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Under such hot, dry periods of weather, ordinary irrigation practices can be

inadequate. How much water to use depends on your soil type.



fruit. Water stress is to blame. Learn how to prevent this on your

Blossom End Rot

is very common

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this year on the first set pepper



needs to be trimmed at the expense of yield and labor.

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The insecticide Radiant has been a staple in the onion thrips management program in onions

but is it slipping in its ability to control this pest?

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Cooperative Extension Cornell Vegetable Program

Irrigation: A New Game in a Hot, Dry Year!

Carol MacNeil, CCE Cornell Vegetable Program

It's been a few years since we've had a prolonged hot, dry period of weather. Under such conditions ordinary irrigation practices can be inadequate. Water stress can reduce vields, but it can also reduce fruit/tuber/bulb size, and can contribute to physiological disorders such as blossom end rot of tomatoes and tipburn of lettuce. The most important times to avoid water stress are during initial crop establishment, during flowering and fruit set, and during sizing of fruit/tubers/ bulbs. It's important to note that yield and quality begin to decrease well before crops begin to wilt.

How much different is this year from the past couple of years? NYS weather records show



Irrigating processing pea field near Batavia, NY. Photo: Julie Kikkert, Cornell Vegetable Program



VegEdge newsletter is exclusively for enrollees in the Cornell Vegetable Program, a Cornell Cooperative Extension regional agriculture team, serving 12 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

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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.



Cornell University Cooperative Extension Cornell Vegetable Program

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The next issue of VegEdge will be produced on July 20, 2016.

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that in July, when there's a combination of cloudy and clear days, and moderate temperature, the loss of water, or evapotranspiration (ET), from a crop with a full canopy (most any crop) can be 1.1" of water/week. In a July with prolonged sunny weather and hot temperatures the ET can be 1.5" of water/ week or more. This is 36% more water loss! Specific ET information for all parts of the state are available at: <u>http://</u> <u>newa.cornell.edu</u>/ Click on Crop Management, then Evapotranspiration Maps. See Evapotranspiration (PET) Amount. Last Week's Conditions shows the inches of moisture lost in the past week from a crop with a canopy covering 80% of the ground. Pro-rate for a smaller canopy. See the Key below the map.

Next, compare the crop water loss or ET for your area for a week, with the inches of rain that fell plus the irrigation applied to your crop for that week. Is there a deficit? If so, you may need to increase the frequency of irrigation. Or you may need to increase the amount of water applied per irrigation, but only IF your soil can absorb it! Sandy soils have a lower water-holding capacity and should be irrigated more frequently with a lower amount of water, while silt/clay loams and muck have a higher water-holding capacity and can be irrigated less frequently with more water each time.

Very early in the season, or after a substantial rain which causes drain tiles to run, the amount of water the soil can store per foot of depth is an important factor. <u>Easily available water</u> (<u>EAW</u>) is the amount of water the crop can extract before water stress begins.

Soil type	Easily available water (in./ft.)
Sandy loams	0.63″
gravelly loams	0.75″
silt loams	1.0"
good muck	1.5″

If a soil has a high % organic matter, if it's well aggregated (has lots of medium-sized pore spaces), and if it has no crusting and very limited compaction, it will hold more than the average amount of EAW. Unfortunately, few vegetable soils are in that good state of health. The EAW stored in the soil per foot X the <u>depth of</u> <u>rooting</u> of your crop gives a good estimate of the <u>water</u> <u>reserve</u> available to your crop. If you have a gravelly loam soil with 0.75" easily available water per foot, and a cabbage crop, which roots rather shallowly (1-2 ft.), you have from 0.75 - 1.5" of water in reserve. If you start the week at "field capacity," the point when the tiles just stop running, your crop has enough water from the soil alone, for about a week, depending on the temperature, sunshine and wind.

In a loose, well-drained soil with good organic matter and without compaction, vegetable crops can root deeply, as noted below. Because of intensive cropping, excessive tillage, lack of soil-building crops, low organic matter and compaction, however, vegetable crop rooting often isn't this deep. Do some digging and find out how deep the roots of your crops penetrate.

Potential rooting depth of a mature crop

1.0-1.5 ft.	 lettuce and onions
-------------	--

1.0-2.0 ft. – cruc	ifers, potatoes, tomatoes, peppers,
cuke	s and muskmelons

2.0-4.0 ft. – beans, carrots, eggplant

3.0-6.0 ft. - winter squash, pumpkins, asparagus

The water in the soil in addition to the <u>easily available</u> <u>water</u>, may be felt as cooler, slightly darker soil. It is tightly held and is difficult to extract, however, stressing crops and slowing growth. You can roughly determine the soil moisture at the depth where the bulk of the roots are by the "feel" method. A soil probe is useful for sampling soil a foot or more deep, where most of the roots are. If a sandy loam or silt/clay loam soil is so dry that you can't form even a weak soil ball then the EAW has been depleted.

(Information from "Irrigation scheduling for vegetable crops in the Northeast, D. W. Wolfe, Horticulture, Cornell University)

Cornell Vegetable Program Welcomes New Program Aide

Please join us in welcoming Mariam Taleb to the Cornell Vegetable Program team! Mariam is a Program Aide working under Vegetable Specialist Christy Hoepting, based out of the CCE Orleans office. We have asked Mariam to introduce herself:

"I am a recent graduate of the University of Massachusetts, with a B.A. in English, and Sustainable Food & Farming. As an undergrad, I largely focused on reducing the environmental impact of agriculture, urban agriculture, and food access for the urban and rural underprivileged. I'm excited to join the vegetable team to help growers find solutions to reduce stress on them, their crops, and the environment around them, and for this opportunity to learn about Extension work and research."



Mariam Taleb joins the Cornell Vegetable Program.

Drought Conditions: A Nuisance for New York, Thanks to "El Niño"

Gretchen Seigworth and Darcy Telenko, CCE Cornell Vegetable Program

The data is in. We have experienced our 9th driest May and the 20th driest June since 1812. The lack of rain has affected farmers across the northeast, causing irrigation use to skyrocket, and water reserves to deplete. This lack of precipitation can be attributed to the natural phenomenon: "El Niño Southern Oscillation", or "ENSO". El Niño represents a naturally occurring climate cycle that causes periodic warming in sea-surface temperatures near the equator, accompanied by high air pressure in the western pacific, which causes global changes of temperatures and rainfall.

El Niño conditions typically lasts 9-12 months, developing during March-June, peaking in intensity during December and April, and then weakening during May-July. However, some prolonged El Niño episodes have lasted 2+



Precipitation rates have been well below average this spring, as indicated by the dark red areas on this rainfall map. Source: http://www.nrcc.cornell.edu/regional/monthly/ monthly.html years. El Niño is followed by "La Niña", another cycle in the ENSO that cools the temperatures of the earth, and causes more rainfall than usual. Historical data suggests that El Niño and La Niña episodes typically occur every 3-5 years. Unfortunately, there is nothing we can do about weather patterns, but vegetable crops are mostly made of water, so it is crucial to make sure they are getting enough hydration to look great on market shelves.

Cucumber, tomato and pepper plants in the field need an average of 1-2 inches of rainfall per week to produce fruit, and even more on exceptionally hot days. This year, some areas in Western New York have only received 0.20 - 0.40 inches of rainfall in the month of June, so farmers have had to supplement the rest of the needed precipitation with sprinklers and drip tape.

In your observations, you may find that vegetables planted on sod or where crop rotation has been practiced and organic matter has built up over time have been doing better than crops planted in sandier or loamier soils. The extra organic matter can absorb and retain moisture much better than bare soil. Fortunately, symptoms of the El Niño cycle that we are currently experiencing are forecasted to decline throughout the summer, but since El Niño happens on a cycle; it is good to proactively prepare for droughts in coming years. Utilize crop rotations and cover crops to naturally increase organic matter in soil. Invest in irrigation equipment and ponds to ward off future drought conditions. Making these investments now is sure to pay off in the long run.

Please be advised that Cornell Cooperative Extension's Disaster Education Network has extensive resources available to help you address questions or concerns regarding water scarcity or potential drought at <u>http://eden.cce.cornell.edu/</u><u>disasters/Pages/Drought.aspx</u>



This graph shows the fluctuation of dry and wet years from 1900-2016. Red lines indicate below average precipitation, and green lines represent above average precipitation. The worst El Niño years can be seen in 1913, 1963-1966, 1986, and 1998. Source: http://www.nrcc.cornell.edu/regional/tables/tables.html

Blossom End Rot on Peppers

Judson Reid, CCE Cornell Vegetable Program

Blossom End Rot, a localized calcium deficiency, appears as a tan or brown lesion on the side or bottom of pepper fruit. It is very common this year on the first fruit set. The calcium deficiency is caused by water stress, and generally not low soil calcium levels. Since it is so wide spread we believe it must be weather related as irrigation practices vary considerably across the region. In heat, or high wind situations, pepper plants that are producing a number of new shoots, in addition to fruit, may not reach the water demand of all growing points; this results in Blossom End Rot.



Blossom End Rot of bell pepper. Photo: J. Reid, CVP

Prevention:

- Use a timer to ensure consistent water schedules.
- Avoid ammonium forms of nitrogen
- Reduce nitrogen application during cloudy weather/short days
- Monitor soil and plant tissue levels of calcium
- Prune out affected fruit as the plant will continue to mature them O

Hot Weather Means Onion Thrips in Cabbage

Christy Hoepting, CCE Cornell Vegetable Program

With harvest of wheat and the very hot weather, onion thrips (OT) pressure is high. Onion thrips are often considered the most important insect pest of cabbage. The feeding of these tiny insects causes unsightly brownish blisters and scarring on the leaves of cabbage heads, often several layers deep (Fig. 1). Damaged leaves need to be trimmed before cabbage can be marketed resulting in considerable economic losses in yield and grade.

When possible, the use of onion thripstolerant varieties can go a very long way towards minimizing losses from onion thrips. For example, summer cabbage varieties, Capture (Bejo - 2733), Celebrate (American Takii - T541) and Benelli (Bejo) exhibited excellent thrips tolerance in our 2009 Cornell trial. Here, Celebrate had virtually no OT damage, compared to Bajonet, which had more than 4 layers affected. Information on the relative tolerance/ susceptibility of storage, kraut and summer cabbage varieties evaluated in Cornell trials

from 2005 to 2009 is available online at the new Cornell Vegetable Program website: http://cvp.cce.cornell.edu/, from the sliding menu on top, click on "cabbage" and scroll down to see a list of all of the content.

When onion thrips-tolerant varieties are not an option, the most effective insecticide is the active ingredient imidacloprid, which is marketed as Admire and several other generics. Several years of Cornell studies (Shelton et. al. 2003, 2004, 2008, 2010) have consistently found that Admire provided the best control of OT when applied to the soil as a directed spray to the base of plants at transplanting and 4 weeks after transplanting. Here, Admire Pro reduced OT damage from 6 to 2 layers. The next best insecticides for OT control in these trials were foliar applications of Provado (which has been replaced with Admire Pro) and Movento, followed by Assail and Radiant, then dimethoate (discontinued), and finally Warrior. Admire can be an especially economic OT control option for susceptible

varieties of summer cabbage. Note that Admire Pro is a different formulation than Admire 2F and is used at different rates. There are several generic 2F formulations of imidacloprid and some have control of onion thrips in Brassicas on the label and some do not. For example, Alias 2F does, while Couraze 2F and Montana 2F do not. Imidacloprid also controls aphids and swede midge. O



Figure 1. Onion thrips feeding in cabbage resulting in unsightly brown blisters and scarring that needs to be trimmed at the expense of yield and labor. Photo: C. Hoepting, CVP

WNY Sweet Corn Trap Network Report, 7/12/16

Marion Zuefle, NYS IPM Program; http://sweetcorn.nysipm.cornell.edu

Fall armyworm and Western bean cutworm numbers are beginning to increase. When scouting sweet corn look for FAW egg masses on the leaves. Egg masses consist of 50-150 eggs and can be distinguished from ECB by the fine hairs covering the egg mass. Feeding damage is also very different from ECB. FAW will cause ragged feeding damage on leaves with large amounts of frass below the feeding site. The larva has a distinct inverted 'Y' on the head.





Fall armyworm egg mass

Fall armyworm dam-Fall armyworm larva. Note the prominent

inverted 'Y' on head.

For WBC it is recommended that all fields that are in the whorl or early tassel stage be scouted for egg masses with a 4% threshold for processing sweet corn and a 1% threshold for fresh market sweet corn. WBC will usually lay eggs on the upper side of the top 1-3 leaves of pre-tassel corn, close to the leaf base. After tasseling has finished WBC seek out younger corn or dry beans.

age

It takes between 5-7 days for eggs to hatch. It is critical that sprays are timed before the larvae have a chance to enter the ear. The egg mass will become purple in color approximately 24 hours before egg hatch (see photo).







WBC egg mass shadow. Photo: T. Baute

WBC egg mass.

WBC eggs become purple prior to hatch. Photo: Marlin Rice

WNY Pheromone Trap Catches: July 12, 2016						
Location	ECB-E	ECB-Z	CEW	FAW	WBC	DD to Date
Baldwinsville (Onondaga)	0	0	1	0	0	1294
Batavia (Genesee)	28	0	1	0	1	1001
Belfast	2	0	2	0	0	1140
Bellona (Yates)	0	0	0	5	0	1366
Eden (Erie)	0	0	0	3	7	1293
Farmington (Ontario)	0	0	0	0	0	1223
Hamlin (Monroe)	NA	NA	NA	NA	NA	1196
LeRoy (Genesee)	NA	NA	NA	NA	NA	1213
Pavilion	0	0	0	0	1	1042
Penn Yan (Yates)	0	0	0	1	0	1345
Ransomville (Niagara)	0	1	0	0	1	1308
Seneca Castle (Ontario)	0	0	0	0	0	1252
Spencerport (Monroe)	0	0	0	0	0	1318
Waterport (Orleans)	NA	NA	NA	NA	NA	1204
Williamson (Wayne)	0	0	0	0	0	1154
ECB - European Corn Borer	European Corn Borer WBC - Western Bean Cutworm					
CEW - Corn Earworm	NA -	not availa	ble			
FAW - Fall Armyworm	DD -	Degree Day (modified base 50F) accumulation				



Water continues to be our #1 issue (see articles on irrigation and the El Niño cycle) and insect pests come in at #2. We are continuing to see issues with flea beetle, cucumber beetle, and thrips. Tarnished plant bug and aphids are starting to appear.

CUCURBITS

There is still minimal risk for downy mildew based on the forecast (see article for more detail). If you suspect downy mildew please contact us, so we can verify. We are finding active powdery mildew on squash and cucumbers. Proactive management fungicide applications will help limit the spread and severity of these diseases in a field. Remember to rotate resistance groups and apply with protectant fungicides like chlorothalonil, copper, or mancozeb. Cucumber beetle populations are still extremely high in pockets around the region.



Cucumber beetles on organic cucumbers. *Photo: D. Telenko, CVP*

DRY BEANS

Many growers are cultivating. Rainfall is needed as so many fields are approaching, or into flowering. Due to recent hot, sunny, sometimes windy weather, the very newest, expanding leaves are showing some gray, wilted leaf desiccation. The <u>Western bean cutworm (WBC)</u> trap catch for the past week in Riga was 24 moths, while all other traps caught few moths. The peak emergence could be earlier this year, however, due to the hot weather. Peak emergence is usually the very end of July-very early August.

A very few adult <u>potato leafhoppers (PLH)</u> are being seen in fields treated with the systemic insecticide seed treatment Cruiser. These fields will only need treating if the PLH population exceeds an average of 1 nymph/trifoliate leaf. Adult PLH typically stop feeding in treated fields. In fields <u>not</u> treated with Cruiser insecticide, in addition to the nymph threshold, if the sweep net catch of adult PLH exceeds an average of 5 adults/sweep, then the field should be treated. PLH causes "hopperburn" due to the toxin it excretes into bean plants when it is feeding. This can cause stunting and yield loss. There are many insecticides/Insecticide Classes approved for conventional PLH control, including Dimethoate, Orthene, pyrethroids, and neonicotinoids (not to be used if Cruiser was used on the seed!). For organic growers azadirachtin and pyrethrin products are effective but have very short residual activity. Some growers combine the two products or use Azera, a pre-packaged combination (from the Cornell Organic and IPM Guide for Beans at: <u>https://ecommons.cornell.edu/</u> handle/1813/42891)

ONIONS

The hot weather has been super favorable for onion thrips, which are exploding everywhere. On top of that, one of our most effective insecticides, Radiant looks like it may be slipping and growers should take extra caution to not abuse this product – see article. At this time, Agri-Mek (PHI 30 day), Lannate + Warrior, Exirel and Radiant are the main products that are used to control thrips. For more information, see Strategic plan for managing onion thrips with insecticides available on CVP website: http://

<u>rvpadmin.cce.cornell.edu/uploads/doc_320.pdf</u>. Bacterial disease started to show up more so this week (Fig. 1) as did Stemphylium leaf blight (see articles in last two week's issues of Veg Edge) and downy mildew in organic onions. Organically, there is not much that can be done to control this disease; it is challenging to control conventionally with



Figure 1. Bacterial diseases of onion are starting to show up more so this week. Early symptoms include bleached areas (a) or water-soaked (b) inner leaves. Eventually, all the inner leaves collapse (c). *Photos: C. Hoepting, CVP*

the best of fungicides. Hot and dry weather to dry up lesions and shut down disease development will help the most. If onions are so ravaged by disease that they die prematurely and do not lodge, they could have higher levels of bulb rot. **Elba muck will host the National Onion Association for a tour this Friday, July 15th and Elba Onion Twilight Meeting on August 4th.**

PEPPERS

Keep an eye out for aphids (Fig. 1). Examine ten sites throughout field. Treatment should begin before population exceeds five nymphs per leaf. Natural enemies help suppress aphid infestations such as ladybug larvae and minute pirate bug (*Orius*) (Fig. 2). Increases in aphid infestations are sometimes associated with application of broad spectrum insecticides that have killed natural enemies.



Figure 1. Aphids on pepper. Photo: G. Seigworth, CVP



Figure 2. Natural enemies of aphids – ladybug larvae and aphid mummies post parasitism by minute pirate bug. *Photos: D. Telenko. CVP*

continued – CROP Insights

POTATOES

Potatoes are making excellent growth, are flowering, and have set tubers, though some fields are late and just getting started. Rainfall or irrigation are needed for the critical 6 weeks beginning at tuber set. Due to recent hot, sunny, sometimes windy weather the newest leaves are showing some gray, wilted leaf desiccation.

Medium to large <u>Colorado potato beetles (CPB)</u> and adult <u>potato leafhoppers (PLH)</u> are being seen in fields not treated with a systemic insecticide seed treatment or in-furrow treatment at planting. <u>Tarnished plant bugs (TPB)</u>, which can also cause dying of the smallest leaves, are also seen in untreated fields. Fields treated with a systemic insecticide at planting are showing few insect pests. Significant feeding by CPB can be tolerated by potatoes. But only 1 adult PLH per sweep with a net is the threshold for treatment. Potato growth and yields are hurt by PLH before "hopperburn" becomes apparent, because of the toxin the pest injects into plants during feeding. From mid-July control of PLH from at planting treatments begins to fade and PLH nymphs begin to be seen on the undersides of leaves, so scout your fields. See last week's Veg Edge for more details.

Fungicide sprays for <u>early blight (EB)</u> are recommended on all potatoes that emerged on or before June 5. Non-rotated, higher risk fields that emerged on or before June 20 should also be sprayed. For other emergence dates see the EB <u>Physiological Day (P-Day)</u> forecast at: <u>http://newa.cornell.edu/index.php?page=potato-early-blight</u> Begin sprays around the time of flowering.

Quadris Opti can be a good component to mid-season potato sprays. It has excellent activity against <u>black dot root rot</u> (looks similar to silver scurf on tubers) which gets started on foliage. When Quadris is mixed with chlorothalonil it provides good control of EB and also <u>late</u> <u>blight</u>. Be sure to alternate to another Chemical Class after one application.

<u>Bacterial blackleg Dickeya dianthicola (BBD)</u> is being found in more and more fields in the Mid-Atlantic region, including Long Island, from seed produced in ME, New Brunswick, and now WI. Varieties affected include: Superior, Reba, Norwis, Vivialdi, Snowden, Waneta, and now Yukon Gold. The disease progresses more rapidly in hot weather. No resistant varieties are available and no fungicides or other sprays are effective. Clean certified seed is the only answer, and tests to determine which seed is infected are on-going now. The pathogen is carried in the infected tuber, though there may be no symptoms. The disease spreads up the inside of stems, causing the wilting and death of potato stems. (See accompanying photos.) It can also spread down the stolons to the daughter tubers. One field of Rebas from ME seed in the Cornell Vegetable Program area has close to 20% of stems wilting and dying. We are waiting for Cornell confirmation of the disease diagnosis. Four samples have been submitted to date. If you have a question about BBD, or see more than 5% of stems wilting and dying (that's not due to cultivator blight!), contact Carol MacNeil at <u>crm6@cornell.edu</u> or 585-313-8796.





Plants may show symptoms on only one of the stems. Photo: Amy Charkowski, UW-Madison



Leaves of plants with milder symptoms are curled. Photo: A. Charkowski, UW-Madison

PROCESSING CROPS

Decayed stem is a dull brown. Photo: Amy Charkowski, UW-Madison

Fields of snap and lima beans are at various growth stages at this time. As beans come into flower, we typically apply a fungicide and insecticide mix to control pod molds and European corn borer. When making a decision on whether or not to apply an insecticide, consider the fact that these applications may also be controlling other insects. Thus, in addition to being aware of the flights of European corn borer (see the Sweet Corn Trap Network report in this newsletter) make sure you are scouting for other insects such as potato leaf hopper (see info in the dry bean section above), tarnished plant bug, twospotted spider mites, Japanese beetles, and Mexican bean beetles. One species that we usually don't see much on beans in New York is Western flower thrips. Leaf samples from two adjacent fields were brought in for disease analysis this past week and it was noted that Western flower thrips were active on the leaves. In this atypical year, make sure you are scouting for this pest as well. From the limited information I've read about thrips in beans, they are of most concern at flowering and can cause scarring on pods. According to the Univ. of Delaware, the thrips threshold is 5-6 per leaflet. You will need a hand lens



Western flower thrips feeding on a leaf. Photo: Whitney Cranshow, Colorado State University, Bugwood.org

to observe these insects. Shaking plant tissue over a white paper can also reveal them, and they are attracted to yellow sticky cards placed in a field.

Managing Onion Thrips in Onion in the Face of Radiant Slipping

Christy Hoepting, CCE Cornell Vegetable Program

The hammer appears to be slipping

The insecticide Radiant, belonging to resistance management group 5 has been a staple in the onion thrips management program. It is strategically positioned in a program to be used when onion thrips pressure is highest and has successfully reduced thrips populations from 8.0 per leaf in the past. At the end of spray season in 2015, it was observed in the Elba muck that control of onion thrips with Radiant had slipped and double applications did not result in the usual knockdown that had come to be expected from this product. This begged the question whether onion thrips were beginning to develop resistance to Radiant?

Upon review of Brian Nault's onion thrips trials all conducted on-farm in Elba, it became apparent that compared to the untreated, percent control achieved by Radiant had slipped by about 30% over the past decade from 95% in 2004 (when Radiant was an experimental in the trials) to 65% in 2015 (Fig. 1). Although this does not confirm the development of resistance of onion thrips to Radiant, it is **cause to take immediate action to preserve the useful life of Radiant for onion thrips control in onions.** Note, that Nault's lab has research underway in 2016 to study resistance of onion thrips to Radiant.

Critical steps to preserve useful life of Radiant for onion thrips control.

- Never use less than 8 fl oz of Radiant. Previously, 6 fl oz rate was recommended. The higher rate will control onion thrips that are beginning to develop resistance ensuring that their slightly more tolerant progeny will not be continued to the next generation.
- 2) Never ever make more than two sequential applications of Radiant before rotating to another chemical class for 2 weeks. During hot weather it takes about 2 weeks for onion thrips to complete a single generation. Thus, we do not want to expose multiple generations in a row to Radiant, because each consecutive generation will progressively become more tolerant.
- 3) Delay the use of Radiant as long as possible. What happens in the Elba muck is that even though most of the growers are implementing resistance management strategies, when Radiant is used last in sequence prior to harvest, thrips exposed to Radiant move from harvested crop to nearby unharvested crop where they are again exposed to Radiant before they move on to next unharvested crop and so on. Consecutive onion thrips populations may be exposed to Radiant beginning in mid-July for 6-7 weeks until early September, with each generation becoming more tolerant than the



Figure 1. Control of onion thrips by Radiant in Cornell on-farm field trials, 2004 to 2015 in Elba muck land (Nault et al). Efficacy of Radiant has dropped about 30% during the past decade. With onion thrips being notorious for developing resistance to insecticides, use of Radiant in a manner to reduce the development of resistance is critical to preserve the useful life of one of the most effective insecticides for controlling onion thrips in onion in New York. one before it. By delaying use of Radiant to late-July or early August, this will reduce the number of consecutive generations that are exposed to Radiant as well as increase the number of generations between those exposed to Radiant at the end of the last season and this season. In Elba, growers are deliberately not applying Radiant to early transplants at this time.

What to use instead of Radiant?

We certainly recognize that this is a challenge, especially this year as thrips are exploding in this unrelenting hot and dry weather.

- 1) Try a tank mix. For example, Agri-Mek + Warrior or Lannate, or Lannate + Warrior. Although not proven, we have several cases where tank mixes work better than either product alone. If thrips are 1.0 per leaf, then Warrior + Lannate could be used. I wouldn't expect this combination to handle much more than 1.0 per leaf. If OT are 2-3 OT per leaf, perhaps try Agri-Mek tank mixed with Warrior or Lannate. Be sure to manage chemical classes of the insecticides that you are using in tank mixes. For example, do not use Warrior for more than two consecutive weeks and rotate to other chemical class(es) for at least two weeks before adding Warrior back into the tank mix.
- 2) Try Exirel. This insecticide has a completely different mode of action (group 28) than any other insecticide labeled for control of onion thrips in onion. In Nault research studies, it has performed about 33% better than Agri-Mek. Research studies to date have not shown significant difference in control between 13.5 fl oz and higher rates. so no need to try more expensive rates. It should be used with a penetrating surfactant. In research trials, Exirel effectively controlled onion thrips when used at 1.0 thrips per leaf spray threshold. It did not provide adequate control at 3.0 thrips per leaf threshold.

Downy Mildew Update

Jodi Callwood and Darcy Telenko, CCE Cornell Vegetable Program

Downy mildew has been confirmed in cucumber in Ontario Canada, Michigan, Ohio and Delaware. Most often found after heavy rains and humid weather downy mildew (*Pseudoperonospora cubensis*) usually appears in late spring or early summer during under wet and humid condition. Characteristic disease symptoms are angular, pale green areas bounded by the leaf veins. They will turn yellow and later necrotic (see photos). Under high humidity conditions sporulation will occur on the lower leaf surface. Apply targeted fungicides tank- mixed with protectant fungicides weekly and alternated among available modes of action (FRAC code), starting when there is a risk for specific crop based on forecasting program.

From Meg McGrath, Cornell Plant Pathologist:

Fungicides Recommended for Cucurbit Downy Mildew. Downy mildew occurs sporadically dictated by movement of the pathogen from where it is known to be able to survive over winter (southern FL and greenhouses). Like powdery mildew, it is most effectively managed with fungicides that have targeted activity, unfortunately they are also prone to resistance development in the pathogen. Presidio and Previcur Flex are no longer recommended because of suspected resistance affecting efficacy in 2015. Fungicides considered the best choices to alternate among this season are Ranman, Zing! or Gavel, Zampro, and Curzate (follow with another fungicide about 5 days later). For more information on managing this disease see article posted at: http://vegetablemdonline.ppath.cornell.edu/NewsArticles/Cucurbit%20Downy%



Downy mildew in cucumber, symptoms on leaf surface: initial water soaked angular lesions (a), yellow angular lesions (b), necrotic angular lesions (c), and sporulation on underside (d). *Photos: D. Telenko, CVP*

Late Blight Risk

Carol MacNeil and John Gibbons, CCE Cornell Vegetable Program

From 1 to 5 <u>late blight (LB) severity values (SV)</u> have accumulated at weather stations this past week. Buffalo, Rochester and Belfast have exceeded or will exceed 18 <u>severity values (SV)</u> very soon, and Penn Yan isn't far behind. This is in addition to sites that exceeded 18 SV earlier: Gainesville, Wellsville, Ceres, Albion, Arkport. If you're near a weather station where 18 SV were reached then all potatoes should be sprayed from the time they are 4-6" tall. If the weather station near you did <u>not</u> exceed 18 SV all potatoes should be sprayed before the rows close together, according to Bill Fry and Ian Small, Cornell.

We have switched to the Simcast Blight Unit LB forecast chart this week since so many potatoes are close to closing rows. After the first spray, whether for LB, <u>early blight (EB)</u>, or bacterial disease (tomatoes), the LB <u>Decision Support System (DSS)/BlightPro blight units (BU)</u> provides guidelines on the spray interval based on the current and forecast weather, your varieties, the residual of the last fungicide sprayed, etc. If you are overhead irrigating note that you are increasing LB favorable conditions!

There are many new LB confirmations in the Eastern half of the US. There are several new reports in MD on tomato (US23), on potatoes in MI (US23), and many reports, mainly on tomatoes, in Arkansas (no samples tested).

Many potato fields should be receiving fungicide applications for <u>early blight (EB)</u>, especially if they are approaching flowering. For the current EB risk on potatoes see Crop Insights - Potatoes in this issue of VegEdge. You can get spray guidelines for both EB and LB at weather station locations only, and for the use of chlorothalonil, at: <u>http://newa.cornell.edu/index.php?page=potato-diseases</u> Note, however, that this NYS IPM NEWA version of the DSS LB forecast does not take into account irrigation.

Tomato growers refer to <u>TomCast</u> regarding EB, Septoria and anthracnose at: <u>http://newa.cornell.edu/index.php?page=tomato-</u> <u>diseases-tomcast</u> Follow the TomCast forecast until LB is detected in your region, according to Abby Seaman, NYS IPM Vegetable Coordinator. LB spores can be carried as far as 30 miles on the wind.

Late Blight Risk Chart, 7/12/16¹

		-			
Location ¹	Blight Units ² 7/06-7/12	Blight Units ³ 7/13-7/15	Location ¹	Blight Units ² 7/06-7/12	Blight Units ³ 7/13-7/15
Appleton	18	8	Lodi	24	7
Baldwinsville	29	4	Lyndonville	17	9
Bergen	15	6	Medina	19	6
Buffalo	18	8	Niagara Falls	12	6
Ceres	33	19	Penn Yan	28	7
Elba	0	6	Rochester	21	6
Fairville	17	3	Sodus	28	3
Farmington	23	6	Versailles	30	3
Gainesville	49	13	Wellsville	30	17
Geneva	17	2	Williamson	22	3
Kendall	11	2	Wolcott	17	10

1 Ø }* 38a^Á;] ;#á ÁrÁ ∖ Ást [Lá/@eshold = 30 BUs (susceptible variety, last fungicide residual like chlorothalonii).

Past week's Simcast Blight Units (BU) Á
 Three day predicted Simcast Blight Units (BUs)

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

Vegetable Pest and Cultural Management Field Meeting

July 20, 2016 | 6:00 PM - 8:00 PM Orleans County, Curvin Martin farm, 12829 Eagle Harbor-Knowlesville Rd, Albion, NY 14411

July 27, 2016 | 7:00 PM - 9:00 PM Seneca County, David K Stoltzfus farm, 4844 Rt 414, Romulus, NY 14541

July 29, 2016 | 6:00 PM - 8:00 PM Ontario County, David Fox farm, 3269 Lake-to-Lake Rd, Stanley, NY 14561

This course will demonstrate pest management in fresh market vegetables in both field and greenhouse (high tunnel) vegetables; primarily for those growing for wholesale auction. A hands-on demonstration of weed, insect and disease identification in vegetables including management options such as inter-row cover crops, grafting and where appropriate, spray options will be used to educate growers. Judson Reid, Senior Extension Associate with the Cornell Vegetable Program along with CCE associates Telenko and Hadad will instruct participants and facilitate peer-based learning. Details on each topic will focus on field observations at that farm. This event is FREE! DEC recertification credits will be available. For more information, contact Judson Reid at 585-313-8912.

High Tunnel Pest and Disease Management: Organic Control Strategies August 2, 2016 | 4:30 PM - 7:30 PM Fellenz Family Farm, 1919 Lester Rd, Phelps, NY 14532

How can you manage your tunnel to limit losses due to pests and disease? This field day will start with identification of common high tunnel pests and diseases and effective organic control strategies, including spraying. Andy Fellenz, with support from NE-SARE, has developed and will demonstrate a boom-style high tunnel sprayer, as well as discuss the proper use of backpack and other relatively low pressure, low flow single-tip sprayers. Variety selection, rotation, cultural practices and spraying all have a place in the overall farm strategy. Fellenz Family Farm received its certification for growing organic vegetables and fruits in Phelps, NY in 2005, and has been growing in high tunnels for more than 10 years.

Cost: FREE! Email Angela Parr at aep63@cornell.edu to register or call 585-394-3977 x426. This event is sponsored by NE-SARE through a Farmer Grant. The Cornell Vegetable Program is cooperating with Fellenz Family Farm to bring you this event.

2016 Elba Muck Onion Twilight Meeting

August 4, 2016 | 5:30 PM dinner; educational program begins at 6:00 PM Mortellaro's Red Shop in the Elba muck land, Elba, NY 14058

Cornell Vegetable Program Specialist Christy Hoepting and Cornell Entomologist Brian Nault will be sharing preliminary research results from current season on-farm onion research trials. This year, attendees will see several herbicide trials, fungicide trials targeting Botrytis leaf blight and Stemphylium leaf blight diseases, as well as trialing several approaches geared to improved onion thrips and onion maggot control. This event is FREE! Contact Christy Hoepting at 585-721-6953 for more information.

Organic Dry Bean Discussion Group Meeting

August 12, 2016 | 1:00 PM - 4:00 PM Klaas, Mary-Howell and Peter Martens farm, 1443 Ridge Rd, Penn Yan, NY 14527

There will be viewing and discussion of the dry bean crop, cultivation for dry beans, the benefits of certain cover crops ahead of dry beans, and the potential for organic reduced tillage. There will be ample time for open discussion regarding organic dry beans. Preregister by August 9 by contacting Carol MacNeil at crm6@cornell.edu or 585-313-8796. Cold juice, water and soda will be available.

Vegetable Walk and Cut Flowers

August 15, 2016 | 5:30 PM Werner's Farm, 8427 West Henrietta Rd, Rush, NY 14543

A discussion and field walk for cut flower growers. Topics will be production considerations, and disease and insect management. The vegetable field walk will be conducted by Cornell Vegetable Program Specialists Judson Reid and Robert Hadad and will cover identification and management of insects, diseases, and weeds. FREE! Contact Robert Hadad for more information at 585-739-4065.

Finger Lakes Soil Health Discussion Group Meeting August 18, 2016 | 5:00 PM - 8:15 PM Hemdale Farms, 2800 Orleans Rd, Seneca Castle, NY 14547

Why Hemdale Farms switched to zone tillage, and how they've been successful doing it for field crops and vegetables will be described. Equipment will be available for viewing. The many niches available for cover crop planting, and the benefits of different cover crops will be covered by Thomas Bjorkman, Cornell. There will be ample time for open group discussion on reduced tillage, cover crops, and all aspects of improving soil health. This event is FREE! DEC credits will be available. Preregistration by NOON on August 15 required. Contact Carol MacNeil at crm6@cornell.edu or 585-313-8796. A light supper will be provided.







Weather Charts

John Gibbons, CCE Cornell Vegetable Program

Weekly Weather Summary: 7/5 – 7/11/16

	Rainfa	all (inch)	Temp (°F)		
Location	Week	Month July	Мах	Min	
Albion	0.26	0.29	91	58	
Appleton, North	0.03	0.06	87	56	
Baldwinsville	0.06	0.06	90	55	
Buffalo*	0.75	0.75	87	61	
Butler	0.12	0.33	90	55	
Ceres	0.70	0.71	87	50	
Elba	0.58	0.83	85	53	
Farmington	0.49	0.51	92	53	
Gainesville	0.00	0.00	85	52	
Geneva	0.02	0.02	90	54	
Lodi	0.42	0.43	91	53	
Niagara Falls*	0.11	0.13	90	63	
Penn Yan*	0.32	0.32	91	56	
Rochester*	0.72	0.82	91	59	
Romulus	0.03	0.03	88	62	
Silver Creek	0.20	0.26	82	60	
Sodus	0.66	0.68	88	52	
Versailles	0.15	0.16	84	55	
Williamson	0.02	0.03	86	53	

Accumulated Growing Degree Days (AGDD) Base 50°F: April 1 – July 11, 2016

Location	2016	2015	2014
Albion	1083	1094	1047
Appleton, North	916	886	886
Baldwinsville	1061	1112	1149
Buffalo	1108	1116	1080
Butler	1052	1130	1117
Ceres	830	994	955
Elba	778	842	855
Farmington	984	1065	1058
Gainesville	780	880	850
Geneva	1028	1084	1083
Lodi	1133	1210	1193
Niagara Falls	1183	1025	1028
Penn Yan	1098	1162	1149
Rochester	1112	1182	1158
Romulus	1020	1102	1103
Silver Creek	985	1006	1010
Sodus	914	971	1013
Versailles	966	1036	1032
Williamson	929	988	1002

* Airport stations
 ** Data from other station/airport sites is at: <u>http://newa.cornell.edu/</u> 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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Cornell University Cooperative Extension Cornell Vegetable Program

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