) high tunnel will need roughly 9-11 pounds of total nitrogen. A foliar test result of 4-5% N during vegetative growth and 3.5-4% N during fruiting is ideal. We have developed the charts below as a resource for growers in need of pre-plant and in-season organic nitrogen sources. This includes traditional organic N sources, as well as some newer products. Regular foliar testing to monitor nutrient levels in the crop will inform how the pre-plant fertility is holding up, and whether additional nitrogen is needed. Prices may vary among vendors of the products listed.



Same high tunnel tomatoes that were not supplied with sufficient nitrogen at the beginning of the season (left) and about a month later (right).
Photos: Cordelia Machanoff, CCE Cornell Vegetable Program

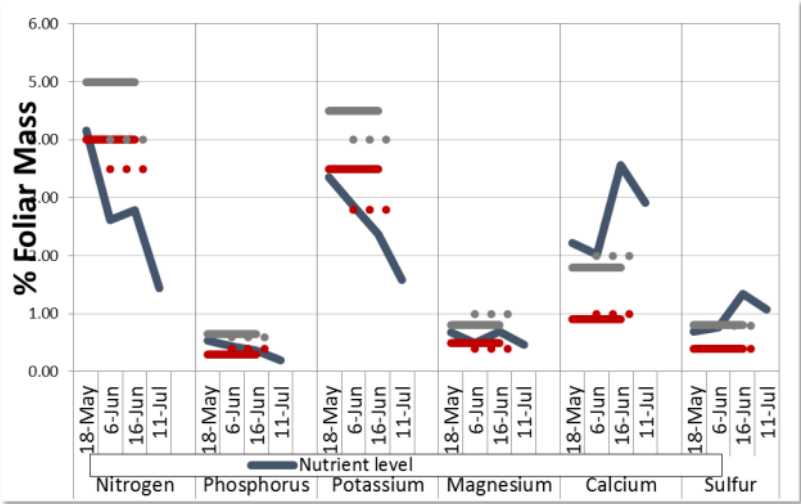


Figure 1. Nitrogen (as well as Phosphorus and Potassium) falls below acceptable ranges, decreasing in foliar samples over the season (horizontal bars represent acceptable levels in vegetative and fruiting stages of tomato crop). In season foliar sampling and fertilizer amendments can prevent these deficiencies.

Table 1. Pre-plant organic nitrogen sources.

Name	Analysis (NPK)	\$ per pound of nitrogen (average)	Release Rate	Notes
Alfalfa Meal	3-1-2 (varies)	\$20+	Medium	Incorporate well into the root zone.
Composted plant material	Variable, usually around 2-1-1	Variable	Slow	Need to test for nutrient content. Will help increase organic matter and improve tilth. Don't rely on it alone for nitrogen.
Feather meal	13-0-0 (varies)	\$8	Medium	Can be hot – incorporate well to avoid hotspots.
Soybean meal	7-1-2	\$13	Medium	Apply 2 weeks prior to transplant to avoid burning plants.

Table 2. In-season organic nitrogen sources.

Name	Analysis (NPK)	\$ per pound of nitrogen (average)	Release rate	Notes
Blood meal	12-0-0	~\$15	Very Fast	Hot, can burn roots. Not soluble (can side dress)
Chilean nitrate (Sodium nitrate)	16-0-0	\$3	Very fast	High salts. If Certified Organic check with certifier prior to use.
Nature's Source	3-1-1	~\$50	Fast	Soluble. Made from oilseed extracts.
Pure Protein Dry	15-1-1	\$200	Fast	Codfish hydrosoluate. Soluble (can be injected)
Verdanta PL-2 (Bioworks Inc)	2-0-6	~80	Fast	New soluble product made of fermented sugar cane. Low salt index. High K.
Ferti-Nitro Plus	13-0-0	\$53	Fast	Soy protein derivative.
Wisgeranic	3-1-1	In development	Fast	Derived from food waste

This work is part of a 2-year project CVP and NOFA-NY are conducting with support from the New York Farm Viability Institute. 🍅

Seedcorn Maggot Feeding is Evident Now

Julie Kikkert, CCE Cornell Vegetable Program

Warm temperatures earlier this spring were conducive to emergence and mating of the first generation of seedcorn maggot flies. Depending on the temperature, the larvae can feed on seeds and seedlings of a variety of crops (sidebar) for several weeks until they pupate and the next generation begins. The cool, wet weather the past few weeks has been conducive to maggot feeding, and coupled with slow growth of the plants has in some cases caused significant crop damage. Locally, we've already seen seedcorn maggot in peas and garlic in the field, while our colleagues in eastern NY have also reported them in flats of vegetables in the greenhouse.

Vegetables Susceptible to Seedcorn Maggot:

Beans
Beets
Cruciferous crops
Cucurbits
Garlic
Onions
Peas
Spinach
Sweet corn

Scout Fields for Damage

Areas of poor emergence or growth may indicate seedcorn maggot injury. Dig up 5 to 10 seedlings or transplants in a suspect area. Infested seeds and stems are often hollowed out. Seeds may be killed and fail to germinate. Infested seedlings are often weak and die. They may have damaged cotyledons or lack a growing point. Onion plants infested early may not emerge, whereas, later damage to pre-bulbing plants may cause misshapen bulbs from which the foliage tends to grow from the side of the bulb. Finding the maggots in association with the damaged tissue is the best evidence. Full grown seedcorn maggot larvae are yellow-white, tough skinned, legless, about ¼ inch long. They have wedge-shaped heads and two black hooks for feeding.

Attack is most severe when cool, moist spring conditions slow seed germination and growth of young plants. Seedcorn maggot adults emerge from overwintering pupae. Mated females fly close to the ground in search of suitable egg laying spots – preferably near decaying organic material or germinating seed to provide a food source for the newly hatched larvae. Eggs hatch 2-3 days after being laid, and the maggots feed on and burrow into the seed and stems. Maggots develop through larval stages for 2 – 3 weeks depending on the temperature. If damaged plants aren't killed outright, the injury provides wounds for plant pathogens to attack, causing root and stem rots to develop.

Prevention is the key to control, because there are no effective rescue treatments. Here is a list of steps you can take:

- Encourage fast germination by planting high quality seeds in a well prepared seedbed at the minimum depth consistent with soil moisture.
- Handle seeds carefully since cracked seed coats can provide entry points for maggots.
- Using transplants may reduce your risk, but maggots can tunnel in stems of young plants, especially if growth is delayed by cold weather after planting.
- Avoid planting in low, wet areas.

- Incorporate crop residues/cover crops 2 to 3 weeks prior to planting.
- Avoid manure applications right before planting as this attracts egg-laying adults.
- Time early plantings to avoid periods of peak adult emergence and/or plant after the first generation maggots have pupated (typically mid-June) as this generation is often most damaging. Degree day models and other methods for estimating fly emergence are described in the references from the University of Wisconsin below.
- Row covers may prevent egg laying and subsequent plant damage, but will not protect crops where pupae are already in the soil.
- Use insecticide and fungicide treated seed to protect seeds/seedlings –see Cornell Vegetable Guidelines for individual crops.
- In-furrow or planter-box insecticide treatments are available in some crops.



Seedcorn maggot feeding on green peas. The seed of the plant on the left has completely rotted away and the stem has extensive tunneling, note larva in the red circle. Damage to the center plant is mostly restricted to the seed. Note the healthy seed and stem of the non-infested plant on the right.

Photo: Julie Kikkert, CCE Cornell Vegetable Program

MORE INFORMATION can be found at

<http://web.entomology.cornell.edu/shelton/veg-insects-ne/pests/scm.html>

<http://labs.russell.wisc.edu/vegento/pests/seedcorn-maggot>

<https://learningstore.uwex.edu/Assets/pdfs/A3972-01.pdf> •

Highlights of 2016 Pre-Emergent Herbicide Trial in Direct Seeded Onion

Christy Hoepting, CCE Cornell Vegetable Program

Trial conducted in hot and dry spring, no annual grass or yellow nutsedge pressure

Results for weed control and crop safety are presented in Table 1. Although it was a hot and dry spring similar to in 2015, the trial was irrigated as necessary and overall weed control was better in 2016. There were no annual grasses or yellow nutsedge (YNS) in the untreated checks. The trial focused on control of broadleaf weeds, particularly pigweed (PW) and annual mustards including marsh yellowcress, wormseed mustard and Shepherd's purse, and there were some Lady's thumb, lamb's quarters, purslane and spotted spurge. The first herbicide application was applied pre-emergent to the onions (PRE) 13 days after planting just as the first onions were beginning to poke through the soil surface. To kill the barley nurse crop, Select EC 1.5 pt was applied with 0.25% v/v LI700 as a maintenance spray over the entire trial (not tank mixed with treatments) when the onions were in the flag+ (first leaf same height as flag) leaf stage.

Outlook – full rate PRE increases injury:

- Full rate applied upfront (trt #17: 21 fl oz PRE) provided better control than split application (trt # 16: 11 fl oz PRE; 10 fl oz flag+) of broadleaf weeds. Suspect that same would be true for control of yellow nutsedge (YNS) – will be trialed in 2017
- Applying full rate upfront resulted in stunting (by 0.8" on Jun-1, 2-leaf onions), similar to 2015, but with less visual injury and no stand reduction.
- Very good control of PW, good control of annual mustards and LQ. In 2015, Outlook resulted in poor to no control of ragweed (RW). Note, Outlook is the only of these three pre-emergent herbicides that has activity on YNS and common groundsel.
- When full rate was applied upfront as part of a program with Buctril 4E 12 pt (trt #22), this treatment resulted in 22% stand reduction and 0.8" stunting in 2-leaf onions, which was still evident at the 5-leaf stage (4.7" stunting), and one of the lowest yields in the trial, similar to 2015 results.

Prowl EC – high rate PRE can cause stunting:

- Excellent control of annual mustards and LQ (better than Outlook), similar to Outlook on PW (good to excellent). Note, in 2015 trial, Prowl EC failed to control RW.
- High rate (4.8 pt) applied PRE and flag+ resulted in 0.7" stunting when onions were in 2-leaf stage, which was still evident at 5-leaf stage (4.6" stunting). These rates did not result in stand reduction.

Buctril 4E – short residual and safe:

- Shortest residual, < 35 days (5 weeks), completely out of gas by Jun-1.
- Full rate (12 fl oz) very safe on the crop
- In 2015, Buctril appeared to be the only herbicide of these three that controlled RW.

Best Program – Split Outlook/Buctril PRE/Prowl EC low rate PRE (trt #18) (Fig. 1a):

- Just as in 2015, this program offered the best combination of weed control (100% in 2016) and crop safety.
- It appears that using lower rates of Prowl EC (2 pt) and Outlook (first half of split app, 11 fl oz) PRE is safer than using full rates of either Outlook (21 fl oz) or Prowl EC (4.8 pt) at this timing, while providing as good weed control.
- In 2015 trial, addition of low rate of Prowl EC at PRE timing appeared to improve overall control of PW compared to treatments without Prowl EC PRE.

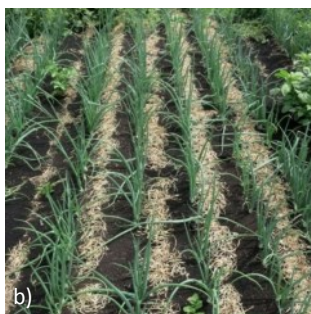
Adding Chateau to the program – excellent weed control, forgiving of injury:

- In previous trials, Chateau 2.0 to 3.0 oz demonstrated impressive pre-emergent control of broadleaf weeds (70 to 90% control).
- In 2016, addition of Chateau 2.0 oz applied at 1-leaf stage to treatment No. 18 (= trt #31) resulted in the highest visual onion injury in the trial (21.5%), 17% stand reduction and 0.8" stunting on Jun-1 when onions were 2-leaf. Stunting (by 4.7") was still evident at 5-leaf stage. This timing of Chateau represented an early application for post-emergent control of weed escapes.
- In 2016, addition of Chateau 1.0 oz PRE and 2.0 oz at 1-leaf to treatment No. 18 (= trt #19) resulted in similar injury as trt No. 31.
- Despite such injury, use of Chateau in these treatments resulted in some of the best weed control in the entire trial (not all data shown) with the second (trt #31, Fig. 1b) and fourth highest yields (trt #19) in the trial.
- Chateau applied PRE resulted in 10% injury to the barley nurse, which was not enough to reduce its effectiveness as a windbreak. Instead, it held growth of the barley back and made it less competitive with the onion seedlings.
- Waiting 1 to 2 days between application of Prowl EC and Select EC (for barley kill) at flag+ before applying Chateau 2.0 oz proved safe. Waiting only 1 hour between applications caused too much onion injury (Fig. 2). This is a worst case scenario with high rates of herbicides on young onions.

Figure 1: Weed control and crop tolerance of best performing pre-emergent herbicide programs in 2017 trial. Photos: Jun-23, 14 DAT 4-leaf (C. Hoepting)



Trt #18: Prowl EC 2 pt + Outlook 11 fl oz + Buctril 4E 12 pt PRE; Prowl EC 4.8 pt flag+ (barley-kill timing) & 4-leaf.



Trt # 31: Trt #18 with Chateau 1.0 oz PRE and 2.0 oz 1-leaf.



Trt # 10: Prowl H2O 4 pt + Buctril 4E 12 pt + Chateau 1.0 oz PRE; Prowl H2O 4 pt + Goaltender 2 fl oz 4-leaf.

Improved crop safety with Prowl H₂O?

- The treatment where Prowl H₂O and Goaltender were tank mixed with Chateau

continued on next page

(trt #21) including Prowl H₂O 4 pt + Buctril 4E 12 fl oz + Chateau 1.0 oz PRE, was one of the safest treatments in the trial and had the highest yield.

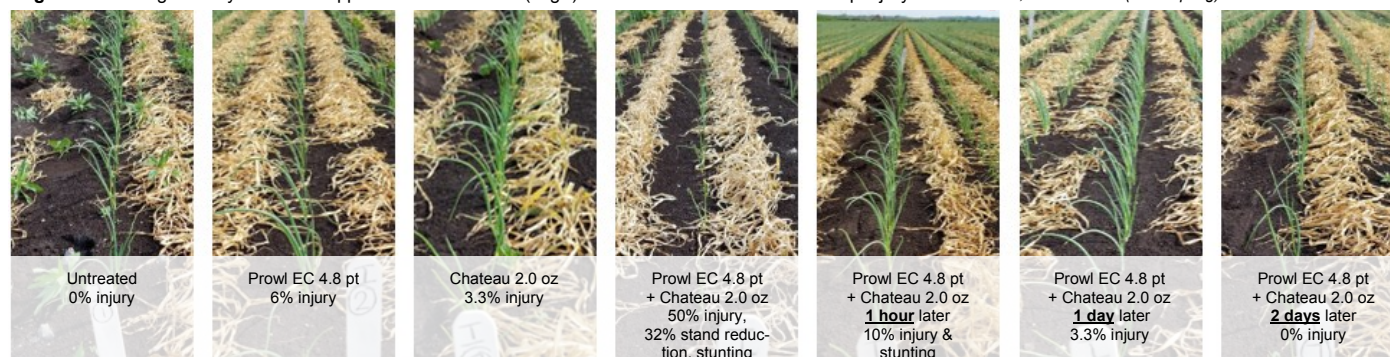
- Although timing of Outlook/Dual Magnum in this trial likely would have failed to control YNS, these results demonstrate the potential for improved crop safety when Prowl H₂O and Goaltender are used with Chateau.

Table 1: Evaluation of pre-emergent herbicides in direct seeded onions (c.v. Gunisen), field trial, Elba, NY, 2016.

Treatment			Jun-1 (14 DAT flag+); onions 2-leaf				Jun-23 (14 DAT 4-leaf; onions 5-leaf)	Marketable yield (lb/24 row ft)
No.	Treatment	Timing to Onions	Overall Weed Control ¹ (%)	Visual Onion Injury (%)	Stand (No. plants/3 ft)	Plant height (inch)	Plant Height (inch)	
18	Prowl EC 2 pt + Buctril 4E 12 pt + Outlook 11 fl oz Outlook 10 fl oz + Prowl EC 4.8 pt Prowl EC 4.8 pt	PRE PRE PRE Flag+* Flag+* 4-leaf	100.0 a ²	5.5 cd	15.8 a-f	6.6 cde	16.1 abc	30.1 (3 rd)
6	Buctril 4E 12 pt	PRE	5.0 g	2.5 a-d	17.7 ab	6.8 a-d	--	--
15	Prowl EC 4.8 pt Prowl EC 4.8 pt Prowl EC 4.8 pt	PRE Flag+* 4-leaf	94.5 a	6.6 cde	16.0 a-f	6.6 cde (-0.7")	12.7 e (-5")	27.3 (8 th)
16	Outlook 11 fl oz Outlook 10 fl oz	PRE Flag+*	67.0 bcd	6.4 def	14.3 b-h (-19%)	6.5 cde (-0.8")	--	--
17	Outlook 21 fl oz	PRE	82.5 ab	6.5 cde	15.8 a-f	5.8 fgh (-0.8")	--	--
22	Outlook 21 fl oz + Buctril 4E 12 fl oz Prowl EC 4.8 pt Chateau 2.0 oz Prowl EC 4.8 pt Prowl EC 4.8 pt	PRE PRE Flag+* 1-leaf 4-leaf 6-leaf	99.5 a	18.8 a	13.6 d (-22%)	5.8 gh (-0.8")	13.1 de (-4.6")	27.2 (9 th)
31	Prowl EC 2 pt + Buctril 4E 12 pt + Outlook 11 fl oz Outlook 10 fl oz + Prowl EC 4.8 pt Chateau 1.0 oz Prowl EC 4.8 pt	PRE PRE PRE Flag+* Flag+* 1-leaf 4-leaf	100.0 a	21.5 a	14.5 b-h (-17%)	5.8 fgh (-0.8")	13.0 de (-4.7")	30.8 (2 nd)
19	Prowl EC 2 pt + Buctril 4E 12 pt + Outlook 11 fl oz + Chateau 1.0 oz Outlook 10 fl oz + Prowl EC 4.8 pt Chateau 2.0 oz Prowl EC 4.8 pt	PRE PRE PRE PRE Flag+* Flag+* 1-leaf 4-leaf	100.0 a	21.5 a	13.8 c-h (-21%)	5.8 cd (-0.8")	14.3 cde (-3.4")	29.5 (4 th)
21	Prowl H ₂ O 4 pt + Buctril 4E 12 pt + Chateau 1.0 oz Prowl H ₂ O 4 pt + Goaltender 2 fl oz Etc. ³	PRE PRE PRE 1-leaf 1-leaf Etc.	92.5 a	8.3 cd	16.0 a-f	7.4 a	18.1 a	31.1 (1 st)

¹Main weed species included pigweed and annual mustards marsh yellowcress, wormseed mustard, Shepherd's purse. ²Numbers in a column followed by the same letter are not significantly different, Fisher's Protected LSD test ($\alpha=0.05$). ³Goaltender 2 fl oz + Chateau 1.0 oz at 2-3 leaf; Prowl H₂O 4 pt + Goaltender 2 fl oz + Chateau 1.0 oz at 4-6 leaf; Dual Magnum 2 pt at 6-7 leaf; Outlook 32 fl oz 7-8 leaf. **Green highlights** indicate best treatments. **Yellow highlights** indicate poor weed control or excessive crop injury.

Figure 2: Waiting 1-2 days between application of Prowl EC (flag+) and Chateau 2.0 oz reduced crop injury. Photos: Jun-6, onions 2-leaf (C. Hoeping)



We continue to strive to improve pre-emergent weed control in onions. In 2017, our trials include:

- Comparison of Prowl EC and H₂O formulations for residual weed control and crop safety
- Incorporating Chateau into PRE program
- Improving crop safety of pre-emergent program
- Improving pre-emergent control of yellow nutsedge
- Development of pipeline herbicides, Zidua and active ingredient bicyclopyrone for improved control of YNS, RW, PW and mustards. ●

UPCOMING EVENTS *view all Cornell Vegetable Program upcoming events at cvp.cce.cornell.edu*

Baskets or Pallets – Wholesale Market Field Day

May 31, 2017 | 5:00 PM - 7:00 PM

Genesee Valley Produce Auction, 8855 County Road 3, Centerville, NY 14029

The Baskets or Pallets series of field days to aide in understanding how to determine quality and grade of agricultural products is co-hosted by CCE Allegany, Erie and Wyoming Counties. The sessions are designed to prepare farms in NY, both beginning and experienced, to enter new markets. Wholesale Market Field Day will review concepts of wholesaling marketing and addressing the importance of quality and uniformity. In addition, we will discuss the importance of tracking products, packaging and overview labeling requirements.

The field days are open to 25 participants; preference given to active or retired NYS Military Veterans on a first-come, first-served basis. COST: \$10/person, veterans may apply for stipend to cover cost of attending. For more info or to apply, contact Lynn Bliven, CCE Allegany County at 585-268-7644 x18 or email lao3@cornell.edu.

Elba Muck Donut Hour Every Tuesday

June 6 - August 15, 2017 | 8:30 AM - 9:30 AM

Elba muck, corner of Transit and Spoilbank, Elba, NY

Meet with Cornell Vegetable Program Specialist Christy Hoepting every Tuesday morning to ask questions and share your observations. Grower experience is combined with research and scouting information for a whole lot of talk about growing ONIONS! Questions? Contact Christy Hoepting at 585-721-6953.



Fresh Market Minutes - Every Other Tuesday in Eden Valley

June 6 - August 29, 2017 | 9:00 AM - 10:00 AM

Across from W. D. Henry & Sons, Inc., 7189 Gowanda State Rd, Eden, NY 14057

New this year! Meet with the Cornell Vegetable Program Specialist Darcy Telenko every other Tuesday morning to ask questions and share your observations in fresh market vegetables. Darcy will be in Eden Valley on the first and third Tuesdays June - August. Questions? Contact Darcy Telenko at 716-697-4965.



Fresh Market Minutes - Every Other Tuesday in Niagara County

June 13 - September 5, 2017 | 9:00 AM - 10:00 AM

Location TBA soon!

New this year! Meet with the Cornell Vegetable Program Specialist Darcy Telenko every other Tuesday morning to ask questions and share your observations in fresh market vegetables. Darcy will be in Niagara County on the second and fourth Tuesdays during the 2017 season. Questions? Contact Darcy Telenko at 716-697-4965.



Baskets or Pallets – High Tunnel Field Day

June 15, 2017 | 6:30 PM - 8:30 PM

CCE Wyoming County, 36 Center St, Warsaw, NY 14569

The Baskets or Pallets series of field days to aide in understanding how to determine quality and grade of agricultural products is co-hosted by CCE Allegany, Erie and Wyoming Counties. The High Tunnel Production session will be an introductory class on growing vegetables in high tunnels. We will cover basics from choosing structure, potting materials and plant varieties through to marketing produce.

The field days are open to 25 participants; preference given to active or retired NYS Military Veterans on a first-come, first-served basis. COST: \$10/person, veterans may apply for stipend to cover cost of attending. For more info or to apply, contact Lynn Bliven, CCE Allegany County at 585-268-7644 x18 or email lao3@cornell.edu.

2017 Oswego Muck Onion Twilight Meeting

June 22, 2017 | Time and Location TBD

This on-farm meeting will provide crucial, in-season research to aid onion growers with their management decisions to keep them profitable. The twilight meeting will emphasize strategies to prevent economic loss from onion pests and weeds. DEC recertification credits will be available. More details soon. Contact Christy Hoepting at 585-721-6953 with questions.



Fresh Market Vegetable Field Day

June 26, 2017 | 9:00 AM - 3:00 PM

CVP Fresh Market Demo Site at Partridge's on the Farm Market
4924 Ellicott St Rd (Rt 63), Batavia, NY 14020

View demonstration plots to exemplify sustainable pest management options for fresh market vegetable production. In addition to the demonstration plots, sessions will be offered throughout the day on weed and disease identification and biology, resistance management, and GAPs/FSMA updates by CVP team members. Regional equipment dealers and industry representatives will be onsite to display equipment and new technology. CCA and DEC credits will be available. Visit <https://cvp.cce.cornell.edu/event.php?id=719> for more info.



Weather Charts

John Gibbons, CCE Cornell Vegetable Program

Weekly Weather Summary: 5/02 – 5/08/17

Location	Rainfall (inch)		Temp (°F)	
	Week	Month May	Max	Min
Albion	2.38	4.03	58	37
Appleton, North	2.59	3.87	56	35
Baldwinsville	2.09	2.95	61	33
Buffalo*	2.17	3.69	53	36
Ceres	1.27	1.87	55	30
Elba	2.09	3.33	55	32
Fairville	1.99	3.11	60	34
Farmington	2.17	3.07	58	33
Gainesville	1.52	2.38	51	30
Geneva	1.93	2.70	60	34
Interlaken	1.83	2.41	62	35
Lodi	1.46	2.09	62	33
Niagara Falls*	2.35	4.16	55	35
Penn Yan*	1.69	2.44	60	36
Phelps	1.64	2.87	60	35
Portland	1.81	2.84	53	36
Rochester*	1.93	2.90	58	38
Silver Creek	NA	NA	54	39
Sodus	1.88	2.96	60	37
Versailles	2.18	3.25	54	36
Volney	2.04	3.46	60	32
Williamson	1.69	2.87	61	36

Accumulated Growing Degree Days (AGDD)

Base 50°F: April 1 – May 8, 2017

Location	2017	2016	2015
Albion	106	47	138
Appleton, North	73	16	99
Baldwinsville	148	63	132
Buffalo	109	69	141
Ceres	141	42	98
Elba	105	20	86
Fairville	123	38	NA
Farmington	136	45	144
Gainesville	93	22	94
Geneva	141	51	147
Interlaken	161	53	NA
Lodi	188	68	172
Niagara Falls	121	66	111
Penn Yan	161	60	155
Phelps	135	46	147
Portland	150	49	129
Rochester	138	61	167
Silver Creek	131	36	107
Sodus	128	35	103
Versailles	155	58	116
Volney	122	NA	NA
Williamson	118	28	94

* Airport stations

** Data from other station/airport sites is at: <http://newa.cornell.edu/> Weather Data, Daily Summary and Degree Days.

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



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