

options to control these pests.

type of aphids

you have, they

way. Learn

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manage ALS.

PAGE 3

Alternaria leaf spot in Cole crops develops on older leaves first and is not a problem unless it

infects the head. Learn how to



and quality crop.

PAGE 4

By matching fertilizer and pH amendments to known levels in the soil, high tunnel growers



Do not leave cull piles of potatoes. Learn how to properly handle culls to minimize the risk of late

blight to future potato plantings.

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Cornell University Cooperative Extension Cornell Vegetable Program

Alternative Aphid Controls

Elizabeth Buck, CCE Cornell Vegetable Program

Right on cue, we're seeing a spike in aphid populations across the growing region in the past few weeks. It is fairly common for aphids to move into peppers and vine crops in late August. Aphids move into greens (lettuce, spinach, beets, and kale) as the weather cools off and other vegetation, particularly weeds, die back. In both cases, infestations will start slowly then seem to suddenly explode, often after warm weather.

All aphids will stress plants out by siphoning off the sap, which can reduce yields directly. Secondary, indirect losses in fruit quality/grade are caused by sooty mold growing on the sticky aphid droppings. They'll also transmit virus, which will stunt crops and may mar fruit. The secondary losses are of more concern to most growers at this point in the season, particularly in peppers and vine crops.

Many species of aphids affect the peppers, vine crops, and greens, but you don't need to worry much about what type you have. Whether your aphids be lime green, rosy, black, yellow, or gray, they will all die the same way. Pyrethroids such as lambda-cyhalothrin (ie Warrior) and permethrin (ie



Pepper plastered in aphids Photo . Elizabeth Buck. CVP

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

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Sweet Corn Trap Network Report, 9/15/1502

The next issue of VegEdge will be published on October 1, 2015.

WNY Sweet Corn Trap Network Report, 9/15/15

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

Eighteen sites reporting this week. European corn borer (ECB)-E and ECB-Z were caught at two sites this week. Corn earworm (CEW) was reported from twelve sites with ten sites high enough to require a 6, 5, or 4 day spray schedule. However, sprays are not required for fields that are within a week of harvest. Also if daily maximum temperatures are less than 80°F for the previous 2-3 days then

add one day to the recommended spray interval. Thirteen of the eighteen sites reported Fall armyworm (FAW). Though several sites still had high trap counts, the average overall number of FAW are definitely beginning to drop. Western bean cutworm (WBC) numbers are very low but six sites still reported trap catches for this week.

WNY Pheromone Trap Catches: September 15, 2015

Location	ECB-E	ECB-Z	CEW	FAW	WBC	WBC to date
Baldwinsville (Onondaga)	NA	NA	NA	NA	NA	139
Batavia (Genesee)	NA	NA	NA	NA	NA	22
Belfast	NA	NA	NA	NA	NA	4
Bellona (Yates)	NA	NA	NA	NA	NA	200
Eden (Erie)	0	0	24	65	1	959
Farmington (Ontario)	0	1	1	0	0	20
Hamlin (Monroe)	0	0	6	5	5	103
LeRoy (Genesee)	1	1	10	7	10	92
Lockport (Niagara)	0	0	1	13	0	32
Pavilion	0	0	25	134	0	521
Penn Yan (Yates)	1	0	0	14	NA	65
Seneca Castle (Ontario)	NA	0	4	118	0	19
Spencerport (Monroe)	0	0	5	4	0	10
Waterport (Orleans)	0	0	0	1	0	7
Williamson (Wayne)	0	0	0	0	0	0
ECB - European Corn B		Vestern E		worm		

CEW - Corn Earworm

FAW - Fall Armyworm

NA not available DD -

Degree Day (modified base 50F) accum.

Pounce) are the first choice of most growers because they are on hand and fairly inexpensive. But increasingly, we're seeing cases where these old standards aren't working as well as expected. This isn't surprising; pyrethroid resistance has been documented in several species, including the green peach aphid commonly found in peppers.

So, maybe the old standard of using pyrethroids (Group 3A) should be given a second thought. At the very least, make a point to rotate chemistries. You certainly don't want to expose a population to the same product or efficacy group all season long. Here's some other materials we've taken a look at in our 2015 aphid field demo and other trials that you may want to consider*:

Assail 30 SG (acetamiprid), Group 4A

Several growers getting less-than-desirable results with pyrethroids in vine crops have tried Assail this season. They report having much better success, in cases going from 40-50% control with pyrethroids to 80-90% control. Control is even better in open canopied peppers, though it has a long (7 day) preharvest interval.

Beleaf 50SG (flonicamid), Group 9C

Beleaf is more popular in peppers than in vine crops, because it has a much shorter PHI (0 days, 12 hour re-entry interval). The material works well in our CVP demo experience. Aphids treated with Beleaf will stop feeding after spraying, but will take a few days to actually die off.

Fulfill (pymetrozine), Group 9B

Fulfill is less commonly used, but performs as well as the Assail and Beleaf when populations are caught early. This is not recommended for heavy infestations. The PHI is short in peppers and vine crops (0 days), and you must leave 7 days between applications.

Mycotrol-O and Botanigard (Beauveria bassiana), Biocontrol

Mycotrol-O (organic) and Botanigard (conventional) are sprays that contain the spores of an aphid attacking fungus. This material has been highly effective in CVP trials, especially in cool season greens production. It is a contact insecticide – the fungus spores must land on the aphids and germinate. This means that it is better suited to open canopy crops like kale, greens, lettuce before heading, and peppers, where you can get good coverage. It is a live fungus, so don't expose it to any fungicide residues in your sprayer. Unlike most other materials, this is best applied before wet, cloudy weather or as an evening spray.

*As with all pesticide applications, be sure to thoroughly read the label before spraying.

More than Bravo May be Needed to Manage ALS in Cole Crops

Christy Hoepting, CCE Cornell Vegetable Program

<u>Alternaria leaf spot (ALS)</u> develops on older leaves first and is not a problem unless it infects the head (Fig. 1). Look for circular small, dark/brown spots with concentric rings (target spots) on the upper surface of leaf. When humidity is high, lesions can be covered with a sooty black mass of spores (Fig. 2). Symptoms on cauliflower and broccoli heads begin as browning at the margins of individual flowers. Black sunken spots develop on individual florets and expand to include large areas of the head. On cabbage, spots range in size from pinpoint to several centimeters in width.



Figure 1. Cauliflower head infected with Alternaria leaf spot. *Photo: Chris Smart, Cornell*

Bravo, Quadris/Quadris Top, Switch, Cabrio and Inspire Super are control options for ALS. In a 2010 Cornell study, Dillard *et al.* found that best control of ALS was achieved with Switch, followed by Quadris and then Rovral (only labeled on Chinese mustard). **Although Bravo provided some control of ALS, it was not as effective as the other fungicides.** None of the fungicides provided more than 50% control of ALS in this study.

Another study conducted in the greenhouse showed that different isolates of Alternaria brassicicola (the most common pathogen of ALS in NY) collected from different fields across NY responded differently to the different fungicides. In two of the isolates, Quadris Top provided 88 to 100% control of ALS, which was closely followed by Bravo, while Inspire provided ~50% control. In another isolate, Bravo failed to control ALS while Quadris Top and Inspire provided only ~50% control. Finally, in a forth isolate, none of the fungicides provided any control of ALS. Finally, isolates collected in 2011 from cauliflower, Brussels sprouts and kale were effectively controlled by Bravo and Quadris Top. Previous studies outside of Cornell have shown that best control of ALS caused by Alternaria brassica (not brassicicola) was provided by Inspire Super, followed by Quadris and then Bravo. These results suggest that ALS can be very challenging to control with fungicides, especially when weather conditions are very favorable for disease development.

For best control, when disease pressure is threatening head quality, a tank mix of Quadris/Quadris Top + Bravo should be used, perhaps alternated with Switch or Inspire Super. Note that there are restrictions on the num-

ber of consecutive applications and rotation partners that can be used with Quadris/Quadris Top and Inspire Super for resistance management. For example, Inspire Super, Quadris, Pristine and Cabrio cannot be used as rotation partners with Quadris Top. Read labels carefully! Protectant fungicides should be used *before* disease levels are high and uniform coverage of fungicides is essential.

Other practices for managing ALS include:

- Avoid using varieties that have shown chronic problems with ALS.
- Incorporate crop residue immediately after harvest to remove this as a source of disease for other plantings and to hasten decomposition of the infested material.
- Rotate away from cruciferous crops for a minimum of two years.
- Straw mulch can reduce disease incidence by providing a protective barrier against soil-borne inoculum.
- Good weed control maintained.
- Storage cabbage should be handled carefully during harvest to avoid bruising and other wounds that will allow easy entry of the fungus.
- Storage facilities should be thoroughly cleaned of debris before harvest and wooden storage boxes disinfected.



Figure 2. Diagnostic target-spot lesions of Alternaria leaf spot on cabbage leaf. Notice the black spores in the center of the lesions.

High Tunnel Tomato Management – Conventional Fertility

Judson Reid, CCE Cornell Vegetable Program

In a previous tunnel update *(see VegEdge7/8/15)*, we covered some of the challenges of organic fertilizers; they are bulky and often contain and wild mix of nutrients, rarely in the proportion our high tunnels crops need. With conventional fertilizers we have a wide selection of options, often of specific nutrients in isolation. So, conventional growers should have no problem applying the precise needs of the crop without any impairment to long term soil health, right? Perhaps in theory, but in reality conventional fertilizers leave much to be desired as they are often employed in high tunnel tomato production.



Figure 1. Over application of phosphorus is common on many conventional farms and may inhibit the uptake of other key nutrients.

Many growers begin their fertilizer program with a material such as 20-20-20. This leads to deep green, vigorous plants initially but, tomatoes grow and ripen fruit well when N, P and K are delivered in a 1.0:1.5:3.0 ratio. Thus we are over applying P and under applying K with any 1:1:1 material. The over application of P can decrease K uptake, which is already being under applied. This would lead us to believe that 9-15-30, or similar fertilizer is the solution. It often can be, but we must remember that high tunnels are not hydroponic systems and our soils have the ability to store P (as well as Ca) over time. With these nutrient excesses, the soil becomes out of balance, resulting in reduced vigor, fruit set and quality.



Photo: Judson Reid, Cornell Vegetable Program

Solutions? First soil test annually in the fall. The soil is still warm and biologically active at this point giving a more accurate measure of P. Fall testing also gives us time to add either lime or sulfur if indicated. Since it is hard to obtain soluble fertilizers in the perfect ratio, it may be wise to apply any P, K or micronutrients called for granular, pre-plant. Nitrogen could then be applied as a stand-alone nutrient in the drip. Regular foliar testing is the next step in the process, allowing us to fine tune any imbalances as the season progresses. In our experience heavy bearing, early determinate tomatoes may be impossible to keep in the 'green' due to the intense nutrient sink that occurs during the main harvest. However, by matching our fertilizers and pH amendments to known levels in the soil, we are able to grow a higher yielding and quality tomato crop over the long term.

This information is a synthesis of several projects funded by New York Farm Viability Institute, Specialty NYSDAM Crop Block Grants and CU Federal Formula Funds, and NNY Agricultural Development Program.

Late Blight Risk

Carol MacNeil and John Gibbons, CCE Cornell Vegetable Program

Conditions have remained very favorable for <u>late blight (LB)</u> development the past two weeks due to continued long dew periods and then the recent rain. New confirmations continue to come in from Western and Central NY. All counties in Western NY and the Finger Lakes Region have confirmed LB except Chautauqua, Cattaraugus, Allegany and Seneca. Several local locations (see chart) have accumulated very high <u>Decision Support System (DSS)</u> <u>blight units (BU)</u> in the past week, requiring a 5 day interval, alternating the best LB fungicides, on tomatoes, and on late, green potatoes. Many locations were around the 30 BU threshold, requiring a 7 day interval, using the best LB fungicides in high risk micro-environments (near trees, etc.). Other locations were in between, requiring either a 5 day interval, or a 7 day interval with the best LB fungicides.

LB fungicides with a longer residual, include Previcur Flex, Presidio, or Ranman, with a mixing partner, or Revus Top. Mefenoxam formulations (Ridomil, etc.) have the longest residual on the foliage (alternate with another material). (Note: All confirmed LB tested for LB strain within 100 miles or more have been US23.) For potatoes, where tubers are sizing up, use a fungicide with activity against tuber blight, such as: Presidio or the high rate of Ranman, with a mixing partner; or Forum with a mixing partner; or Gavel or Zing! (Note: Some of these latter materials don't have the longest residual.) Mefenoxam also has activity against tuber blight, but rotate with another fungicide. Where potato foliage is mostly dead, with a much less dense canopy, regular applications of copper are adequate.

Don't harvest potato fields where LB has been observed until 2-3 weeks after the last vine-killing. Do not produce cull piles of potatoes infected with LB. Culls should be spread on fields which will not be tilled, and where potatoes will not be grown the following year. This can result in the freezing and complete destruction of the potato and of the LB organism. Potato culls can also be destroyed by deep (2 ft.) burial, or feeding to livestock.

From Amanda Gevens, University of WI, Veg Crop Update, 9/5: In tomato, foliar infection may precede fruit infections. Clean harvesting infected plants can capture some return before fruit lesions develop. Fruit with subtle yellow or blush color can ripen off the vine. Continue to monitor the fruit post-harvest as there may be LB infections too small to be visible at harvest. Fruit without symptoms that were harvested from plants with LB are safe to eat. See the link regarding food safety precautions for processing/canning tomatoes with LB, however, below, due to secondary bacterial infections of fruit which may pose a risk for illness (B. Ingham, UW-Food Science).

http://fyi.uwex.edu/news/2009/08/26/tomatoes-andpotatoes-infected-with-late-blight-are-they-safe-for-eatingor-preserving/

Late Blight Risk Chart, 9/1	15/15 ³
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Location ¹	Blight Units ² 9/09-9/15	Blight Units ² 9/16-9/18	Location ¹	Blight Units ² 9/09-9/15	Blight Units ² 9/16-9/18
Appleton	32	17	Kendall	30	15
Arkport	42	18	Lodi	28	18
Baldwinsville	32	19	Lock/Niag F.	30	18
Bergen	23	17	Lyndonville	45	11
Buffalo	31	18	Medina	29	16
Butler	NA	NA	Penn Yan	31	18
Ceres	35	17	Rochester	35	18
Elba	57	17	Sodus	25	18
Farmington	32	19	Versailles	17	16
Gainesville	45	19	Wellsville	31	19
Geneva	29	17	Williamson	42	18

1 Past week Simcast Blight Units (BU)

2 Three day predicted Simcast Blight Units (BUs)

3 Threshold = 30 BUs (susceptible variety, last fungicide-shorter residual)



Figure 1. Late blight infected potato tubers. Note brown, corky internal tissue (A), and sunken, dark external symptoms (B). O Photos: Amanda Gevens, U of Wi, Veg Crop Update, 8/28/15





COLE CROPS

Cole crops, which had been suffering during the heat wave of early September caught a much welcomed reprieve with the steady rain over the weekend and were looking much refreshed this week. Hot weather has been favorable for worm pests, including the cabbage looper (Fig. 1). Also, cool nights and heavy dews of fall are favorable for Alternaria leaf spot – *see article, pg 3.*

Cabbage looper can be hard to kill when they get large, and should ideally be killed when they are small. Looper larvae are light green with a prominent white strip along each side of the body. It can be distinguished from other worm pests by its characteristic "looping" habit when it moves (even when they are only 3 mm long!) and reach 1.5 inches long when mature (Fig. 1). Early looper damage resembles that of diamondback moth (DBM) feeding on the undersides of the lower leaves. Larger larvae make ragged holes in the leaves and generally feed on the base of the head. Presence of larvae and frass in heads of fresh market cabbage, broccoli and cauliflower can render them unmarketable. A large cabbage looper causes 5 times more damage than DBM. To control cabbage looper, high rates of pyrethroids (Baythroid, Brigade, Mustang Max, Pounce and other permethrin formulations, Danitol, Hero, Asana and Warrior) may be needed. Also, Radiant, Synapse/Belt, Coragen, Voliam Xpress and Avaunt provide excellent control of large loopers.



Figure 1. Characteristic looping of cabbage looper in broccoli. *Photo: Christy Hoepting, CVP*

DRY BEANS

Don't miss the NYS Dry Bean Field Meeting, Thurs, Sept. 17, 5:15 pm, at Paul Stein & Sons Farm Bean Field in Caledonia. Contact Carol MacNeil at <u>crm6@cornell.edu</u> or 585-313-8796. Harvest of early planted, early varieties is continuing and quality is reported to be good. Yields are variable. The extended hot, dry period (before the recent rain) has hastened maturity. The recent rains have resulted in some bean regrowth. Trace amounts of European corn borer and Western bean cutworm damage have been seen.

ONIONS

The heat wave over the last couple of weeks took its toll on the onion crop causing excessive leaf dieback and the plants to die prematurely, or standing up. In addition to heat stress, downy mildew and Stemphylium leaf blight also contributed to this. In this situation, the onions do not lodge or cure properly, which can result in poor storage ability. Growers held off on pulling and harvesting too many onions during the heat wave, but after the weekend's rain, pulling was in full swing early this week (Fig. 1). Hopefully, the weekend's rain falling on onions that were dying standing up will not result in increased bacterial rot problems (Fig. 2). The race is now on to get the leaves and neck tissue dried down before harvest to ensure best bulb quality (Fig. 3). Despite all of this leaf dieback, bulb size is very good in most fields.

POTATOES

Vine killing and harvest are continuing, though growers were cautious during the recent hot weather. Harvest bruising and hot weather are the recipes for <u>Pythium leak</u> infection and development. To reduce harvest bruise and subsequent disease (leak, Fusarium, soft rot, etc.) be sure to: avoid harvesting when tuber pulp temperature is above 65°F; pad all deflectors and sharp points; make minimum use of agitation chains; keep all drops to a minimum (6"); and adjust chain speed in relation to ground speed to keep chains full to avoid roll-back. If potato foliage is hard to kill, or if tubers bruise easily, reconsider the rate of nitrogen you are using. Too much can delay maturity.



Figure 1. Pulled onions drying in wind rows that had properly lodged (left) compared to those that had died while still standing (right). *Photos: Christy Hoepting, CVP*



Figure 2. Bacterial diseases of onion move down the leaves, through the neck and into the bulb at this time of year. Once in the bulb, they cause bulb rot. *Photo: Christy Hoepting, CVP*



Figure 3. Bacterial infection located in neck tissue of an onion, which has not yet moved into the bulb where it will cause bulb rot. It is a race to dry down the neck tissue before bacterial infections can move from the neck into the bulb, because bacterial diseases only move in green tissue. *Photo: C. Hoepting*

Willie Kirk, Plant Pathology, MI State University, Aug 12: <u>Curing</u> disease-free potatoes can reduce storage shrink from dehydration by as much as 2-4% in the first month of storage. Tubers heal harvest wounds through the suberization and thickening of the skin during curing. Potatoes should be held at 50-60°F, and at high relative humidity, for 10 - 21 days. Uniform air movement is essential to avoid condensation and lack of oxygen. If <u>silver scurf</u> is present maintain the relative humidity below 85%. If there is decay in the potatoes eliminate the curing period and cool them down as quickly as possible.

Weather Charts

John Gibbons, CCE Cornell Vegetable Program

Weekly Weather Summary: 9/8 – 9/14/15

	Rainfa	all (inch)	Temp (°F)		
Location	Week Month		Мах	Min	
		September			
Albion	3.67	3.67	88	51	
Appleton, North	3.91	3.93	85	49	
Baldwinsville	1.64	1.64	91	54	
Buffalo*	2.49	2.91	88	49	
Butler	2.13	2.13	90	52	
Ceres	1.51	1.53	88	42	
Elba	1.97	1.99	83	46	
Farmington	1.20	1.21	88	51	
Gainesville	1.49	1.50	86	46	
Geneva	1.19	1.19	90	52	
Lodi	1.24	1.24	93	52	
Niagara Falls*	2.79	2.79	87	45	
Penn Yan*	1.46	1.46	88	53	
Rochester*	2.41	2.44	91	52	
Romulus	1.41	1.41	92	53	
Silver Creek	3.02	3.51	84	53	
Sodus	2.58	2.58	84	50	
Versailles	NA	NA	88	50	
Williamson	2.73	2.73	87	50	

Accumulated Growing Degree Days (AGDD) Base 50°F: April 1 – September 14, 2015

-		-	
Location	2015	2014	2013
Albion	2441	2158	2298
Appleton, North	2121	1939	2080
Baldwinsville	2440	2300	2370
Buffalo	2469	2252	2421
Butler	2450	2250	NA
Ceres	2114	1940	1951
Elba	1856	1735	2005
Farmington	2303	2115	2180
Gainesville	1920	1705	NA
Geneva	2356	2165	2296
Lodi	2572	2381	2533
Niagara Falls	2325	2154	2314
Penn Yan	2494	2305	2393
Rochester	2548	2324	2485
Romulus	2503	2247	NA
Silver Creek	2289	2188	2314
Sodus	2191	2054	NA
Versailles	2256	2113	2230
Williamson	2161	2059	2328

* 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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