UMass Extension

Vegetable Notes

For Vegetable Farmers in Massachusetts since 1975

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In this issue:

Crop conditions

With storm bursts followed by sunny days this past week, crops seem to be ready for harvest overnight! Growers are starting to ramp up harvest crews as broccoli, cabbage, head lettuce, zucchini/summer squash, and spring onions are coming in as well as the more labor intensive harvests like peas continue. At the research farm, we have been fertigating trials nervously as we get plenty of rain, knowing the crops don't need more water, but they do need a boost. We have also been pleased with cultivating around plastic using our Multivator. At a well-attended irrigation and food safety field walk yesterday at Tangerini's Spring Street Farm in Millis, MA, we learned about pumps, drip tape, water wheels and micro-irrigation from Trevor Hardy (Brookdale Farm, NH). Farmers Laura and Charlie Tangerini, and Assistant Manager Steve Chiarizio talked about designing the system with Trevor and working with Lisa Petruski at NRCS to fund the project. We also heard about FSMA and water testing from Lisa McKeag (UMass) and Michael Botelho (MDAR). In just 2 hours, we gained many helpful tips such as:

Trevor Hardy shows field walk attendees at Tangerini Farm in Millis, MA on Wednesday the new 'flow control drip tape' diesigned to evenly distribute water on hilly fields.

- Float suction hoses 1-2 ft. below the surface of a pond to draw in the cleanest water and keep filters running longer—marine float balls work well because they can stand up to UV exposure and they don't easily deflate.
- Tape the ends of irrigation lines closed for storage at the end of the season to keep rodents from residing inside and later making a mess in your irrigation system.
- 250-300 gal/minute are needed to irrigate 15-20 acres of vegetables.
- A new type of 'flow control drip tape' is available for hilly fields and can cover over 600ft. with a 25ft elevation gain.
- Micro-irrigation, which provides frost protection to strawberries and pumps out less than 1 gal/minute is considered a conservation practice eligible for funding by NRCS.
- Four labs in Massachusetts are currently certified to conduct the EPA Method 1603 test for quantifying generic *E. coli* in agricultural water samples. FSMA's Produce Rule states that growers should use this test or one that is scientifically equivalent. While we wait for guidance from FDA about equivalent tests, growers can continue using any certified laboratory tests that will quantify generic *E. coli.* See article this issue on the proper way to take a water sample.

Pest alerts

Brassica:

Diamondback moth caterpillars were reported in Franklin, and Hampshire Cos., MA and Imported cabbageworm was reported in Norfolk and Middlesex Cos., MA this week. Scout fields by checking undersides of leaves on 25

plants across the field. In the Northeast, there is generally no need to treat young plants unless weather conditions delay plant development and at least 35% are infested. Treat plants between the start of heading and harvest if 20% or more of the plants are infested. The most critical time to scout and apply controls is just prior to head formation. Use a 10-15% threshold throughout the season for kale, collards and mustard.

Cucurbits:

Squash vine borer adults have emerged in earnest at trapping locations across MA (Table 1), though there were still no eggs found even in the fields where trap counts were highest (20 in Easton and 28 in Sharon). While treatment threshold is 5 moths/trap/week, wait to spray until eggs are found in susceptible crops. Pyrethrins, pyrethroids, carbaryl, *Bacillus thurigensis* (Bt) toxin formulations are effective when newly hatched larvae at the base of the plant are targeted. 2-4 weekly applications may be necessary to achieve control.

Squash bug eggs were found this week in zucchini crops in MA and RI. A spray is warranted once eggs hatch and nymphs are first seen if there is more than one egg mass per plant, . When targeting adults use the following thresholds: 1 adult per plant for watermelon; 1 adult per 2 plants for more susceptible crops like summer squash, zucchini butternut, and pumpkin.

Squash beetle adults (not to be confused with Squash bugs or Mexican bean beetles, see photo) are now being reported in cucumbers and squash in RI. This minor pest is limited to southern New England and is usually not seen in most of MA. Feeding by adults and larvae creates round scars in leaves, leaving lacy veins intact. Adults can also produce spiral scars on the fruit which may render them unmarketable.

Cucurbit downy mildew was reported in New Jersey, Ohio and Essex Ontario (southernmost point) this week on cucumber. Storms from the south or west could bring the pathogen here, protect susceptible cucumbers before such a weather event. See article this issue for reccomendations

Table 1. 6/22/17-6/29/17

Location	SVB Weekly Total
MA	
Amherst	0
Easton	20
Westhampton	0
Millis	4
Sharon	28
Leominster	8
Berlin	1
NH	
Litchfield	1
Hollis	0
Mason	0

Squash vine borer (SVB)

Squash beetle. Photo: A. Radin

Potato:

Late blight has been confirmed as far north as Virginia this year, where it was observed on potato; so far the dominant genotype is US 23 (occurs on tomato and potato and is sensitive to mefenoxam). Some disease models predict a high risk for infection as far north as Long Island (not surprising with cool nights and dewy mornings), however, without a source of inoculum in MA, protective sprays are not yet recommended.

Potato virus Y (PVY) was confirmed in the variety 'Goldrush' on several organic farms in Hampshire and Franklin Co., MA. This disease is seedborne and then is transmitted by aphids. PVY can reduce yield at plant, as emerged plants may be stunted or slow-growing, or at harvest if tubers develop necrotic spots—Goldrush tubers did not seem to be affected last year, even in fields where virus incidence was high, but the virus could spread into other more susceptible varieties. Plant certified disease free tubers (and ask to see results from the winter grow-outs to check % virus) and choose resistant varieties like 'Premier Russet' or 'Eva.'

Colorado potato beetle eggs continue to hatch and we are seeing the full range of adults, small, and large larvae causing damage to potatoes and eggplant. The small larvae (2nd and 3rd instars) are most susceptible to sprays and should be targeted in order to stop them before they morph into those large monstrous larvae that do so much defoliating. Treat if you find 1 adult, 8 small larvae, or 3 large larvae per 2 stalks on potato, or 4 small

Table 2. Accumulated Growing Degree Days: 1/1/17 - 6/29/17

Location	GDD (base 50°F)
Western, MA	
Amherst	802
Westfield	892
South Deerfield	796
Central, MA	
Leominster	851
Stow	912
Eastern, MA	
Sharon	895
Seekonk	894
Ipswich	786
Hollis, NH	837
Burlington, VT	862
Newport, RI	738
Castleton, NY	933

or 4 large larvae per eggplant.

Sweetcorn:

European corn borer: We have passed the peak spring flight (631 GDD base 50F) of this pest without many moths at all! We are now in the first generation treatment period according to Tables 2 and 3, however, treatment is not likely needed due to very low pest pressure indicated by the trapping network. Scout tasseling and silking corn and treat if any fields are infested (more than 15% of the plants having one or more larvae present).

Corn earworm is being captured in NY and NH in silking corn. Some corn in MA is now silking as well and traps should go out, especially since we continue to get storms that can blow the CEW moths up to our region.

Sap Beetle: is being reported now on a farm which also grows peaches in Worcester Co., MA. This pest can be particularly troublesome on diversified fruit/veg farms because eggs are deposited in rotting fruit as well as in corn. Populations build when attracted to decomposing fruit, cull piles, or corn ears injured by birds or caterpillars. Ears with exposed tips, especially super sweet and Bt varieties, are susceptible to infestation. To prevent or reduce damage, select varieties that have good tip cover, use clean cultivation, control ear-infesting caterpillars and remove or bury decomposing fruit on a regular basis. Insecticides will not completely control heavy infestations.

Table 3 European corn borer (bivoltine) development estimated using a modified base 50F degree day calculation.

Development Stage	Growing Degree Days
First Generation	
First spring moths	374
First eggs	450
Peak spring moths	631
First generation treatment period	800-1000
Second Generation	
First summer moths	1400
First eggs	1450
First egg hatch	1550
Peak summer moths	1733
Second generation treatment period	1550-2100

J. W. Apple, Department of Entomology, University of Wisconsin

Multiple

Potato leafhopper is now reported to be causing damage and hopper burn (on beans and potato) in locations all over New England including MA. The presence of hopperburn indicates a potentially yield-limiting population and action should be taken to protect the crop—treat potato if more than 15 nymphs are found per 50 compound leaves. In green beans, thresholds are 0.5 per sweep or 2/ft of row at the seedling stage, and 1/sweep or 5/ft of row from 3rd trifoliate leaf to bud stage. Use a threshold of 1.5 leafhopper per leaf in eggplant.

Saltmarsh caterpillar is usually not a major pest of vegetable crops but can do some damage in hot spots. These were found feeding on allium and brassica crops in RI this week and Eastern NY last week. According to the UMass Floriculture program: "Salt marsh caterpillars have a wide host range. They may feed upon broad leaf weeds (especially pigweed), vegetable and field crops plus herbaceous perennials such as mallow, Joe-Pye weed, asters and yarrow. Salt marsh caterpillars are very hairy. Young larvae are yellowish white becoming more reddish brown as they grow. Often, caterpillars may be found on the edges of outdoor mum fields especially near weedy areas, but they are active dispersers and can move into the greenhouse to feed upon mums. Young larvae skeletonize the foliage but as they grow you may see large holes in the leaves plus the presence of caterpillar droppings (frass). Adults are fairly large white moths with many small black spots. Larvae can be managed with either chemical insecticides labeled for caterpillars or *Bacillus thuringiensis* when they are young and actively feeding."

Saltmarsh caterpillar defoliating broccoli. Photo: A. Radin

MANAGE SWEET CORN PESTS THROUGH SCOUTING AND PHEROMONE TRAPPING

The earliest corn is now tasseling and some is silking in MA. Many successions are coming up across the state and the first European corn borer (ECB) flight has passed—pressure from them was fairly low. *Trichogramma ostrinea* biocontrol releases were made several weeks ago. Other major sweet corn pests will be emerging and arriving soon including corn earworm (CEW), fall armyworm (FAW), sap beetle) and this year, we are monitoring for western bean cutworm (WBC) in the western part of the state where the pest may move in from New York. Common armyworm has been reported this year as a minor pest causing damage in some hotspots in Eastern NY and NH, but not in MA.

Brown and Green CEW photos: E. Grundberg

Fall Armyworm photo: R. Hazzard

Given this menagerie of pests to manage in sweet corn, farmers, Extension educators and scouts in Massachusetts all contribute to a statewide pheromone trapping network for ECB, CEW, FAW and now WBC, in order to monitor populations. We also receive and publish trap counts weekly from Extension educators in the neighboring states of NY and NH. We report this information regionally so that growers may be prepared to manage these pests effectively. Both pheromone trapping information and scouting are needed to successfully manage corn pests. Refer to the UMass Sweetcorn Insect Management Field Scouting Guide for instructions and record sheets to scout corn now. Each stage of corn growth (whorl, tasseling and silking) has a different scouting procedure and treatment thresholds.

ECB eggs at blackhead stage. photo: A. Radin.

Whorl Stage Corn: FAW and ECB may be found in whorl stage corn, but it is better to wait for tassle emergence to begin treatments. Darcy Telenko of Cornell Extension wrote: "Two well-timed applications at tassel emergence have been found to be more effective than applications at the whorl stage on bare ground sweet corn even when ECB trap counts are high. Larvae feeding in the whorl are protected from insecticide applications and mortality will not be as high as at tassel emergence, when larvae feeding in the emerging tassel are exposed to the spray. Larvae will leave the tassel as it opens up and no longer provides a moist, protected feeding environment, and move down the plant looking for protected places to feed. Insecticide applications need to be timed to kill larvae before they bore into a new feeding location where again they will be protected from sprays. In fields with very uneven development, two applications may be necessary, one when approximately 25-50% of the tassels have emerged, and again after 75-100% of the tassels have emerged, if the field is still over threshold."

European Corn Borer. photo: R. Hazzard

Tasseling Corn: Begin scouting for ECB and FAW larvae when tassels first emerge in the whorl (probably now!). For corn borers, look down into emerging tassels for tiny larvae or frass (white to brown material about the size of fine sand). For armyworms, look for ragged feeding holes and frass pellets the texture of coarse sawdust. If threshold is reached at this growth stage (Table 1), sprays should be made to target the tassels. Treat the field if more than 15% of plants are infested with FAW and/or ECB (combined count).

Table 2. Spray intervals for corn earworm

Moths/Night	Moths/Week	Spray Interval
0 - 0.2	0 - 1.4	no spray
0.2 -0.5	1.4 - 3.5	6 days
0.5 - 1	3.5 – 7	5 days
1 - 13	7 – 91	4 days
Over 13	Over 91	3 days

Silking Corn: Once corn reaches the silk stage, action thresholds are usually based on trap captures rather than field scouting (Table 2). Not all moths found in pheromone traps are pests! Make sure to learn moth ID before making spray decisions. Refer to Identifying Moths in Traps for Sweet Corn Pests to learn moth ID. Once a field has reached the silking stage, scout the ear zone (roughly from two leaves above and one leaf below the ears) for ECB egg masses and ECB or FAW larvae. ECB and FAW egg masses are found most frequently on the underside of leaves near the midrib, and consist of approximately 10-20 flattened eggs overlapping like fish scales. Eggs are white when first laid, turning cream

colored after a couple of days, and show the black head capsules of the tiny larvae through the surface of the eggs when within 1 day of hatching (the "black head" stage). Egg masses can also sometimes be found on the flag leaves of the ears or on the husk itself. Look down into the tops of the silks for newly hatched larvae, and pull the ear away from the stalk slightly to look for larvae feeding between the stalk and the ear. If threshold is reached at this growing stage (Table 1), target the ears with sprays.

Look for scouting reports and pheromone trapping data on corn pests in the Pest Alerts section of Vegetable Notes this season.

Table 1. IPM decision making guide for the major sweet corn pests

	Moth life cycle		**Action Thresholds based on crop growth stage**		
	Emergence or Arrival	**Egg hatch**	**Whorl stage**	**Tassel emergence to first silk**	**Silk stage to 5 days before harvest**
European corn borer	Two generations/yr 374 GDD and 1400 GDD base 50°F	450 GDD and 1550 GDD base 50°F or 4-9 days	Usually no spray necessary	15% infestation combined with FAW	Trap captures of EII (IA) and Z1 (NY) traps combined exceed 12 moths per week, then spray weekly
Fall armyworm	Early-mid July – September. Arrival up the coast from the south.	2-10 days	Scout when moths are captured in pheromone traps and treat at 15% infestation	15% infestation combined with ECB	5% infestation combined with ECB
Corn earworm	Earl July – September. Arrival from southeast and west.	2.5-6 days	Usually no spray necessary	Monitor trap catches to detect arrival and flight activity (see Table 2 for spray intervals)	Trap captures exceed 1.4 moths per week, then use Table 2 to determine recommended spray interval

Resources:

Darcy Telenko, CCE Cornell Vegetable Program, from VegEdge, Vol. 12, Iss. 07, 6/1/16.

Eaton, A. Identifying Moths in Traps for Sweet Corn Pests. University of New Hampshire Extension. 2012.

Hazzard, R. Brown, A. and Westgate, P. Sweetcorn Insect Management Field Scouting Guide. University of Massachusetts Extension.

Other sweet corn trapping networks:

New York: http://sweetcorn.nysipm.cornell.edu/

Pennsylvania: http://www.pestwatch.psu.edu/sweetcorn/tool/index.html

--By Katie Campbell-Nelson, UMass Extension

EFFECTIVELY MANAGING CUCURBIT DOWNY MILDEW IN THE NORTHEASTERN USA IN 2017

-- Margaret Tuttle McGrath Plant Pathology and Plant-Microbe Biology Section, Cornell University Long Island Horticultural Research and Extension Center

Producing a high-quality cucurbit crop necessitates effectively managing downy mildew. This foliar disease is common in the northeast because the pathogen produces a large quantity of asexual spores that are easily dispersed long distances by wind, which enables it to spread widely. There has been no evidence that the pathogen is surviving between growing seasons where winter temperatures kill cucurbit crops (outdoors above the 30th latitude); however, recently both mating types have been found, albeit typically on different cucurbit crop types, thus there is the potential for the pathogen to produce oospores (sexual spores) that could enable the pathogen to survive in northern areas of the USA. The downy mildew forecasting program has documented based on downy mildew occurrence movement of the pathogen throughout the eastern USA each year via its wind-dispersed asexual spores. The pathogen does not affect fruit directly; however, affected leaves die prematurely which results in fewer fruit and/or fruit of low quality (poor flavor, sunscald, poor storability).

The most important component of an effective management program for downy mildew is an effective, properly-timed fungicide program. And the key to that is applying mobile fungicides targeted to the pathogen starting when there is a risk of the pathogen being present. Mobile (or translaminar) fungicides are needed for control on the underside of leaves. Each year there often are changes to the fungicides recommended as the pathogen develops resistance or new products are registered. Because these fungicides have targeted activity, additional fungicides must be added to the program when there is a need to manage other diseases such as powdery mildew. Most targeted fungicides effective for downy mildew are also effective for Phytophthora blight.

Resistant varieties. Resistance was the main tool for cucumbers until a new strain of the pathogen developed. Since 2004, varieties with this resistance, which include most hybrids, have provided some suppression of the new pathogen strains present, but substantially less than the excellent suppression that was achieved against strains present before 2004. However, these resistant varieties are still considered a worthwhile component of an integrated program. Fortunately, a new source of resistance has been found and cucumber varieties with these new genes for resistance are starting to become available. DMR 401 Cucumber developed by Cornell plant breeders is available at http://commonwealthseeds.com/varieties-offered/.

***Fungicide program*.** Alternate among targeted, mobile fungicides in different FRAC groups and apply with protectant fungicide to manage resistance development and avoid control failure if resistance occurs, and also to comply with label use restrictions. The pathogen has demonstrated ability to develop resistance to fungicides, thus a diversified fungicide program applied to resistant varieties when possible is critical for success.

***When to apply fungicides*.** An important tool for determining when fungicide application is warranted is the forecast web site for this disease at http://cdm.ipmpipe.org. Cucurbit plants are susceptible to downy mildew from emergence; however, this disease usually does not start to develop in the northeast until later in crop development when the pathogen is dispersed by wind into the region. The forecast program monitors where the disease occurs and predicts where the pathogen likely will be successfully spread. The pathogen needs living cucurbit crops to survive, thus it cannot survive where it is cold during winter. The risk of downy mildew occurring anywhere in the eastern USA is forecast and posted three times a week. Forecasts enable timely fungicide applications. Growers can subscribe to receive customizable alerts by e-mail or text message. Information is also maintained at the forecast web site of cucurbit crop types being affected by downy mildew. This is important because the pathogen exists as pathotypes that differ in their ability to infect the various crops. All pathotypes can infect cucumber; some also can infect melons, and squashes are susceptible to others. Success of the forecast system depends on knowledge of where downy mildew is occurring; therefore prompt reporting of outbreaks by growers is critical.

Scouting routinely for early symptoms is also important to ensure targeted fungicides are applied starting at the onset of disease development. While the forecast program has accurately predicted many outbreaks, a forecasted risk of infection may not result in infection if conditions are not as favorable as predicted, and the forecast program can miss predicting a risk in particular when downy mildew is not reported. The program is predicting movement of the pathogen from known sources of the disease.

See http://livegpath.cals.cornell.edu/gallery/cucurbits/ and http://vegetablemdonline.ppath.cornell.edu/NewsArticles/Cuc_Downy.htm for photographs of symptoms.

***Recommended targeted fungicides*.** Use in alternation and tank mixed with a protectant fungicide. Label directions for some state to begin use before infection or disease development. The forecasting program helps ensure this is accomplished. There is a table of fungicides for this and other key diseases of cucurbit crops at http://vegetablemdonline.ppath.cornell.edu/NewsArticles/Cucurbit%20Fungicide%20List%202016.pdf

Orondis (FRAC Code U15). The novel active ingredient, oxathiapiprolin, has exhibited excellent activity in fungicide evaluations. It is formulated with mandipropamid as Orondis Ultra (REI is 4 hr) and with chlorothalonil as Orondis Opti (REI is 12 hr). PHI is 0 day.

Ranman (FRAC Code 21). Use organosilicone surfactant when water volumes are less than 60 gallons per acre. REI is 12 hr. PHI is 0 day. Apply no more than 6 times in a season with no more than 3 consecutive applications.

Curzate or Tanos (27). These have some curative activity (up to 2 days under cool temperatures) but limited residual activity (about 3-5 days). They can be a good choice when it was not possible to apply fungicide at the start of a high risk period when temperature is below 80 F. Apply another targeted fungicide 3-5 days later. Both must be tank-mixed with a protectant. REI is 12 hr. PHI is 3 days. Apply no more than 4 times in a season (6-9 for Curzate depending on rate); no consecutive applications of Tanos are permitted. Tanos also has a FRAC Code 11 ingredient. It is recommended used only when this ingredient is needed for other diseases that are also occurring, such as Plectosporium blight.

Zing! or Gavel (22). These are the only products that consist of a targeted fungicide and a protectant fungicide (chlorothalonil or mancozeb). REI is 12 hr and PHI is 0 days for Zing!. REI is 48 hr and PHI is 5 days for Gavel. Apply no more than 8 times in a season. Some cantaloupe varieties are sensitive to Gavel (see label). Workers must be notified that a dermal sensitizer is applied both orally and by posting at entrance to treated area 24 hours before the scheduled application and for 4 days afterwards. The amount of chlorothalonil in Zing! is an intermediate rate (1.18 lb/A chlorothalonil) of the labeled rate range for downy mildew in products with just chlorothalonil (1.125-1.5 lb/A). Chlorothalonil is labeled for use at a higher rate (1.5-2.25) to manage several other diseases including powdery mildew. Growers trying to manage these diseases as well as downy mildew should apply additional Bravo to bring the amount of chlorothalonil up to the higher rate. To obtain an application rate of 1.5-2.25 lb/A chlorothalonil, tank mix Bravo WeatherStik at 0.43-1.43 pt/A with Zing!.

Zampro (40 + 45) or Revus (40). Zampro is the best choice, but it is not labeled for use on Long Island due to groundwater contamination concern. Apply Zampro no more than 3 times in a season with no more than 2 consecutive applications before switching to a fungicide with different FRAC code. Revus can be applied 4 times; there is no label restriction on number of consecutive applications, but more than 2 is discouraged for resistance management. REI is 12 hr and PHI is 0 day for both products. There is a different FRAC code 40 fungicide ingredient in Zampro and Revus which may have slightly different mode of action, thus there may be benefit to using both in a fungicide program. Revus must be applied with a spreading/penetrating type adjuvant. Revus has exhibited differential activity, being effective for downy mildew in pumpkin but not in cucumber. Therefore it is not recommended for use in cucumber. Forum (40) is no longer recommended because it was ineffective in recent fungicide evaluations (see table).

***Targeted fungicides no longer recommended*.** Resistance is suspected of having developed in the cucurbit downy mildew pathogen to the following fungicides based on the fact they have provided limited to no control of downy mildew when tested alone in recent university fungicide evaluations, in contrast with excellent control provided in the past (see table). Poor control has also been reported in commercial crops.

Previcur Flex (FRAC Code 28).

Presidio (43).

Additionally, fungicides with mefenoxam and metalaxyl (FRAC 4), e.g. Ridomil, or a strobilurin active ingredient (FRAC 11), e.g. Cabrio, have not been recommended since 2004 as they have been ineffective due to resistance.

***Recommended protectant fungicides*.** Chlorothalonil and mancozeb are the main protectant fungicides for downy mildew. Copper is not as effective.

In summary, to manage downy mildew effectively in cucurbit crops:

1. select resistant cucumber varieties,
2. sign up to receive alerts about downy mildew occurrence and routinely check the forecast web site to know where the disease is occurring and what crops are affected,
3. inspect crops routinely for symptoms beginning at the start of crop development, and
4. apply targeted fungicides weekly with protectant fungicides and alternate among available chemistry based on FRAC code, starting when there is a risk of downy mildew for the specific crop based on the forecasting program. Add new fungicides to the program when they become available; substitute new for older product if they are in the same FRAC group.

Please Note: The specific directions on fungicide labels must be adhered to -- they supersede these recommendations, if there is a conflict. Check labels for use restrictions. Any reference to commercial products, trade or brand names is for information only; no endorsement is intended. Confirm state registration before purchase. Some products mentioned are not registered in MA.

Efficacy for cucurbit downy mildew of fungicides at risk for resistance development in replicated field experiments conducted at university field facilities in the United States.

Year and state of study	Control of downy mildew obtained with fungicides applied typically on 7-day interval (%) [z]							
	Curzate	**Forum**	**Gavel or Zing!**	**Presidio**	**Previcur Flex**	**Ranman**	**Revus**	**Zampro**
2009, Michigan			75	79	61	88	46	
2010, North Carolina	25		46	62	38	61		
2012, Michigan			29	91	75	86		
2013, North Carolina	42		49	21	74	75		57
2015, Michigan	31	***3*** [y]	49	23	***0***	49	***8***	49
2015, North Carolina		***3***		***5***	14	51	*7*	
2015, Ontario Canada				***13***		51		56
2015, Pennsylvania			98	63	*7*			99

z Efficacy calculated as percent control, relative to non-fungicide-treated plants, using AUDPC or severity near end of experiment.
y Values in bold italics indicate disease value not significantly different from non-treated control.

BE SURE TO USE PROPER TECHNIQUES WHEN COLLECTING WATER SAMPLES

--by Scott Monroe, Purdue University Extension. Originally published in Purdue Vegetable Crops Hotline issue 612, May 10, 2016

Whether or not their farm is covered by FSMA's Produce Rule, produce growers should sample agricultural water sources—irrigation or post-harvest water that will directly contact the harvestable part of the crop—for microbiological analysis. Using proper techniques to collect water samples will help to prevent inaccurate testing results.

When collecting water samples, one should start with the appropriate collection container. Many laboratories will only test water samples that are received in their containers. Consequently, it is important to select a lab, determine their individual requirements, and obtain the appropriate containers prior to collecting samples. Generally, containers used for water sampling will be large enough to hold at least 100 ml of water (~ 1/2 cup). The interior should be sterile and the container should be sealed to prevent contamination. Sampling containers may also contain crystals or tablets when received from the lab. These tablets or crystals are made of sodium thiosulfate and are place in the container to neutralize any chlorine that may be in the water sample. They should not be removed.

If irrigation water from a well is being sampled, it is a good idea to collect the sample as close to the water source as possible. This means collecting the sample from the outlet that is closest to the well. Prior to collecting, the rim of the outlet (valve, spigot, etc.) should be sanitized. This can be done using a flame or chlorine. The system should then be allowed to run and water should be allowed to flow out of the outlet long enough to flush the system. A good rule of thumb is to run the system at least 3-5 minutes longer than is necessary to empty the volume of stagnate water remaining from the last use. To collect the sample, the seal on the sample container should be removed or broken and the sample container should be opened only as far as needed to collect the sample. Containers should be filled at least to the fill line and should be closed as quickly as possible. Once the sample is collected, the container should be marked with the date and time of collection and immediately cooled. Samples should be kept as cool as possible by icing or refrigerating until they are delivered to the lab. Many labs have a maximum time interval between collection and sample receipt, usually 24 hours. Samples received too long after collection will not be processed. Those growers who are covered under the Food Safety Modernization Act Produce Rule should pay special attention to time requirements, as the rule specifies EPA Method #1603, which only allows a maximum of 8 hours from sample collection to processing.

If sampling from surface water, such as ponds and lakes, one should try to sample at a depth of 6-12 inches. The container should be submerged prior to opening the lid. The container should then be filled and the lid put back in place prior to removing it from the water. If a dock or other structure is not available for access to deeper water, one can attach a sample container to a pole. Care should be taken not to sample too close to the bottom, as sediments may be collected with the sample. If one finds it necessary walk into the water, sampling should be done ahead of the muddy front that is stirred up by motion. Remember that excess rainfall can also stir up bottom sediments and alter test results. Samples should not be taken immediately after rainfall. Best practice is to collect the sample during a time when the water would normally be used for irrigating. If irrigating from flowing surface water, such as a creek or stream, and it is necessary to wade into the water, be sure to sample from the upstream side, again to avoid collecting stirred up sediments.

Collecting samples of water used for postharvest is similar to collection from an irrigation well. One should select an outlet close to where water lines come into the packing facility. All attachments such as aerators or garden hoses should be removed. The outside rim of the outlet should then be sanitized and water should run through the outlet for 3-5 minutes. The sample container may then be filled, taking care to make sure that the container is open for as little time as possible.

In many cases, unexpected results from a water test can be traced back to poor or inappropriate collection techniques. Details such as not flushing the system, failing to remove attachments, and sampling too near the bottom of surface water can drastically alter water test results. Taking some time to practice proper collection techniques prior to the upcoming season will help to ensure that your water test results are as accurate as possible.

SIGN UP TODAY FOR THE CENSUS OF AGRICULTURE

Currently, the census is the only complete count of U.S. farms and ranches and the people who operate them. It includes even the smallest plots of land – rural or urban – growing fruits, vegetables, or raising food animals, if $1,000 or more of such products were raised and sold, or normally would have been sold, during the census year. The information produced by the Census of Agriculture guides Congress, agribusiness, policymakers, researchers, local governments and many others on the creation and funding of agricultural programs and services – decisions that can directly impact your local operations and the future of the agriculture industry for years to come.

Please note that new farmers or existing farmers who have not participated in a prior Census of Agriculture still have time to sign up to be counted through the end of June at https://www.agcounts.usda.gov/cgi-bin/counts/. The survey takes less than a minute – and will ensure that you receive a Census form (that you can fill out in paper form or online.) If a farmer/rancher is not on our list frame by June 30th, 2017, the producer will not have an opportunity to participate in the 2017 Census of Agriculture.

For more information about the census, please visit www.agcensus.usda.gov, follow NASS on Twitter @usda_nass, or call (800) 727-9540.

Events

2017 Twilight Barn Meeting

When: Wednesday, July 19, 2017 - 5:30pm to 9:00pm

Where: Walnut Hill Farm, 39 Koebke Rd. Dudley, MA

Please join us for a wonderful event and dinner. We will discuss some innovative practices adopted by farmers in recent years. This years Twilight Meeting will be hosted by the Koebke family in Dudley. Come and join us for a great educational event and dinner!

2017 Twilight Meeting Agenda

5:30 - Registration and Social - 6:00 - Welcome and Farm Tour

6:50 - MDAR Commissioner John Lebeaux

7:00 - Recent Innovative Practices on the Farm- Panel Discussion Moderated by: Carl Majewski (UNH Extension), Participants include 3-4 farmers, Kate Parsons (NRCS), and Dr. Masoud Hashemi (UMass).

7:50 - Massachusetts Farm Energy Program (MFEP). Gerry Polano (MDAR).

8:00 - Massachusetts Nutrient Regulations Updates. Hotze Wijnja (MDAR).

8:10 - Southern New England AgrAbility Project. Joyce Meader (UConn Extension)

8:15 - RMA Update. Tom Smiarowski and Paul Russell - 8:20 - NRCS Update, Bob Purcell - 8:25 - FSA Update, Kip Graham

8:30 - Dinner and Social - 9:00 - Adjourn

For more information and to RSVP, please contact Masoud Hashemi at (413) 545-1843 masoud@umass.edu or Kelly Kraemer at (413) 545-5221 kkraemer@umass.edu.

Thank you to our sponsors

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Vegetable Notes. Katie Campbell-Nelson, Lisa McKeag, Susan Scheufele, co-editors.

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