Temperature swings may have played havoc on seed germination in many veg crops, in particular, early sweet corn.

PAGE 1

Do you have cold damaged plants in your high tunnel? Find out how to avoid that in the future and what to do with your damaged plants now.

PAGE 5

Looking at greenhouse tomato diseases, we learn how they spread and opportunities for management.

PAGE 7

Onion thrips have already reached the spray threshold in some upland plantings of transplanted onions. Learn more about how to control this pest.

PAGE 9

VEGEdge

YOUR TRUSTED SOURCE FOR RESEARCH-BASED KNOWLEDGE

Volume 11 | Issue 7 | May 27, 2015

Photo: Darcy Telenko

Cornell University
Cooperative Extension
Cornell Vegetable Program

Extreme Temperature Fluctuations Causing Injury and Poor Stands

Darcy Telenko, CCE Cornell Vegetable Program

The month of May has seen extreme temperature fluctuations just as the pace of planting of vegetable transplants and seeds is picking up. On the 14th and 23rd of May, temperatures dropped into the 30s after a high of 80° temperatures in preceding weeks. This extreme fluctuation in temperature may have played havoc on seed germination in many vegetable crops and in particular early sweet corn. Sweet corn seed requires a minimum soil temperature of 50° for germination and growth with optimum growing temperatures ranging from 60-90°F. Warm temperatures around our region on May 8th and 9th, and again on May 17th and 18th would have promoted rapid seed germination but were then followed by near freezing events. Cold weather can cause poor stand, retarded growth and frost-kill seedlings. Weather data from the NEWA weather stations in Lockport, Buffalo, Arkport and Medina all show similar trends in the extreme heat and cold fluctuations for the month of May (see charts, next page). The green line in each chart is the minimum soil temperature (50°F) for sweet corn germination. This rapid fluctuation may have been extreme enough to differentiate between good and poor sweet corn

Sweet corn stand – foreground has poor stand vs. background with good stand, planted days apart. *Photo: Darcy Telenko, 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 11 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:
CCE Cornell Vegetable Program
480 North Main Street, Canandaigua, NY 14224
Email: cce-cvp@cornell.edu

Web address: cvp.cce.cornell.edu

Editor
Carol MacNeil

Contributing Writers
Robert Hadad
Christy Hoepting
Julie Kikkert
Carol MacNeil
Judson Reid
Darcy E. P. Telenko

Publishing Specialist/Distribution/Sponsors
Angela Parr

VegEdge is published 25 times per year, parallel to the production schedule of Western New York growers. Enrollees in the Cornell Vegetable Program receive a complimentary electronic subscription to the newsletter. Print copies are available for an additional fee. You must be enrolled in the Cornell Vegetable Program to subscribe to the newsletter. For information about enrolling in our program, visit cvp.cce.cornell.edu. Cornell Cooperative Extension staff, Cornell faculty, and other states' Extension personnel may request to receive a complimentary electronic subscription to VegEdge by emailing Angela Parr at aep63@cornell.edu. Total readership varies but averages 750 readers.

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.

Cornell University
Cooperative Extension
Cornell Vegetable Program

Contents

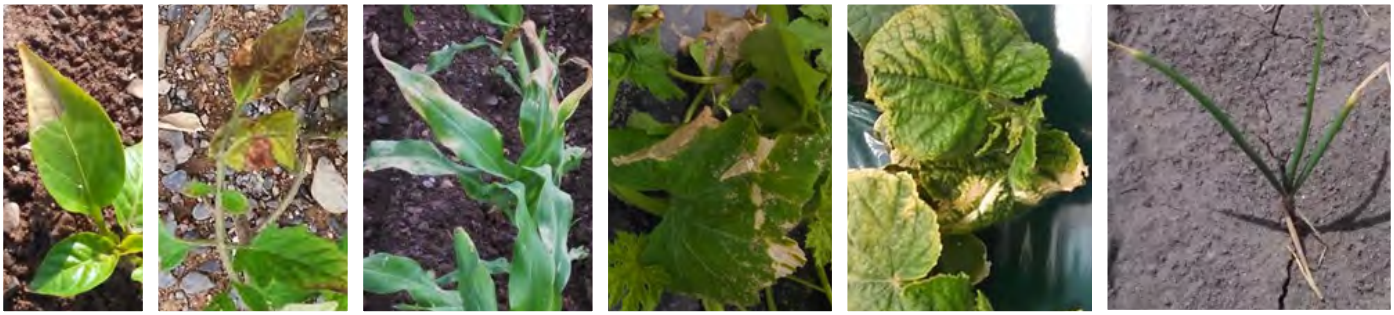
The next issue of VegEdge will be produced June 3, 2015.

NYS Dry Bean Industry Research Awards, 2015-2016

Marc Smith and Shelly Cowles, Cornell

The NYS Dry Bean Industry Committee met March 18th after the educational meeting in LeRoy, to make decisions on funding dry bean research proposals.

Researcher Name	Title	Award
Bellinder, Robin	Evaluating Weed Management Programs in Zone-Till Dry Beans and New Herbicide Evaluations	**$4,700**
Griffiths, Phillip	Breeding, evaluation and development of dry bean varieties that are highly adapted to NYS growing environments and markets	**$14,000**
Hamlin, Amie	Healthy School Food	**$2,000**
MacNeil, Carol	Determine the magnitude and distribution of Western Bean Cutworm, and the Risk to Dry Beans, in the Major Production Area in New York (continuing project)	**$2,759**
MacNeil, Carol	Comparison of new and standard dry bean varieties in an on-farm strip trial (new project)	**$3,281**
Pethybridge, Sarah	Tackling white mold from the ground-up	**$10,000**
		$36,740



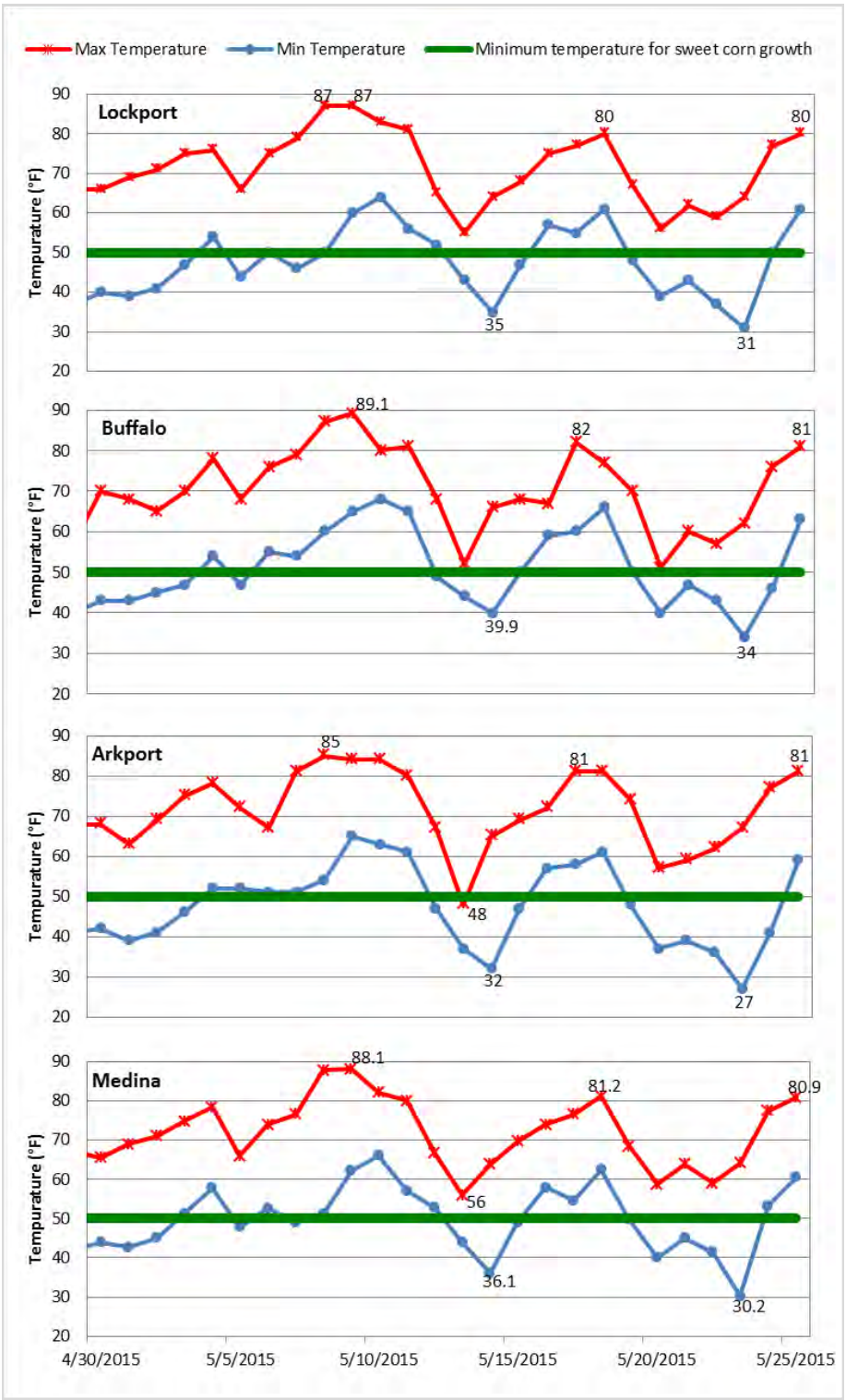
Cold damage to pepper, tomato, sweet corn, squash, cucumber, and onion leaves. *Photos: Darcy Telenko, Cornell Vegetable Program*

populations planted days apart. The soil temperature would not have fluctuated as rapidly as the air, but if a small seedling is just breaking through the warm soil surface and is greeted with 31°F night air, it may have been enough to frost-kill it, leading to some spotty stands similar to the ones we are encountering in various fields. The cold may not be the only problem, particularly with sweet corn planted under plastic – some areas may have experienced heat damage with high temperatures under the plastic – leaf scorching may be a result. In addition, many sweet corn plantings in our region have experienced both sets of high and low temperature fluctuation events causing sweet corn growth to be uneven from week to week.

Even more vegetables were in the ground for the latest round of low temperatures and visible damage can be seen in the more sensitive crops. Luckily, very few vegetables were lethally damaged. See above for a number of photos of how the frost injury may appear in different crops.

With our ever changing weather forecasts, it is probably best to continue to hedge your bets by using multiple planting dates, on and off plasticulture as we race to pick the first fresh vegetables of the season.

Also see Cold Damage in High Tunnels, page 5.



CROP INSIGHTS

CABBAGE AND COLE CROPS

Despite the roller coaster ride of temperatures this past month, it seems that the hot and dry weather is winning out and driving insect pests in Cole crops including flea beetles, onion thrips and imported cabbage worm. The first generation of cabbage maggot is occurring now with untreated plants becoming infested and eggs being found (Fig. 1) – *see last issue of VegEdge for control options.*

Figure 1. Early aboveground signs of cabbage maggot include wilting and loss of turgor. If seen, look for cabbage eggs (bright white) in crevices in the soil along the stem at the soil line. *Photo: Christy Hoepting, CVP*

Figure 2. Early signs of flea beetle: shot hole feeding and tiny shiny black beetles. *Photo: Christy Hoepting, CVP*

Figure 3A. Newly hatched imported cabbage worm from single bullet-shaped egg. *Photo: Canadian Phytopathological Society*

Figure 3B. ICW worm: green and fuzzy, sluggish when prodded. *Photo: A. Bryant, Michigan State Univ.*

Flea beetles (FB) are especially problematic on Asian crucifers. When FB reach 1 beetle per plant at the 6-8 leaf stage, 50% infested during the cotyledon stage, or at the first signs of shot hole feeding damage, the crop needs to be sprayed (Fig. 2). Any of the labeled pyrethroids (i.e. Baythroid XL, Brigade, Warrior, Hero, Mustang MAXX and their generics), Sevin, or neonicotinoid pre-mixes with a pyrethroid including Voliam Xpress, Endigo and Leverage may be used. Soil applications of Platinum (neonicotinoid) or Verimark (diamide) provide longer residual control. Spun-bounded row covers can also be used to protect from FB, which will also protect against cabbage maggot, but the trick is that they need to be applied before the FB get there and the edges need to be sealed tightly. Organic chemical options include Entrust, which has a 2(ee) label for suppression of FB. Abby Seaman, NYS IPM, found that both Surround and hot pepper wax worked as well as Rotenone, the old standard for FB, at protecting seedlings from lethal attacks of FB. They will not prevent enough feeding for greens to be marketable, but they will prevent enough feeding for broccoli, cauliflower, cabbage, etc. to outgrow the damage. Other organic chemical options include Mycotrol O, azadirachtin (various products including Aza-Direct, AzaGaurd, Neemix, Molt-X and other brands) and Pyganic (see labels for crops and rates). Frequent scouting and retreatment will be required and under heavy flea beetle pressure you may only get some suppression.

Imported cabbage worm (ICW) butterflies, eggs, and worms of all sizes were found this week (Fig. 3). Sprays are not needed until larvae start to feed on 20% of the plants. Look for tiny larvae feeding on the undersides of the leaves where they hatched. ICW larvae are sluggish when prodded, unlike diamondback moth larvae, which wriggle and hang from a silk thread. Look for ICW eggs, which are bullet-shaped, stand on end and go from off-white when newly laid to dark yellow when they are ready to hatch. They are laid singly mostly on the undersides of leaves, especially on plants along field edges. If you see the yellow cabbage butterfly ICW adults flying about, you should check your plants for eggs and larvae. All of the materials labeled for flea beetles, except for Platinum will also control ICW. They will also control onion thrips.

FRESH MARKET VEGETABLE

Insect activity is on the rise. All stages of imported cabbage worm (egg, larval, and adult) were noted in cabbage and broccoli plantings across the western part of the state. There are a few hot spots with flea beetle feeding and adult thrips have moved in on some onions and cabbage. Striped cucumber beetles are also out an about on early planted squash.

The weekend frost has only nipped most fresh market vegetable crops in the field and they seem to be growing past the damage, especially with the warm weather and water (rain and/or irrigation). Cucumbers seem to have been the most sensitive.

Keep an eye on crops under plastic – with the increase in temperatures and a little moisture – conditions are perfect for fungal and bacterial diseases. Powdery mildew and angular leaf spot are a few diseases that are starting to appear. Opening up the plastic and allowing the plants to dry out may help knock back these diseases so we won't have early epidemics reducing fruit quality.

Weeds are popping up everywhere – don't let them get away. Remember the small thread and seedling stages are the best times to control weeds both mechanically and chemically. Most herbicides will list effective size range and if the weeds exceed that range herbicide effectiveness will be limited.

ONION

Turbulent temperature extremes and high winds during the last two weeks of May created stressful conditions for the onion crop. For the most part, the crop has hung on: struggling transplants planted into bone dry soil have somehow managed to put down roots and begun to green up, and barley nurse crops strategically protected seedlings from wind damage. Unfortunately, in other fields, poor emergence, over-grown barley and/or heat stress has caused thin and stunted stands. Early transplanted onions are in the 8-leaf stage, and early direct seeded crops are just starting their third leaf with the majority of the direct seeded crop in the first leaf stage with the barley dying. The hot and dry conditions have also been favorable for onion thrips, especially in upland transplanted onions. ***Growers should scout their transplanted onions with 4 leaves or more for onion thrips*** – *see article, page 9.* Muck Donut Hour begins June 2 – *see page 10.*

POTATO

Frost and even freezing hit many parts of the CVP region. Small potato plants from healthy seed pieces are very tolerant of some foliage loss from frost or Colorado potato beetles, and typically grow back rapidly. If your potatoes lose foliage, no extra

continued on next page

continued - CROP insights

nitrogen should be needed unless you were in one of the few areas that got a drenching 3-4+ inch rainfall, then apply it before the crop reaches 8" tall.

If you didn't use an insecticide on the seed or at planting, note that Colorado potato beetles (CPB) adults will be emerging with the hot weather. They are most likely to appear first in fields, or adjacent to fields, where potatoes/tomatoes/eggplant were last year, and adjacent to hedgerows. Control isn't needed unless the population exceeds 1 CPB adult/plant and/or defoliation reaches 30%. Spot, edge treatment early in the field infestation is preferred. For adult CPB, Avaunt + PBO (piperonyl butoxide at 0.25 lb active ingredient/acre), which significantly improves activity, is suggested by entomologist Russ Groves, U WI. Beetles quickly stop feeding but take a few days to die. For organic fields there are no effective sprays. Rotation some distance from last year's fields, thick straw mulch, trench trapping, or row cover, prior to infestation, or hand picking, bug vacuums, or flaming to kill CPB (and not burn plants), after infestation, are suggested.

NOTE! If you have a high population of CPB adults emerging, and you did not use an insecticide on the seed or at planting, please contact Carol MacNeil at 585-313-8796 ASAP. Entomologist Brian Nault, Cornell – Geneva, needs to collect thousands of live adult CPBs for researching control.

SWEET CORN

Sweet corn plantings are doing well except for areas where seed has been trying to germinate. Seeing irregular germ rates and fields with a lot of skips. A couple of plots had significant corn flea beetle pressure on the seedlings.

There had been some conversation among university vegetable specialists in the Midwest about catching corn earworm moths in traps in early May. In fact, some earworms had been found feeding in strawberries. With the heavy winds out of the west/southwest, it may not be surprising that we end up with an early population. It seems like they are showing up earlier each year for us in WNY.

TOMATO

The Eastern NY Commercial Horticulture Program, in their last newsletter, observed what looks like bacterial speck on tomato. Young developing fruit can be severely affected by this disease. This is something we should be on the lookout for if there are cool nights with heavy dew or prolonged leaf wetness. Preventative copper sprays can be used following the label's directions for timing of applications.

Cold Damage in High Tunnels

Judson Reid, CCE Cornell Vegetable Program

Multiple plantings of tomatoes in high tunnels were damaged by freezing temperatures last week. In Cornell Vegetable Program research we have documented that a single layer of polyethylene can actually create colder temperatures than ambient air (Chart 1). This makes emergency heat and row covers essential for high tunnel tomato production. **If a forecast calls for temperatures near freezing, high tunnels are high risk.**

What do to with damaged plants? If they are still alive the best approach is to continue to water and fertilize, and if practical, prune out damaged tissue. Botrytis Gray Mold can overtake this dead tissue leading to further fruit infection and yield loss. Ventilation and appropriate fungicides such as labeled copper materials or Scala SC (1 D PHI, ventilate for at least 2 hrs after application) can help control Botrytis outbreaks after freeze damage.

Low tunnels are essential to high tunnels. *Photo: Judson Reid, Cornell Vegetable Program*

Freeze damaged tunnel tomatoes. *Photo: Judson Reid, Cornell Vegetable Program*

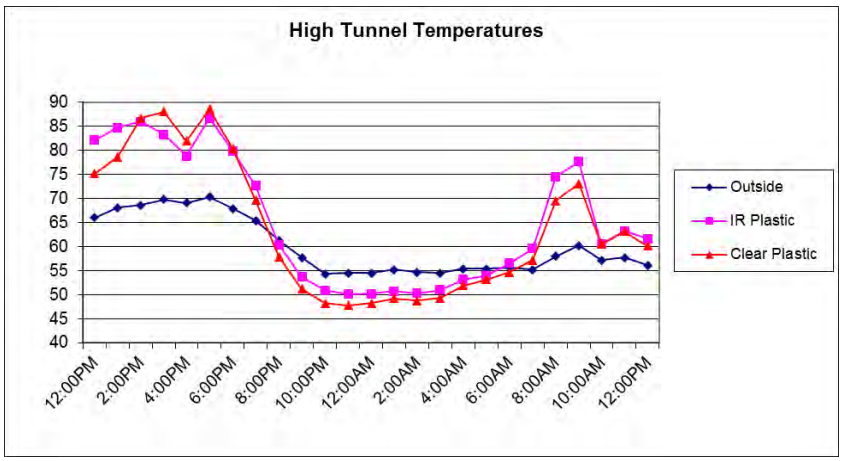


Chart 1. Spring time tunnel temperatures can dip below outside if row covers or heat aren't used.

Late Blight Risk

Carol MacNeil, CCE Cornell Vegetable Program

Late blight (LB) Blitecast severity values (SV) have begun to accumulate since May 13, the date of 1st potato sprout emergence on the muck in Wayne County in the CVP area. *Check your potato cull piles NOW to be sure they're covered with at least 2 ft. of soil! Culls need to be buried, fed to livestock, etc. ASAP so they don't serve as a source of LB for your potato or tomato crop.*

If within 30 miles of you, the 1st potato sprouts from culls/volunteers/seed emerged, or 1st southern-grown tomatoes were set out, earlier/later than May 13, use your local 1st emergence date to begin counting LB SVs. Within a week of accumulating 18 SVs, LB spores from those first potatoes/tomatoes could be in the air, traveling on winds up to 30 miles. While most weather stations have only accumulated a few SVs, the Elba and Arkport stations could reach 18 SVs during the next week. Once 18 SVs are reached in an area growers have a week to get a fungicide spray on all potatoes 4+ inches tall, and on all field tomatoes. (A copper fungicide applied to tomatoes for bacterial diseases counts as the first spray, though its residual is shorter than chlorothalonil or mancozeb.)

Allegany County Alert! Last year new strains of LB were detected in Allegany County and western Steuben County. It was determined last winter in plant pathologist Bill Fry's lab, Cornell, that they originated from the crossing of A1 and A2 LB Mating Types. This means that LB oospores may have over-wintered in the soil, to date a very unusual occurrence in the U.S. In addition to destroying all potato culls and volunteers from last year, growers in this area should scout potatoes and tomatoes carefully in the first few weeks for signs of foliar or stem infection. This could occur anytime, well before 18 LB SVs are reached, since oospores in the soil infect plants directly. If you see suspicious symptoms, contact a Cornell Vegetable Program Specialist or Technician, or Carol MacNeil at crm6@cornell.edu or 585-313-8796.

For a tally of LB SVs for many locations, and to set a different 1st emergence date, see: http://newa.cornell.edu/index.php?page=potato-late-blight (or the Tomato Page Blitecast link). Select the closest weather station, a first emergence date, and click on Get Report. To compare the weather station with your farm (distance, elevation, topography, etc.) check out the station specs at: http://newa.cornell.edu/index.php?page=station-pages To find out about getting your own Northeast Climate Center/LB forecast-compatible weather station go to: http://newa.cornell.edu/index.php?page=get-weather-station

After the first LB spray is applied, the Simcast forecast, part of the internet-based LB Decision Support System (DSS), should be used since it is much more site-specific and accurate than Blitecast. More on the DSS next week!

Why Healthy Soil is 'Water in the Bank'

Ron Nichols, Natural Resources Conservation Service, 5/12/15 (from the Cornell Soil Health Blog (https://blogs.cornell.edu/soilhealth/)

While most look to the sky for drought relief, an increasing number of farmers are looking to the soil. And for good reason: Healthy soils capture and store much more water – which can come in handy during dry spells. "Organic matter and living organisms provide the foundation for soil to function properly, allowing it to take in, store and deliver water to plants, among many other benefits," said NRCS' Soil Health Division Director, Dr. Bianca Moebius-Clune, formerly Crop & Soil Science, Cornell. "Organic matter causes soil to form stable soil aggregates, or crumbs," she said. "With better soil structure, infiltration of water into the soil improves, which allows the entire soil profile to take in and hold more water when it rains." Healthy soil acts much like a sponge, with its ability to absorb and hold much of its volume in water. In healthy soil, earthworms, arthropods and decaying roots create "macro-pores" into which water can flow, to then be stored in the soil. "Bacteria, fungi and other soil life build and stabilize smaller 'micro-pores' that further increase the soil's capacity to hold water," Moebius-Clune said. Plowing or tillage actually reduces the capacity of the soil to receive and hold water over time, according to Moebius-Clune. "That's because tillage destroys soil aggregates and the biologically produced glues that hold soil aggregates together," she said. "This results in the collapse of those aggregates and the pores between them, which leads to compaction, crusting, and increased run-off, all of which decreases the amount of water that enters the soil profile to be stored and used by crops." But Moebius-Clune said there's good news and a new hope in healthy soil. "By farming using soil health principles and practices adapted to each local production system, such as reducing tillage, growing cover crops and diversifying rotations farmers are actually increasing microbial activity and building organic matter in their soil," she said. "They are improving its ability to take in and hold 'water in the bank.' They're even creating wildlife and pollinator habitat—all while decreasing risks from extreme weather and harvesting better profits and often better yields." All of us can take those soil health benefits to the bank. - See more at: http://blogs.usda.gov/2015/05/12/a-hedge-against-drought-why-healthy-soil-is-water-in-the-bank/#sthash.cpQMllEV.dpuf

Greenhouse Tomato Disease Distribution

Judson Reid, CCE Cornell Vegetable Program

This spring we have witnessed the distribution of diseases from transplant greenhouses to other farms via infected plants. Looking at the diseases we learn about how they spread and opportunities for management.

Impatiens Necrotic Spot Virus (INSV) affects a wide distribution of ornamentals, but can also infect tomatoes and peppers. We watched this disease hopscotch from greenhouse to greenhouse with the movement of seedlings. The virus is spread by Western Flower Thrips. A greenhouse and produce farm with virus problems in 2014 kept some greenhouse space warm throughout the 2014/15 winter. There was likely a small population of thrips overwintering in this space which were able to perpetuate the disease when seedlings were started in January for greenhouse tomato production. Moving along the chain from seedling greenhouse to transplant facility very minor levels of thrips were detected, however plant stunting and veinal necrosis occurred sporadically in the final production greenhouse. Some plants exhibited diagnostic ringspots, and an ELISA test eventually confirmed INSV.

Powdery Mildew of tomatoes is caused by several fungi, but in this case likely *Oidium lycopersici.* This appears similar to the powdery mildew of cucurbits but is a different fungus and does not cross-infect. In 2014 an ornamental greenhouse decided to grow out tomatoes in containers in unused summer space. By late fall these plants were completely overcome with powdery mildew. Again, a small portion of the facility was kept heated over winter. In the Spring of 2015 transplants from this facility were distributed to other greenhouses, with Powdery Mildew soon developing in those sites.

With more growers combining vegetables and ornamentals, we may see more of both of these diseases in the future. The following table lists some options for preventing and managing these diseases, giving us insight into the differences between an insect vectored-virus and an environmentally influenced fungal disease.

MANAGEMENT TECHNIQUE	INSV	POWDERY MILDEW
Shut Down (freeze out) greenhouse	X	X
Scout and Control Thrips	X	
Apply labeled fungicides		X
Increase ventilation (decrease relative humidity)		X
Separate ornamentals from vegetable transplants	X	

MilStop (potassium bicarbonate, OMRI listed) is labeled for control of Powdery Mildew on greenhouse tomatoes. A number of thrips controls are available including biological controls, OMRI listed materials such as Molt-X and conventional insecticides. Remember that virus infections are systemic in a plant and not controlled with fungicides.

The combination of ornamentals and tomatoes in a greenhouse increases the risk of diseases such as INSV in tomatoes, while the additional shade and higher relative humidity favor powdery mildew. *Photo: Judson Reid, Cornell Vegetable Program*

INSV on tomato. *Photo: Judson Reid, Cornell Vegetable Program*

Powdery mildew on greenhouse tomato. *Photo: Judson Reid, CVP*

New organic tomato greenhouse. Modern greenhouse designs have increased light and ventilation, reducing the environmental conditions that favor powdery mildew. *Photo: Judson Reid, CVP*

Cucurbits: Using Imidacloprid Applications for Striped Cucumber Beetle Control

Chuck Bornt, CCE Eastern New York Commercial Horticulture Program; Weekly Vegetable Update, 5/22/15

I know some early summer squash has gone in the ground this week and the next couple weeks we will really get geared up for direct seeding and transplanting the majority of our winter squash and pumpkins, so it's time I dusted off the figuring out rates article for using imidacloprid (Admire Pro, Advise etc.) for striped cucumber beetle control (SCB).

First and foremost, I know that many of you have been using the FarMore treated seeds for SCB control. This product has been working very well when you are direct seeding the crop. However, in many cases for early summer squash or even pumpkins and other crops we might be using transplants, you should not be relying on FarMore to give you control once you move those plants to the field. Why? The activeingredient in FarMore for SCB has a residual of about 2 –3 weeks. Therefore, most of your transplants are older than that when they are planted so there will be no control once they are planted, which is why you need to either scout aggressively after transplanting or apply another treatment before planting.

Second, you need to know what formulation of imidacloprid you are using. Imidacloprid has many different brand names now including Admire Pro Systemic, Advise, Widow, Alias, etc. However, you need to carefully read the label to make sure that the application you want to use is actually labeled for that use!

Third, you need to be very aware that the percent or amount of active ingredient may vary from product to product so you need to adjust rates accordingly. For example, Admire Pro Systemic (4.6 lbs per gallon) has over twice as much active ingredient in it than Advise 2F (2.0 lbs per gallon).

Most of the labels allow a "Planthouse Application" and I think it is easiest is to apply it to the transplant flats a day or two prior to transplanting. Use a very low rate (0.02 ml/plant of a imidacloprid 2F or 2 pounds AI per gallon formulation) to treat transplants about 1 day prior to planting in the field. It can be applied with a backpack sprayer, Dosatron or other injection watering system or with a watering can. To determine the amount needed, multiply the number of plants in your flat x .02 ml. Then multiply that number by the number of flats you have to plant. You need to use enough water to sufficiently soak to soil mix evenly. Be sure to rinse the plants off after the application so that the imidacloprid gets washed into the soil. It needs to be taken up by the roots to be most effective.

Remember, know your formulation - if you are using Admire Pro, the recommend rate is 0.44 fluid ounces (13.2 ml) per 10,000 transplants (note this is the rate for controlling aphids and whiteflies in cucurbit transplants. It is not labeled for control of SCB as transplant treatment). When measuring out this small amount of product it might be handy to have a couple different sized syringes on hand that measure in milliliter (ml). Also remember that if you don't have a syringe that has ml on it, 1 milliliter is equal to 1 cc.

If you are using plastic mulches with drip tape, you could use the drip system to apply the imidacloprid. However, it may take a couple of days for the plants to recover from transplant shock and reached the material leaving them vulnerable to insect attack. If you decide to use the drip system, be sure you have all the appropriate back-flow preventers on your system. I would calculate the rates based on the acreage you have under plastic the same way you determine fertigation rates. For example, if your bed spacing is 7 feet, divide 43560 by 7 feet to get 6,223 linear ft per acre. If your plastic width (the area covered by the plastic) is 2.5 feet, multiply your linear ft of 6,223 x 2.5 ft = 15, 558 square ft per acre. To convert this back to acres, divide 15,558 by 43,560 sq ft. per acre to get 0.36 acres. Using the 24 ounce per acre rate of imidacloprid, multiply 24 ounces per acre x 0.36 acres for a total of 8.6 ounces of imidacloprid to mix and inject into the system.

A third option for transplants would be to use it in the transplant water if you are using a water-wheel transplanter. Note that there is the same concern as with the chemigation that is the plants may take a couple of days to recover from transplant shock which may slow-down the uptake. Again, I'm sorry to say that there will be math included here as well! The key here is knowing how much water you apply to each transplant, how many transplants you can plant per tank of water and how much acreage you cover per tank.

For example, if your bed centers are 7.0 feet apart, divide 43,560 sq. ft. by 7 ft =6,223 linear feet per acre. Take 6,223 row feet and divide it by the number of plants you would plant per acre. If you are using 6 ft spacing between plants, you would divide 6,223 linear feet per acre by 6 ft plant spacing to get 1,037 plants per acre. Next, determine the amount of water you are putting out with your transplanter. Typically, most growers use about 4–6 fluid ounces of water per each hole punched. If you are averaging 6 fluid ounces of water per hole, take 6 fl oz and multiply it by 1,037 holes per acre and you will be using about 49 gallons of water per acre (=6,223 fl oz divided by 128 fluid ounces per gallon). If your water-wheel holds 200 gallons, then you would average about 4 acres per tank.

Now to determine the imidacloprid rate: We can use the same rates as we determined for the transplant trays:. The rate of 0.02 ml per plant was found to be adequate for the control of SCB in research trials. So, in this case multiply the number of plants per acre by .02 ml or 1,037 x 0.03 ml = 21 ml per acre. You know that in this example

continued on next page

your tank will cover roughly 4 acres so you would add 84 ml (4 acers x 21.0 ml imidacloprid per acre) or 2.8 fluid ounces (84 milliliters divided by 29.6 ml per fluid ounce). By plugging in your own spacing information, how much water you use in each hole and how much water your tank holds you can figure out how much imidacloprid to add to each tank.

In-furrow application for direct seeding: Research conducted with 2F formulations of imidacloprid has shown that 1.1 ounces per 1,000 feet of row is adequate for striped cucumber beetle control. To determine the per acre rate at different spacing's,take 43,560 square feet (the number of square feet in one acre) and divide it by your between row spacing. Take that value and divide it by 1,000. Finally, take that number and multiply it by 1.1 fluid ounces and that is the number of ounces you need to treat one acre. For example, if you plant your Jack-O-Lanterns on 10 foot centers, then you would take 43560/10 = 4,356 row feet. Divide that by 1,000 row feet: 4,356/1000 = 4.4 (this is the number of 1,000 row feet per acre per your spacing). Then take 4.4 and multiply that by 1.1 ml imidacloprid per 1000 feet = 4.8 ounces of imidacloprid 2F per acre. Most growers are aiming to apply their imidacloprid in between 5 and 10 gallons of water per acre. If you have Admire Pro, essentially you will use half that rate (2.4 ounces per acre).

Again I cannot stress the importance of knowing what formulation of imidacloprid you have! If you need help please feel free to give me a call and I will do my best to help you determine what you have and how much you need to use!

Onion Thrips Breaking Spray Threshold in Upland Transplanted Onions

Christy Hoepting, CCE Cornell Vegetable Program

It's not even June yet and onion thrips (OT) have already reached the spray threshold in some upland plantings of transplanted onions. Onion thrips were also found in several fields of transplanted onions in Elba and Wayne County muck lands, although not yet at threshold. **The threshold to spray onions for onion thrips is <u>1.0 onion thrips per leaf.</u> At this time, the majority of the thrips are adults (Fig. 1).** Thrips feeding reduces the photosynthetic capacity of the onion plant, which can reduce yield and bulb size by 30% or more. If thrips build to greater than 1.0 OT per leaf, they can quickly become challenging to control with insecticides. If they are sprayed too much before the spray threshold is reached, it is an inefficient use of insecticides and prolongs the spray season; with only a handful of effective products with limited usage, you could burn through the spray program before the thrips spray season is over. Or, if you are relying mostly on pyrethroids, as many small-scale growers do, starting to spray too early increases the risk that OT will develop resistance. Both scenarios can lead to poor control of thrips by the end of the season.

Figure 1. Adult onion thrips have already begun to infest transplanted onions that are in the 4-5-leaf stage and older. *Photo: Christy Hoepting, Cornell Vegetable Program*

RECOMMENDATIONS:

The Cornell recommendation for the first onion thrips spray is Movento 5 fl oz with a penetrating surfactant. ***If using Movento:*** Since Movento does not control adult onion thrips, **we recommend waiting to make the first spray until the majority of the thrips that you are seeing are nymphs (Fig. 2).** At the rate that the thrips appear to be building, it is likely that this could occur next week. Movento has a proven track record to provide excellent control of onion thrips when applied first in sequence at the 1.0 ± 0.3 OT per leaf threshold. If the population exceeds 1.0 OT per leaf, often the knock down is not seen until 1 week after the second application of Movento. Do not tank mix Movento with Bravo.

Figure 2. Onion thrips nymphs in leaf axil of onion plant. *Photo: Whitney Cranshaw, Colorado State Univ.*

If <u>not</u> using Movento: For small-scale upland growers who generally do not use Movento, **we recommend to apply a pyrethroid such as Warrior or Permup to control the adults (and nymphs) when your thrips population reaches 0.7 OT per leaf or more.** Continue to manage OT with pyrethroids until the population exceeds 1.0 OT per leaf, when you will have to switch to Radiant, which is more effective.

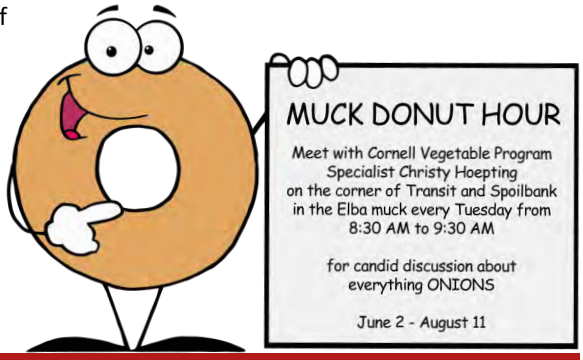
continued on page 10

continued from page 9 – Onion Thrips Breaking Spray Threshold in Upland Transplanted Onions

Figure 3. Subtle streaking along leaves is an early indication of early onion thrips feeding. This plant has reached the spray threshold. *Photo: Christy Hoepting, CVP*

SCOUTING FOR ONION THRIPS:

To find the first thrips of the season, look deep into the leaf axils. The adults are brown and up to 2 mm in length (Fig. 1), while the nymphs are yellow and 0.5 to 1.2 mm in length (Fig. 2). Inspect 15 to 20 plants and count the total number of OT per plant and divide by the average number of leaves per plant to get the number of OT per leaf. Thrips feeding causes silvery streaking along the leaves. If you can already see thrips feeding damage (Fig. 3) that is also a good indication that it is time to spray. If there is a lot of feeding damage, than you likely missed a timely first spray.



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

Fresh Market Vegetable Weed Management Field Days: Cultivation Options

June 22, 2015 | 4:00 - 7:45 PM
Fenton's Produce LLC, 3323 Pratt Rd, Batavia, NY 14020

Research and Extension Educators will be leading demonstrations and answering questions on cultural and mechanical weed management options for fresh market vegetable growers. Attendees will see demos of new cultivation equipment in vine crops, beans, cabbage, and lettuce. Growers will learn what equipment is right for their farm and how to set-up (common equipment sweeps/shanks). CCA and DEC credits will be available. Register and pay online, or 716-652-5400 and pay at the door. For more info, call Darcy Telenko at 716-697-4965.

Fresh Market Vegetable Weed Management Field Days: Weed Management in Vegetable Production

June 23, 2015 | 8:30 AM - 3:30 PM
CVP Weed Management Demo Site at Partridge's on the Farm Market, 4924 Ellicott St Rd (Rt 63), Batavia, NY 14020

Research and Extension Educators will be leading demonstration site tours and answering questions on cultural and mechanical weed management options for fresh market vegetable growers. Equipment options and considerations will be discussed and industry representatives will be on-hand to comment on their products.

Topics:

- Weed Management Between the Rows
- Weed Identification and Biology
- Tillage Options for Weed Management
- Essential Weed Management Equipment for the Beginning Farmer
- Herbicide Options in Sweet Corn
- Herbicide Injury Demo
- Perennial Bed Row Cover

CCA and DEC credits will be available for portions of the day. Register and pay online, or call 716-652-5400 and pay at the door. We request pre-registering for the event so that we have a lunch count. For more info, contact Darcy Telenko at 716-697-4965.

Crop Quality Control on Small-Scale Organic Farms & High Tunnels

July 8, 2015 | 3:00 - 6:00 PM
Falkimmer Farms Organic Growers, 8595 E Eden Rd, Eden, NY 14057

Tour several acres of cultivated fields to learn how the Falkowskis produce quality organic produce, and market it through direct-to-consumer opportunities. Cornell Vegetable Program Specialist Judson Reid will lead a demonstration and discussion of tomato pruning and other high tunnel production practices that improve quality, especially in organic systems. There will be time to network and ask questions, and bring a dish to pass for the potluck at the end of the event! To pre-register and pay, shop online or call Stephanie at 585-271-1979 ext. 509. The fees are $15/person or $25 for two or more people/farm. Pre-registration is encouraged and closes at 4pm on 7/6/15. *This event is produced by NOFA-NY, in partnership with Cornell Cooperative Extension, and with support from USDA-Risk Management Agency.*

Weather Charts

John Gibbons, CCE Cornell Vegetable Program

Weekly Weather Summary: 5/19 – 5/25/15

Location	Rainfall (inch)		Temp (°F)	
	Week	Month May	Max	Min
Albion	0.00	0.63	82	30
Appleton, North	0.00	0.81	81	30
Baldwinsville	0.08	1.79	85	33
Buffalo*	0.04	0.75	81	34
Butler	0.02	1.76	85	32
Ceres	0.00	1.47	82	26
Elba	0.08	1.07	79	26
Farmington	0.04	1.63	82	27
Gainesville	0.09	0.80	80	26
Geneva	0.01	1.42	84	33
Lockport	0.00	0.46	80	31
Lodi	0.02	1.67	86	31
Penn Yan*	0.00	2.22	86	36
Rochester*	0.22	1.07	87	32
Romulus	0.00	0.92	85	36
Silver Creek	0.20	1.45	82	36
Sodus	0.05	2.71	86	26
Versailles	NA	NA	NA	NA
Williamson	0.04	2.22	85	29

Accumulated Growing Degree Days (AGDD) Base 50°F: April 1 – May 25, 2015

Location	2015	2014	2013
Albion	326	220	311
Appleton, North	248	152	218
Baldwinsville	339	281	314
Buffalo	337	224	377
Butler	362	277	320
Ceres	270	221	251
Elba	237	175	288
Farmington	338	263	298
Gainesville	254	185	NA
Geneva	338	269	324
Lockport	299	198	NA
Lodi	395	310	370
Penn Yan	373	277	332
Rochester	376	284	374
Romulus	336	269	NA
Silver Creek	283	198	334
Sodus	276	244	NA
Versailles	NA	224	365
Williamson	285	226	282

* Airport stations

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

Cornell University
Cooperative Extension
Cornell Vegetable Program

480 North Main Street
Canandaigua, NY 14424

VEGEdge

YOUR TRUSTED SOURCE FOR RESEARCH-BASED KNOWLEDGE

VEGEdge

YOUR TRUSTED SOURCE FOR RESEARCH-BASED KNOWLEDGE

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.

VEGETABLE SPECIALISTS

Robert Hadad | 585-739-4065 cell | rgh26@cornell.edu
food safety & quality, organic, business & marketing, and fresh market vegetables

Christy Hoepting | 585-721-6953 cell | 585-798-4265 x38 office | cah59@cornell.edu
onions, cabbage and pesticide management

Julie Kikkert | 585-313-8160 cell | 585-394-3977 x404 office | jrk2@cornell.edu
processing crops (sweet corn, snap beans, lima beans, peas, beets, and carrots)

Carol MacNeil | 585-313-8796 cell | 585-394-3977 x406 office | crm6@cornell.edu
potatoes, dry beans, and soil health

Judson Reid | 585-313-8912 cell | 315-536-5123 office | jer11@cornell.edu
greenhouse production, small farming operations, and fresh market vegetables

Darcy Telenko | 716-697-4965 cell | 716-652-5400 x178 office | dep10@cornell.edu
soil health, weed management, plant pathology

PROGRAM ASSISTANTS

Elizabeth Buck | 607-425-3494 cell | emb273@cornell.edu

John Gibbons | 716-474-5238 cell | jpg10@cornell.edu

Cordelia Hall | ch776@cornell.edu

Nelson Hoover

ADMINISTRATION

Angela Parr | 585-394-3977 x426 office | aep63@cornell.edu

Steve Reiners | sr43@cornell.edu

Mark Giles | fmg4@cornell.edu

For more information about our program, email cce-cvp@cornell.edu or visit us at CVP.CCE.CORNELL.EDU

Cornell University
Cooperative Extension
Cornell Vegetable Program