



**UMASS  
EXTENSION**



# Vegetable Notes

For Vegetable Farmers in Massachusetts

Volume 22, Number 10

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## CROP CONDITIONS

There has been no lack of rain across that state in the past week. The days have been sunny and breezy with temperatures in the low 80's allowing plenty of time for cultivation, planting and pesticide applications where necessary. A few of the main season crops are continuing to be harvested this week. Harvesting of snap beans, cabbage, zucchini and summer squash, greenhouse tomatoes, cucumber is increasing, and harvests of lettuce, salad mix, other bunching greens, beets, radishes, salad turnips, peas and peas. The Fourth of July favorite, sweet corn, is absent from farms in Massachusetts this year. Some predict that they are about a week or more behind their anticipated harvest for sweet corn. Strawberries are winding down; most pick you own operations have ended. Succession planting of fall crops is underway. Leaf hopper is busy feeding on potato, beans and eggplant while cucumber and Colorado potato beetles continue to be very active. Overall

things are good, a little behind, but good. One note of caution is that the weather has been favorable for a number of crop diseases – septoria and early blight are rampant in many tomato plantings, and both cucurbit downy mildew and late blight have been found within striking distance of our area. See below for details and recommendations.

*Cumulative GDD starting Jan 1, 2001. Base 40 and 50 °F*

*Base temp 40 °F is for maggot flies; base temp 50 °F is for most other insects.*

Cumulative GDD are higher when base temp is 40 °F.

Date	Location	GDD since Jan 1		Rainfall 7 days (inches)	7-day SV	SV -Season total
		Base 40 °F	Base 50 °F			
30-Jun	Pittsfield	1484.8	732.3	1.4	15	42
30-Jun	Ashfield	1510.5	724.3	2.6	21	61
30-Jun	Belchertown	1726.4	907.3	1.4	18	41
30-Jun	Amesbury	1577	743.5	0.1	13	36
30-Jun	Tyngsboro	1592.5	827.5	0.9	17	37
30-Jun	Bolton	1498.0	788.0	1.5	19	52
30-Jun	Northboro	1653.1	831.6	1.9	17	38
30-Jun	New Bedford	1853.6	939.6	0.1	16	33

Weather data from NEWA, other New England locations are available

<http://newa.cornell.edu/index.php?page=degree-days>

Total severity values during last 7 days

<3	3	4	5	6	>6
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SV= Severity Value, based on BLITECAST

SV Seasonal Total

ASSUMES POTATO EMERGENCE MAY 20

(earlier emergence results in higher seasonal SV)

Total rain/irrigation for past 10 days	Spray Interval for late blight control (in number of days)					
>1.2 inches	10-14	10	7	5	5	5
<1.2 inches	10-14	10-14	10	7	5	5

## **LATE BLIGHT ALERT**



*Late Blight on Potato*

Late blight has been found on tomato and potato in Long Island, and on potato in VA and DE. Given the location of the infected fields and predominately southerly winds at this time, MA growers are at moderate risk. Conventional growers should consider a preventative spray program including protectant materials, which may already be in place for control of other tomato diseases. Fields should be scouted regularly and carefully, especially in low areas in fields, wherever water accumulates, and fields where Late Blight occurred previously. If late blight is found growers should switch to an aggressive program of systemic, lower fungi specific materials that are effective on LB – Previcur flex, Presidio, Revus or Revus top, Ranman, Forum, and Gavel have proven efficacy. See the efficacy tables attached to the email version of this newsletter for more details. These tables indicate relative efficacy only, please check the label for specific usage. Organic growers should consider beginning regular applications of copper. The UMass vegetable IPM program has funding to cover diagnostics and in some cases may be able to pick up samples at your farm. If you think you have late blight, please contact the vegetable program at 413-577-3976 or [umassvegetable@umext.umass.edu](mailto:umassvegetable@umext.umass.edu) or the Diagnostic lab (413-545-3209 or [mbdicklo@umext.umass.edu](mailto:mbdicklo@umext.umass.edu)). Instructions for submitting samples can be found at <http://extension.umass.edu/vegetable/services/disease-diagnostics>.

In 2010, we saw minimal losses to late blight despite two confirmed outbreaks in MA. The extreme drought we experienced last summer was not conducive to Late Blight development; the pathogen requires wet, cool weather. If 2010 had been even a moderately wet summer we would have very likely seen the disease spread and experienced significant losses. In 2009, we had an extremely wet year combined with multiple points of infection, which led to extreme losses. The weather so far this year has been conducive to the establishment and spread of the disease. UMass Extension has weather stations deployed across the state and is using the data to forecast disease risk; risk severity values are posted weekly in the newsletter. Other sources of weather data, forecasting models, and current location of the pathogen include: [http://uspest/risk/tom\\_pot\\_map](http://uspest/risk/tom_pot_map), <http://newa.cornell.edu/>, and <http://usablight.org/>.



*Late Blight on Tomato Leaves*

## **DOWNY MILDEW UPDATE**

Downy mildew (*Pseudoperonospora cubensis*) was confirmed on cucumber in Vineland, NJ. The current weather patterns are unfavorable for the northward spread of the disease, but with a source of inoculum near to MA it's time to be vigilant. Watch the weather, regularly scout cucurbit fields for disease occurrence, have appropriate fungicides ready, and visit <http://cdm.ipmpipe.org/> if you have internet access. We recommend that crops not already in a spray program be treated with protectant materials now, with downy mildew specific materials added to the program when the disease is closer, or when forecast risk is high.

Materials effective specifically for downy mildew include Revus, Presidio, Tanos, Ranman, Gavel, Aliette, Forum, and Previcur Flex.



*Downy Mildew on Cucumber*

Copper-based fungicides have traditionally been recommended for suppressing downy mildew in organic production systems. Caution is advised, however, as copper can be phytotoxic to some cucurbits, especially at higher temperatures - you may want to test a small patch first.

Most studies involving other organic remedies haven't shown them to have consistent efficacy against downy mildew. There are a host of different products available - compost teas, neem products, microbials such as Actinovate or Serenade, and potassium bicarbonate products like MilStop and Kaligreen. Some success with them has been reported; however, the results in University research trials indicate low effectiveness and inconsistency. Your success may vary as microbial products are most effective when applied preventatively, early in disease development, and repeatedly. It's very difficult to introduce microbial organisms into an established habitat and have them survive and

have a meaningful impact on the existing microbial populations. The most successful implementations of these products has been where they have been introduced early, in the greenhouse, against soil-borne organisms, and on seedlings grown in relatively sterile media where the microorganisms can establish before challenged by plant pathogens.

*-Andy Cavanagh & Bess Dicklow*

## **COPPER FUNGICIDES FOR ORGANIC FARMS**

The only material available to organic growers that has proven effective in preventing late blight is copper. Copper has no curative value, and once an infection is established in your fields spraying copper will do little to slow its spread. Given the proximity of late blight infection (NJ) and the uncertainty of weather conditions organic growers should consider applying copper preventatively, when risk is low to moderate. Regular applications of copper will also help to control other common tomato blights.

### **Using Copper**

One copper product that is allowed in certified organic production is registered in Massachusetts: NuCop 50WP. Copper hydroxide is the active ingredient. The copper ion is absorbed by the germinating spore, and the copper denatures spore proteins and kills the fungus before it infects the plant. Because there is no 'kick-back' or curative action, coppers must be applied regularly throughout the production season, beginning before the disease becomes established in the field. In dry conditions, coppers persists on plant surfaces. New growth would not be covered. Thus, when the foliage is growing rapidly or when there is frequent rain, applications are required more frequently in order to protect the foliage. Using an approved adjuvant or 'sticker' may help the product be more rainfast. There is some evidence that stimulation of plant resistance or plant nutrition plays a role in copper's efficacy against disease, but that is not well understood (Danoff et al, 2008).

### **Human Health Hazards**

Skin and especially eye exposure is the most serious risk associated with using copper hydroxide. The greatest health risk is to the person who mixes and sprays the material. Proper protective equipment should be worn when handling or applying any pesticide or fertilizer. The required protective equipment is specified on the label: long-sleeved shirt and long pants, chemical resistant gloves made of any waterproof material such as polyethylene or polyvinyl chloride, shoes plus socks and protective eyewear. You may also want to consider wearing a respirator or at least a dust mask, especially for mixing. In addition, the product generally comes in a paper bag that has a tendency to leak out the seams. It would be wise to put the container in a double plastic bag. The same set of precautions that apply to conventional pesticides should be observed when applying copper.

This also means that workers or pickers who are in the field after spraying could be exposed to treated foliage or fruit.

There is a 24 hour days to harvest restriction, which means no fruit can be harvested for 24 hours after a spray. Even after that waiting period, pickers should wear gloves and long sleeves. Workers should pick and wash the fruit before selling; pick-your-own tomatoes pose some risk.

### Environmental Hazards

Some farmers have expressed concern about copper toxicity in the soil or with respect to soil microbes. Copper is actually a plant micronutrient; that is, it is an essential plant nutrient at low levels. In New England it is more often deficient than excessive in soils. The amount found naturally in soils in MA ranges from 0.1 to 8 ppm. The desirable level for agriculture would depend on the crop to be grown and other soil factors such as pH. Copper does not degrade in soil or leach into groundwater, but becomes chemically bound up, especially with organic matter. An application of 1 lb of active ingredient per acre is estimated to raise the copper levels about 0.5 ppm. A single application of Nu Cop at 2 lb per acre with 77% AI adds about 1.5 lb copper per acre to the soil, or could raise the concentration in the soil by 0.5 to 0.75 ppm. Depending on the level in your soil, it would take numerous applications to exceed the levels that are in the normal range.

The cumulative effect of copper applications might be more of a concern in perennial planting systems. In annual rotational systems, where copper applications might only be made every 4-6 years, copper accumulation is less of a concern. Nonetheless, copper use is regulated and certified organic farmers in the US are required to restrict their use of copper products. Regular soil tests should be taken and copper levels in the soil should be monitored. In addition, copper can be very toxic to fish and aquatic organisms, so care should be taken to apply sprays properly and avoid drift and run off.

Note that copper will also protect tomatoes against early blight and Septoria leaf spot, which can progress rapidly and cause plantings to produce far less than their full potential yield. It will also protect potatoes from early blight.

--R. Hazzard, A. Cavanagh. Sources: Brady, *Nature and Property of Soils*; *Handbook of Plant Nutrition*, A. Barker & D. Pilbeam, 2007; *Mineral Nutrition and Plant Disease*, L. Datnoff, W. Elmer, D. Hubner. 2008

## TOMATO PITH NECROSIS

With the rainy weather last week conditions have been favorable for tomato pith necrosis in high tunnels; we just had our first sample come through the lab.

Tomato Pith Necrosis is caused by *Pseudomonas corrugata* and other soil-borne species of *Pseudomonas*. While high tunnels provide ideal conditions for the growth of early season tomatoes, this environment and traditional greenhouses also provide ideal conditions for a newly emerging disease of greenhouse tomatoes. This disease generally occurs on early planted tomatoes growing when night temperatures are cool, the humidity is high, and the plants are growing vigorously because of excessive levels of nitrogen. The disease is also associated with prolonged periods of cloudy, cool weather.



*Tomato Pith Necrosis*

Initial symptoms often appear just as the first fruit clusters reach the mature green stage and consist of yellowing and wilting of young leaves. Serious infections can result in chlorosis and wilting of upper portions of plants with brown to black lesions on infected stems and petioles. When stems are cut longitudinally, the center of the stem (pith) may be extensively discolored, hollow, and/or degraded. Stems may be swollen, numerous adventitious roots can form, and infected stems may shrink, crack, or collapse. The pathogen, a bacterium, is considered to be a weak pathogen on tomatoes that are growing too rapidly. There is no effective treatment for this disease; however, affected plants may recover if environmental conditions improve (warm, sunny weather). The epidemiology of this disease is not well understood; it is possible that the bacteria are seed-borne and most certainly survive in the soil in

association with infected tomato debris. Preventive measures to minimize the occurrence of this disease in high tunnels include: adequate ventilation to avoid high humidity levels (especially during cloudy weather), avoiding excessive nitrogen levels to prevent vigorous plant growth, incorporation of crop debris to speed decomposition of residue and associated bacteria, and crop rotation.

## **SUBMITTING DISEASE SAMPLES TO UMASS**

Vegetable Diseases: M. Bess Dicklow, (413) 545-3209, [mbdicklo@umext.umass.edu](mailto:mbdicklo@umext.umass.edu)

Nematodes: Dr. Robert Wick, (413) 545-1045, [rwick@pltpath.umass.edu](mailto:rwick@pltpath.umass.edu)

Contact the appropriate individual listed above to discuss your sample and to ensure that someone will be available to examine the specimen. Microscopic and laboratory identification of fungi, bacteria, viruses, and nematodes are routinely carried out. Samples can be hand-delivered (if possible) or sent overnight mail, UPS, or Federal Express. Along with your sample, you must include a completed Vegetable & Floriculture Diagnostic Form. Be as complete as possible; accurate diagnosis depends on sufficient information about cultural practices and environmental conditions. Collect specimens that show a range of symptoms, avoiding rotted or decayed specimens. Please avoid Friday samples; Friday samples will not be examined until Monday which can lead to deterioration of the sample. Upon reaching a conclusion, the lab will send or e-mail a report on the diagnosis including complete management guidelines emphasizing cultural and biorational controls, as well as chemical control options.

### **Guidelines for Sending Vegetable or Floriculture Specimens:**

Please submit samples according to the following guidelines, based on the symptoms present. Diagnostic Fees (payment payable to University of Massachusetts): \$50

**Leaf Spots and Blights:** Leaf spots and blights of floriculture or vegetable crops are often caused by fungi or bacteria. Certain pesticides, or environmental or nutritional factors can also cause spotting. Select leaves which show a range of symptom development. Specimens that are dead or dry are of little diagnostic value. Place leaves between sheets of paper or inside a magazine. Place the package in a plastic bag, then into the envelope for mailing. Never wrap leaves in wet paper towels.

**Fruit Rots:** Select early stages of disease rather than badly rotted tissue. With large fruit such as a pumpkin, cut the affected area out with a knife and submit. Wrap fruit or fruit sections in newspaper, and put into a plastic bag for mailing.

**Stem Cankers:** When a canker occurs on a large plant, cut a section of the stem with the symptoms, wrap in newspaper and place in a plastic bag for mailing. If the plants are small (1 foot or less), shake the soil from the roots, wrap in newspaper and put into a plastic bag for mailing.

**Wilt, Crown Rot or Root Rot:** If the plants are 1 foot or less, include the entire plant. Dig the plant, including a good handful of the root system. Leave the soil on the roots. Place the root/soil ball into a plastic bag and tie off at the crown to prevent soil from spilling out. Wrap in newspaper and put into a plastic bag for mailing. If the plants are large, send a portion of the plant that includes the infected tissue. For wilt diseases, we must have lower stem tissue and roots.

**Scorch, Defoliation or Poor Growth:** These symptoms are usually caused by nutritional or environmental factors. They may also be the result of root rot or vascular disease. Collect a specimen as for wilt (above); be sure to submit a soil sample to the UMass Soil Testing Laboratory. A tissue analysis may also be advisable. Call the Soil Testing Lab at (413) 545-2311 before sending the sample.

### **Address packages to:**

**UMass Plant Diagnostic Lab**

**101 University Drive, Suite A7**

**Amherst, MA 01002**

**(413) 545-3208 - fax (413) 545-4385**

# CORN REPORT

Location	ZI	EII	Total ECB	CEW	FAW
<b>CT Valley</b>					
Amherst	0	0	0	0	0
Sunderland	0	2	2	0	0
Hadley	0	2	2	0	0
Hatfield	0	2	1	0	0
Feeding Hills	0	0	0	0	0
<b>Central &amp; Eastern MA</b>					
Millis	0	0	0	0	0
Concord	4	4	8	9	0
Northbridge	1	1	2	0	0
Leicester	1	0	1	0	0
Lancaster	4	0	4	1	0
Dracut	14	2	16	5	0
Rehobeth	1	3	4	0	0
Tyngsboro	1	4	5	0	0
Sharon	0	0	0	0	0
<b>NH</b>					
Litchfield, NH	1	0	1	0	0
Hollis, NH	0	0	0	0	0

The greatly anticipated local Fourth of July corn will be absent from many farm stands this year. Cool rainy temps at the end of Spring put planting behind and the hope of having a few days with temperatures in the 90s to speed up growth is gone. Most early corn fields will be ready to harvest within the next two weeks. At this time last year harvesting had started for a lot of growers and sales were up. Despite the absence of local corn at farm stands, plants have been growing well with the pleasant 70-80 degree temperatures we have been having. Pest pressure is down, corn ear worm is lurking but not infesting yet and we are in between generations of European corn borer.

The first European corn borer flight is over with trap captures at zero in most locations, or with only a few moths hanging on. Scouting has shown that there are still a high number of borers feeding in pretassel and tasseling corn. Fields that have been sprayed were scouted and found to be under threshold. Fields sprayed should be scouted 3-4 days after application to ensure that another “clean up” is not needed. Remember to only count new feeding damage and live caterpillars when scouting after a spray has been applied to get an accurate picture of current infestation levels.

Corn earworm trap counts remained low this week, with the exception of Concord. This migratory pest is expected to make an appearance to the Northeast soon. All fields with silking corn should have corn

Corn Earworm Threshold		
Moths/Night	Moths/Week	Spray Interval
0-0.2	0-1.4	no spray
0.3-0.5	1.5-3.5	every 6 days
0.6-1	3.6-7	every 5 days
1.1-13.0	7.1-91	every 4 days
Over 13	Over 91	every 3 days

earworm traps. Place two traps per field with lures suspended directly above the freshest silk found. Move traps to fresh silk as needed. See CEW threshold table for spray interval recommendations. No southern storm fronts are anticipated however large populations can arrive overnight and begin laying eggs that will hatch on fresh silk and tunnel into developing ears. Watch for southern coastal storms which may bring greater numbers up to the Northeast. Fall armyworm trap captures were at zero this week as well.

## UPCOMING MEETINGS

**Mid New England Grain Conference and Festival: ‘Bread, Beer & Biodiversity’**

**July 14 - 15, 2011 9:00 a.m. – 4:30 p.m.**

Join us for our two day event to learn about the reintroduction of grains into NE farming systems and to celebrate the harvest with a festival on the second day. Come and listen to a variety of speakers whose expertise in grain breeding, production, marketing, and value-added products will have you planting your own field of grain in no time!

**Day 1: July 14 – Growing Local Grains Conference**

UMass Crops, Animal, Research and Education Farm, 89-91 River Rd, North of RT. 116, South Deerfield MA (Exit 24 on I-91)

**Day 2: July 15 – Community Grain Festival**

Colrain Seed Farm, 400 Adamsville Road, Colrain, MA 01340

Cost is \$25\* per day per person or \$40\* for both days per person. (\* includes lunch)

Please Mail Registration by July 8, 2011 to:

Att: Jacqui Carlevalle University of Massachusetts Extension

305 Bowditch Hall, 201 Natural Resources Rd., Amherst, MA 01003-9294

If you have questions or would like to register by phone or email,

Phone: 413-545-5221 Email: jcarleva@psis.umass.edu

For further information visit: <http://extension.umass.edu/vegetable/>

**Fruit Growers Summer Meeting**

**Wednesday July 18, 9:00 - 2:00pm**

**Parlee Farm, Tyngsborough MA**

For more information contact Fruit Growers Association, Wes Autio 413-545-2963 autio@pssci.umass.edu.

Workshops for Beginning and Established Farmers presented UMass Vegetable Program Extension Educators

**Insecticide Application and Pesticide Safety - Ruth Hazzard, UMass Extension**

**Wednesday July 20 10:00am-12:00pm**

**Nuestras Raices Farm, 24 Jones Ferry Rd, Holyoke, MA**

Vegetable Production Educator Participants will learn how to identify damaging pests, and the basics and safety of choosing an insecticide for application.

To register call Amy at 413-535-1789

UMass Crops Research and Education Farm 2011 Field Days

August 2nd & 3rd 2pm

UMass Crops Research and Education Farm, 89 –91 River Road South Deerfield, MA

6pm dinner & open house to follow on both days

Day 1: Renewable Energy, Biochar, & Pasture Systems

Day 2: Innovations in Vegetable Crops

Please see the flier attached to the email version of the newsletter for details, or visit [umassvegetable.org](http://umassvegetable.org).

**Northeast Organic Farming Association 2011 Summer Conference**

**August 12-14, 2011**

**UMass Amherst**

Keynote Speakers: Eric Toensmeier, Perennial Edibles Expert, and Dr. Ignacio Chapela of UC Berkeley, GMO Activist.

Over 200 Workshops on Organic Gardening, Farming, Food Politics, Permaculture, Homesteading, Landscaping, Draft-Animal Power, Alternative Energy, Livestock, Cooking, and more! Hundreds of Vendors and Exhibitors. Live Entertainment. Children's and Teen Conference. Country Fair and Farmer's Market. Silent Auction. This year NOFA is proud to partner with the Draft-Animal Power Network. Spend the weekend or come for the day. Activities for all ages.

To register: [www.nofasummerconference.org](http://www.nofasummerconference.org)

Email: [info@nofasummerconference.org](mailto:info@nofasummerconference.org)

Call: 978-355-2853

*Vegetable Notes. Ruth Hazzard, editor and Amanda Brown and Andrew Cavanagh, assistant editors. Vegetable Notes is published weekly from May to September and at intervals during the off-season, and includes contributions from the faculty and staff of the UMass Extension Vegetable Program, other universities and USDA agencies, growers, and private IPM consultants. Authors of articles are noted; author and photographer is R. Hazzard if none is cited.*

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