



Vegetable News

Cabbage and Brassica Update

Chuck Bornt, *ENYCHP*



Figure 1: ICW feeding damage on cabbage (Picture by R. Foster)

The hot dry weather of late is really favoring insect populations to build. This week I found Imported Cabbage worm (ICW) and Diamondback moth (DBM) caterpillars in early cabbage with heads about 4" in diameter. This concerns me because once they get into the head it becomes much harder to control

material that has some translaminar activity such as the diamides (Coragen etc.) or spinosyns (Radiant).

To review from the June 15th issue of the ENYCHP Vegetable News (Vol. 4, Issue 8), ICW larvae start out as small velvety green caterpillars and after feeding for 2 to 3 weeks turn dark velvety green with a light yellow stripe down their back and a broken stripe along each side of the body. For me, it's the velvety or fuzziness of the caterpillar that distinguishes from DBM. When mature, they are approximately 1 1/4 inches long. You may also find the pupae in its "chrysalis" or cocoon stage attached to the undersides of the leaves. When in doubt scouting, follow the "frass" or the poop that they leave behind during feeding.

them. The threshold for fresh market cabbage in the early headed to harvest stage is 10% - 15% (combined damage) infestation or 1.5 plants per 10 scouted, which demonstrates the need to control these pests at this stage. The two fields that I was in yesterday were well over the thresholds mentioned here, with the predominate worm being ICW. See Table 1 for a list of effective insecticides against these pests. Please note that once they get into the head, it becomes increasingly difficult to control them with contact materials like pyrethroids. At this stage I would consider a



Figure 2: ICW chrysalis (Photo by Chuck Bornt) and caterpillar feeding on a cabbage leaf (Source: Dept. Entomology and Pathology, Oklahoma State University)

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Diamondback Moth: DBM larvae begin mining within leaf tissue and later instars feed on heart leaves of young plants and underside of the leaf surfaces of more mature plants. Mature larvae are 1/3 inch long, pale greenish-yellow, and pointed at both ends. They are not nearly as fuzzy looking as ICW and tend to have "bristles" if looked at with a hand lens. I also tend to think they have a "forked" tail as well compared to other species. Other identifiers include habit of actively wriggling or dropping from the leaf on a silken thread when disturbed. The pupa develops within a delicate, loosely spun, open lacework cocoon that is attached to the leaves and stems of the plant.

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DBM pupa (left) and larva (right). Note the forked tail on the larvae. Photo courtesy of Manitoba Agriculture, Food and Rural Initiatives

Table 1 is a list of insecticides labeled for use on various cole crops with tentative efficacy ratings for control of imported cabbage worm (ICW), small and large cabbage looper (CL) and diamondback moth (DBM), which was put together by Cornell researchers in Long Island. Growers and other researchers may have somewhat different opinions and results vary according to rates, application method and frequency, location, etc. so selection of controls should not be made solely based on this chart. Not all materials are labeled for all crops or areas - check labels. For most cole crops, addition of a spreader-sticker is advised. Source: Veg Edge

Table Key and Footnotes:

xxx = most effective (usually good control expected)

x = least effective (fair or poor control)

- = not labeled or not effective.

Not all formulations listed.

Rates in amount of formulated product unless otherwise indicated.

¹ 4.5 – 6 oz for CL

² higher rates needed

³ Where insecticide resistance is not a problem better control of DBM with some materials may be expected

⁴ *Bt aizawai* may provide better control of DBM where populations are resistant to *Bt kurstaki*

⁵ Avaunt is not labeled for use on Long Island.

⁶ Has not been trialed in University studies.

⁷ a premix of Warrior + Actara/Cruiser.

⁸ A premix of Coragen + Warrior.

⁹ Continued registration status for Belt is expected July 6. It can't be sold, but growers with Belt on hand can still use it.

¹⁰ Ambush and Larvin are still registered but in 'discontinued' status (ending in 2017)

Table 1: Relative Efficacy of Insecticides for Control of Worm Pests in Cole Crops

Material, Formulation and Rate	IC W	Sm CL	Lg CL	DB M ³
Diamides (Group 28):				
Coragen (3.5 – 5 fl oz)	xxx	xxx	xxx	xxx
Voliam Xpress ⁸ (5-9 fl oz)	xxx	xxx	xxx	xxx
Exirel (7 -13.5 fl oz)	xxx	xxx ²	xxx ²	xxx
Belt SC (2-2.4 fl oz) ⁹	xxx	xxx	xxx	xx
Spinosyns (Group 5):				
Radiant SC (5-10 fl oz)	xxx	xxx	xxx	xx
Entrust SC (1.5 – 4 fl oz)	xxx	xxx	xx	xx
Indoxacarb (Group 22):				
Avaunt 30WG ⁵ (0.15 – 0.22 lb)	xxx	xxx	xxx	xxx
Avermectin (Group 6):				
Proclaim 5G (2.4 – 4.8 oz)	xxx	xxx	xx ²	xxx
Pyrethroids (Group 3A):				
Warrior II w/ Zeon Technology (1.28 – 1.92 fl oz)	xxx	xxx	xx	x
Endigo ZC (4 – 4.5 fl oz) ⁷	xxx	xxx	xx	x
Danitol 2.4 EC (10.6 – 16 fl oz)	xxx	xxx	xx	x
Brigade/Capture 2EC (2.1 – 6.4 fl oz)	xxx	xx	xx	x ²
Pounce/Ambush (0.05 – 0.2 lb ai) ¹⁰	xxx	xx	x	x
Baythroid XL (1.6 – 2.4 fl oz)	xxx	xx	x ²	x
Perm-Up 3.2 EC (2-4 fl oz)	xxx	xx ²	x ²	-
Mustang Maxx (2.24 - 4 fl oz)	xxx	xx ²	x ²	-
Asana XL 0.66EC (5.8 – 9.6 fl oz)	xxx	x ²	x ²	-
Hero (4-10.3 oz)	? ⁶	?	?	?
Bts (Group 11):				
<i>Bt kurstaki</i> (see labels) (Biobit, Javelin, DiPel, Crymax)	xxx	xx ²	x ²	x ²
<i>Bt aizawai</i> (see labels) (Xentari, Agree)	xxx	x	x	xx ⁴
OPs (Group 1B):				
Orthene 97 (1.0 lb)	xxx	xx	xx	x
Carbamates (Group 1A):				
Lannate LV 2.4L (1.5 – 3 pt)	xxx	x ²	x ²	x ²
Larvin 3.2F (16 – 40 fl oz) ¹⁰	xxx	x ²	x ²	x ²
Sevin 4F (1-2 qt./A)	x	-	-	x

Vine Crop Update

Chuck Bornt, *ENYCHP*

Now that green and yellow summer squash harvest is moving right along, it's time to think about controlling powdery mildew in these crops, especially if your next planting is behind due to the dry weather. Powdery mildew is a pathogen that is always around but we normally don't see it until there is stress put on the plant and there is no greater stress to a plant than when it starts to fruit. Quintec is not an option as it cannot be used on "edible peel" cucurbits which includes green and yellow squash along with cucumbers. The good news is we have a fair amount of other PM materials to use. Tornado and Vivando are the two newest materials labeled for PM and will only control PM. They are both best used as preventatives or before the disease gets started. They are also useful in that they have a 0 pre-harvest interval.

If you have early pumpkins, gourds or winter squash that are starting

to set fruit, you can include and I would recommend that you start with Quintec at 4-6 fluid ounces tank mixed with a protectant such as chlorothalonil. I've also given you the different FRAC codes (Fungicide Resistance Action Committee) which represent the different modes of action of the fungicides. Please use these codes or groups of fungicides to rotate your sprays and reduce the chance of fungicide resistance. Please pay attention to products with multiple modes of action in the same container as well.

Downy Mildew: We've not seen any Downy Mildew in the region, but we just got word from Cornell Plant Pathologist Chris Smart that DM was confirmed on cucum-

Table 1: Partial list of conventional and organic fungicides labeled for Powdery Mildew Control in summer squash.

Fungicide	FRA C Code	Recommend- ed Rate/Acre	REI	PHI	Seasonal Limits	Adjuvant Recommendations
Vivando ¹	U6	15 fluid ounces	12 hours	0 days	3 applications	
Torino ¹	U8	3.4 ounces	4 hours	0 days	2 applications	Organosilicone or non-ionic surfactant
Procure ¹	3	8 fluid ounces	12 hours	0 days	40 fluid ounces total	
Merivon ¹	7	5.5 fluid ounces	12 hours	0 days	3 sprays	
Chlorothalonil (Bravo or other labeled formulation)	M5	See specific label	12 hours	0 days		
Regalia ²	P5	1—4 quarts	4 hours	0 days		
Trilogy ²	NC	0.5—1%	4 hours	0 days		
JMS Stylet Oil ²	NC	3—6 quarts per 100 gallons water	4 hours	0 days		
Potassium Bicarbonate (MilStop, Armicarb etc.) ²	NC	2.5—5.0 lbs	Varies by product			
Actinovate AG ²	NC	3—12 ounces	1 hour	0		

¹ Should mix with a protectant partner such as chlorothalonil.

² Approved for organic use, but be sure to double check with your certifying organization.

bers from Ontario Canada (Kent County). This information has yet to be posted on the Downy Mildew website. Please be on the lookout for downy mildew on cucumber and other cucurbits. We will keep you posted on the movement of DM across the country and of course across the state. Because this newest finding hasn't even been posted yet on the Cucurbit Downy Mildew Forecasting website (<http://cdm.ipmPIPE.org/>), the forecasting tool has not updated to give us a new report. However, watching the weather report on the news this morning, I know that they were reporting a storm front heading our direction from the northwest so I believe it would be wise to make sure your cucumbers have a protective fungicide at the least. Remem-

ber that all stages of cucumbers are sensitive to this strain of DM followed by melons, summer squash, winter squash and pumpkins. See the table below for Downy Mildew fungicide options.

Please note that in recent years we have had very good success with controlling DM with Previcur Flex. However, last year in NYS and elsewhere, Previcur Flex was not providing good control of DM due to increased resistance of the pathogen. Therefore, we are not recommending Previcur Flex this year. Ranman and a newer material called Zampro are providing very good control. See Table 2 for a list of fungicides labeled for DM. Double Nickel (rates dependent on formulation) has shown some effectiveness for controlling DM as has copper, especially if applied before the disease develops.

Table 2: Partial list of conventional fungicides labeled for Downy Mildew Control in cucurbits.

Fungicide	FRAC Code	Recommended Rate/Acre	REI	PHI	Seasonal Limits	Adjuvant Recommendations
Ranman ^{1,2}	21	2.75 fluid ounces	12 hours	0 days	6 sprays	Organosilicone or non-ionic surfactant
Zampro ^{1,2}	40 + 45	14 fluid ounces	12 hours	0 days	3 sprays	
Fourm ^{1,2}	40	6 fluid ounces	12 hours	0 days	5 sprays	
Presidio ^{1,2}	43	4 fluid ounces	12 hours	2 days	4 sprays	
Tanos ^{1,2}	27 + 11	8 ounces	12 hours	3 days	4 sprays	
Zing!	22 + M	36 fluid ounces	12 hours	0 days	8 sprays	
Curzate ¹	27	3.2 ounces	12 hours	3 days	9 sprays	

¹ Should mix with a protectant partner such as chlorothalonil.

² Also labeled for Phytophthora blight.

None of the above fungicides will control Powdery Mildew.

Pruning Tomato Leaves: How much is too much?

Amy Ivy, ENYCHP

Tomatoes are vigorous crops, producing lots of fruit and lots of leaves throughout the summer. Removing their lowest leaves helps reduce foliar diseases by increasing the air flow around and between the plants. And just like removing suckers, it also directs the plants' resources to setting and ripening more fruit. This is especially helpful with the more intensively managed high tunnel crops.

For determinate tomatoes, remove all the leaves up to the first fruit clusters. Indeterminate tomatoes behave more like a vine and will keep on growing and producing fruit as long as the season allows, getting longer and taller. Because they keep growing, you need to keep pruning. Remove all the lower leaves up to the first fruit cluster, then remove a few more each week. Growers differ in the degree to which they remove these leaves. Some expose only the lowest fruit cluster while others like to expose 2-3 clusters of fruit. Somewhere in between is ideal.

The plants in the left photo need their lower leaves removed, while the plants in the right photo are on the verge of excessive pruning. Try to find a balance between fruit set and leaf tissue. When in doubt, expose the lowest fruit cluster and then gradually keep removing leaves up the stem as the fruit is harvested.



CAUTION: Cucurbit Downy Mildew

Maire Ullrich, ENYCHP

Cucurbit Downy Mildew has been identified in several states up the east coast from Florida. Now it also has been seen in Ontario, Canada. Because this is a fast-moving disease, quick action is needed if you see it.



Early Lesions of Cucurbit Downy Mildew. Photo Courtesy of M.T. McGrath, Long Island Horticultural Research and Extension Center, Cornell University



Lesions and sporulation. Photos Courtesy of M.T. McGrath, Long Island Horticultural Research and Extension Center, Cornell University

Initial, spots are small and water soaked, then they become more yellow. Spots are angular, delineated by the veins. Several spots may coalesce forming larger spots. An over-

all yellow mottling may occur. In the even the weather is right, this disease moves quickly and with a couple of days, you may see a purple-grey fungus on (usually lower surface) of the leaves and leaves may begin to die. Very quickly, fields can succumb to this fungus. All cucurbits can be infected (cucumbers, melons, pumpkins etc.).

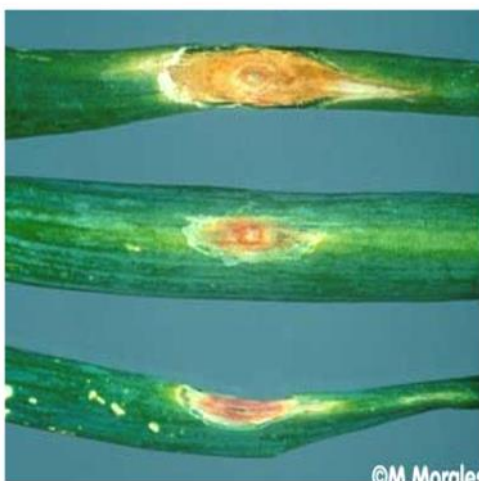
Using the appropriate chemicals is also important in successful management. See the Guidelines....

Mobile fungicides are needed to effectively manage downy mildew on the underside of leaves but are at risk for resistance development. To minimize selection of resistant pathogen strains and impact of resistance on control, alternate among chemical classes and apply these products with protectant fungicides; note that this is a label requirement for some products. Ranman, *Zing! or Gavel (same active ingredient), Forum, Omega, and Aliette are considered the most effective choices currently. Efficacy recently in research plots and commercial fields has been substantially reduced compared to when first available for several fungicides, most notably *Presidio and to a lesser degree Previcur Flex, Revus, Curzate, and Tanos. These changes are likely due to resistance having developed. Revus has exhibited variable control across crop types; efficacy has been poor on cucumber and excellent on pumpkin. Curzate and Tanos have limited residual activity which partly explains poor control when applied on a weekly schedule. Phosphorous acid fungicides are not as effective for this DM as for others. Ridomil Gold, and the QoI fungicides (Quadris F, Quadris Opti, Flint, Cabrio, Pristine, and Reason are no longer recommended because of resistance.

Onions and the Heat

Maire Ulrich, ENYCHP

The 3 days of 90+ degree heat will stress the onion crop. Onions do not grow much above 88° because they are spending so much time respiring (sweating, kind of) that they do not have the additional energy to grow. And, often, if there are additional stresses such as low moisture or herbicide stress, the onions may seem like they are “going backwards”. Avoid additional stresses, if you can, such as herbicide applications. Unfortunately, sunny is the best time to do some to reduce likelihood of phytotoxicity. Do your best to balance the stress to the crop and the needs of weed control.



Also know, this is the time when we might start to see Purple Blotch or *Alternaria porri*. It is an opportunistic disease that needs stressed tissue to develop, that's why we often first see it on outer leaves or tips that have suffered tip-burn. However, in this heat, Botrytis becomes less of a threat since it will not reproduce in these temperatures. Check the Guidelines or labels to be sure that whatever mix you are applying includes fungicides that are effective against Purple Blotch.

Photo: M. Morales. Source: Cornell University Vegetable MD on

Making the Case for Field Grading at Harvest (and Timing the Harvest)

Crystal Stewart, ENYCHP



Garlic harvest will be starting this week in some areas of eastern NY, and the amount of disease present has been slowly increasing over the last few weeks. The increased pressure makes it more important than ever to field grade garlic. Field grading is not just about choosing what garlic will stay in the field—it is also about deciding what garlic is food grade and what garlic is seed grade. A lot of the garlic that I have been pulling this week has enough *Fusarium*, for example, to cause it to flag early, but not so much to keep it from making a marketable bulb. After these bulbs are cured and cleaned, it will be a challenging to tell there was an issue at all, especially if the basal plate gets shaved and cleaned. As a quick example, the top image to the right is of a garlic plant which was dying much faster than others in the field, and which showed some fusarium basal rot symptoms when I pulled it out. A quick cleaning of the bulb yielded what you see in the second picture.



Why bother?

If the garlic was healthy enough to make a decent bulb, why not assume it's healthy enough to plant? The primary reason is that you know that you are going to be planting disease inoculum along with the bulb in the fall if you plant seed that started out diseased. You may be able to reduce inoculum level with sanitizing dips, but chances are low that you will eliminate disease altogether. By visually selecting the healthiest bulbs for seed stock, and then possibly also following with a sanitizing dip at planting, you can compound your disease reduction efforts.

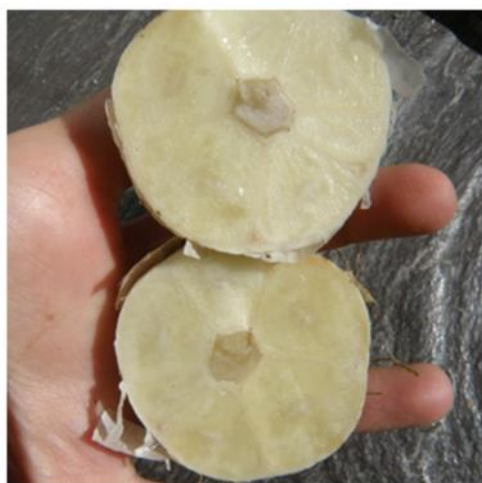
Timing the Harvest:

As we near harvest, how should a grower decide if the garlic is ready? The best answer is to pull a few plants, cut through the head sideways (so you cut through all the cloves), and see how well developed the cloves are. You

can use the leaves as a guide to decide when to do this (lowest third or half of the leaves yellowing and dying is a good mark to start with, though this has been challenging this year because of the tip burn), but looking at the cloves is the best way to know if the garlic is ready. Cloves should fill the wrappers—if they seem a little loose, the garlic has a little ways to grow. On hardnecks, this filling will pull the inner cloves away from the scape (see below). A little of the very outer wrapper leaves may have started to decay at this point. That is okay—it's a normal part of the maturation process. The key is to harvest before the bulbs pop, which can happen relatively quickly, especially if we have another wet year. If you don't think you will be able to get out and harvest for a period of time, it's better to harvest bulbs a little too early than a little too late.

Knowing when to harvest garlic can be tricky. Use the leaves as a first indicator, but also feel and look at the bulb. You want the bulb to be very firm in its skins, and when you cut it in half perpendicular to the scape you want to see a small gap around the scape. The garlic on the bottom isn't quite ready; the garlic on the top is.

Photos by CLS



Local Food Directories: National Farmers' Market Directory Update

Jesse Strzok, ENYCHP

The USDA is requesting your help to update the National Farmers' Market Directory by July 15. The USDA National Farmers Market Directory aggregates a large amount of information from when and where to available products and accepted forms of payment. Please see the ENYCH website article for more information or visit search.ams.usda.gov/farmersmarkets/.

Average Weekly Farmers' Market Prices

UPCOMING EVENT

Twilight Meeting:

**Long-Term High Tunnel
Soil Health and Nutrient
Management for Tomato
Production.**

**Thursday, July 14,
6-8:00 pm.**

Host Obercreek Farm (**Dutchess County**) shares their success in managing tomato production in a high tunnel by maintaining and improving soil health and fertility, controlling pests and disease, and ensuring profitable yield and excellent quality. Registration fees are \$15/person or \$25 for two or more people/farm. Sponsored by NOFA-NY through the NVFVI High Tunnel grant.

Product (NC = nonconventional)	Unit	Mid-Hudson	Capital	Saratoga - Lake George	Northern
Beefsteak Tomatoes	1 lbs.				
Beefsteak Tomatoes NC	1 lbs.		\$4.48	\$3.95	
Blueberries	pint	\$7.50	\$4.25	\$4.00	\$3.50
Blueberries NC	pint		\$5.00		
Carrots	bunch	\$3.00	\$2.50		\$2.00
Carrots NC	bunch			\$3.00	
Cherry Tomatoes	1 lbs.				
Cherry Tomatoes NC	1 lbs.		\$5.00		
Heirloom Tomatoes	1 lbs.				
Heirloom Tomatoes NC	1 lbs.				
Raspberries	pint		\$6.13	\$4.00	
Raspberries NC	pint		\$3.50		
Red Potatoes	1 lbs.		\$4.00		
Red Potatoes NC	1 lbs.	\$2.50			
Russet Potatoes	1 lbs.				
Russet Potatoes NC	1 lbs.				
Salad Mix	1/2 lbs.		\$3.00	\$5.00	
Salad Mix NC	1/2 lbs.	\$4.75	\$5.06	\$4.70	
Shelled Peas	pint	\$3.50	\$3.00		\$2.50
Shelled Peas NC	pint	\$3.50	\$4.00		
Strawberries	pint	\$5.00	\$4.67	\$4.00	\$4.00
Strawberries NC	pint		\$5.00	\$4.00	
Sugar Snap Peas	pint	\$2.50	\$3.58	\$4.00	\$4.00
Sugar Snap Peas NC	pint	\$3.50	\$4.17	\$4.60	
Sweet Corn	dozen				
Sweet Corn NC	dozen				
Yellow Potatoes	1 lbs.		\$4.00		
Yellow Potatoes NC	1 lbs.			\$4.00	

Site	2016 Weekly Total 6/28-7/5	2016 Season Total 3/1-7/5	2015 Season Total 3/1-7/5	2016 Weekly Rainfall (inches) 6/1-7/5	2016 Total Rain- fall (inches) 3/1-7/5	2015 Total Rainfall (inches) 3/1-7/5
Albany	146.0	1073.9	1388.0	1.42	8.44	12.89
Castleton	145.1	1036.0	1088.6	0.36	10.79	12.64
Glens Falls	135.6	942.5	960.0	1.51	10.7	13.42
Griffiss	120.7	841.0	906.0	0.84	14.23	19.87
Guilderland	137.5	959.0	1029.0	0.35	12.91	18.44
Highland	NA	NA	1172.8	NA	11.6	17.56
Hudson	156.6	1135.3	1170.6	1.45	13.88	16.82
Marlboro	143.4	1082.8	1112.8	1.47	11.72	13.55
Montgomery	147.6	1073.5	1152.0	0.72	9.81	15.09
Peru	133.3	864.8	884.9	0.22	7.32	15.43
Red Hook	142.6	1076.4	1105.6	0.29	8.3	13.42
Willsboro	125.6	849.0	860.3	1.07	8.86	18.82
N. Adams, MA	122.8	827.6	868.0	0.3	11.91	14.2

2016 Weather Table—The weather information contained in this chart is compiled using the data collected by Network for Environment and Weather Applications (NEWA) weather stations and is available for free for all to use. For more information about NEWA and a list of sites, please visit <http://newa.cornell.edu/>. This site has information not only on weather, but insect and disease forecasting tools that are free to use.

Sweet Corn Pest Chart (week ending 7/5)					
Location	CEW	ECBZ	ECBE	FAW	WBC
S. Clinton	0	0	0	0	0
N. Washington	1	0	0	0	0
S. Washington	0	0	0	0	0
Albany	0	0	0	0	0
Rensselaer	0	0	0	0	1
Saratoga	NA	NA	NA	NA	NA
Fulton	NA	NA	NA	NA	NA
Schoharie	NA	0	0	NA	NA
Greene	0	1	0	0	0
Orange	1	0	0	0	0
N. Ulster	6	1	0	0	0
S. Ulster	2	0	0	0	0
Ulster	1	0	0	0	0

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