



UMASS  
**EXTENSION**



# Vegetable Notes

For Vegetable Farmers in Massachusetts

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## CROP CONDITIONS

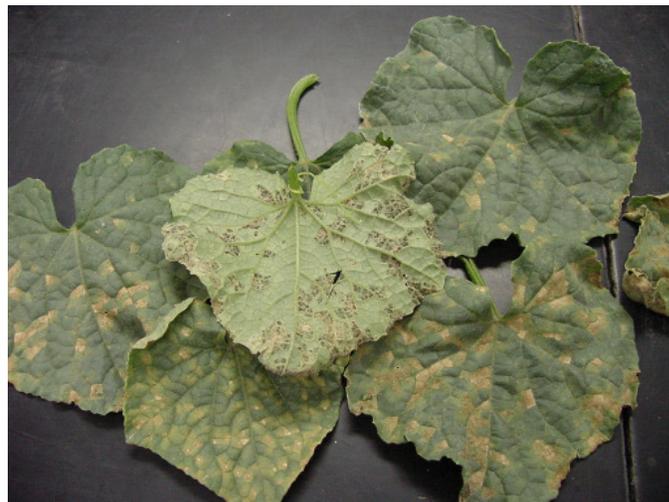
The operative word of the week is DRY. Drier air, sunnier skies, and soils that are no longer quite as completely waterlogged – all of this has lifted farmers and crops out of the difficulties of constant rain. We continue to hear the tales of hailstorms that hit specific farms on certain unforgettable days during July and August and caused an enormous amount of damage in a few minutes. Fields continue to be lost to Phytophthora crown and fruit rot, which spreads rapidly once it gets established in any part of the field. However, many crops are looking good and yielding well. Tomato harvests have picked up in pace and quality. The first ripe pumpkins and winter squash are being harvested and are hitting the market. Fall Brassica crops are growing well, but need protection from caterpillars and flea beetles. Garlic that has been curing since late July

is ready for sale or long term storage. Markets are busy and demand is good. The years of ‘buy local’ efforts around the state seem to be benefitting farmers in all types of markets.

## DOWNY MILDEW UPDATE

Downy Mildew was detected on Butternut Squash ‘Waltham’ this week on a farm in East Windsor, CT. This is the first occurrence of Downy Mildew in the Connecticut River Valley confirmed by the UMass Extension Plant Diagnostic Lab. On August 21, downy mildew was confirmed in cucumbers and cantaloupes at the UMass Crops Research Farm (South Deerfield, Franklin County, near the Connecticut River). This suggests that it has arrived widely throughout this region. Growers should assume that all types of cucurbits are at risk at this time.

Now is the time to apply fungicide applications with materials specifically targeted toward this pathogen. The top five materials for Downy Mildew control include Previcur Flex (propamocarb), Ranman (cyazofamid), Tanos (famoxadone plus cymoxanil), Curzate (cymoxanil), and Gavel (zoxamide plus mancozeb). Do not use Gavel on winter squash and pumpkin as it contains mancozeb. Mix these systemic fungicides with a protectant fungicide such as chlorothalonil, copper, or maneb to prevent resistance development in the pathogen population. Alternate these products by active ingredient group avoiding consecutive applications of any one material. Other alternate fungicides include Reason (fenamidone), Forum (dimethomorph), Ridomil Gold (mefenoxam), and phosphorous acid materials like Agri-Fos, ProPhyt, Fosphite, Phostrol and other brand names.



*Downy Mildew on Cucumber*

Organic products that may offer some protection from downy mildew include primarily coppers (see article in this week’s

issue). See also last week's Vegetable Notes, Guidelines for Managing Cucurbit Powdery Mildew Organically, for other products that may be labeled for this disease.

Downy mildew caused by *Pseudoperonospora cubensis* is one of the most important foliar diseases of cucurbits. It occurs worldwide where conditions of temperature and humidity allow its establishment and can result in major losses to cucumber, melon, squash, pumpkin, watermelon, and other cucurbits. Symptoms of downy mildew are confined to the leaves and their appearance varies widely among cucurbit species. On most species, lesions are first visible on the upper leaf surface as small, irregular to angular, slightly chlorotic areas. Symptoms appear first on older leaves and progress to younger leaves as they expand.



*Powdery & Downy Mildew on Winter Squash*

When conditions (leaf wetness and humidity) favor sporulation, the production of fruiting bodies (sporangia) on the lower leaf surface gives the undersides of the lesions a downy appearance, varying in color from light gray to deep purple. Lesions can coalesce and result in large areas of dead tissue which exposes the fruit to sunscald.

*Pseudoperonospora cubensis* infects only members of the cucurbit family and is an obligate parasite. Its survival depends on the presence of cucurbit hosts, either in climates which permit their growth year round or in greenhouse culture. The source of primary inoculum in cold climates is windblown sporangia from areas where plants survive the cold season. Generally, downy mildew of cucurbits does not arrive in southern New England until September. However, in some seasons it can move up the eastern seaboard early and arrive in July. The progress of downy mildew is tracked by the North American Plant Disease Forecast Center and warnings issued based on disease progression and weather ([www.ces.ncsu.edu/depts/pp/cucurbit/](http://www.ces.ncsu.edu/depts/pp/cucurbit/)). Physiological specialization occurs in *P. cubensis* and at least five pathotypes have been described. Cucumber and melon are susceptible to all pathotypes, while squash and melon cultivars vary in their reactions. Spread of Downy mildew within a field can be by air currents, rain splash, workers, and tools.

The main means of control are fungicide applications, the use of resistant cultivars, and cultural practices. Maximum control can be achieved only with a combination of these measures. Maximize the distance from potential inoculum sources. Use plant spacing which reduces the density of the plant canopy. Avoid overhead irrigation. Both these practices are aimed at minimizing the length of leaf wetness periods. Many commercial cultivars of cucumber have good levels of resistance to downy mildew. Watermelon and melon cultivars are available with low levels of resistance. Squash and pumpkin cultivars are resistant to some pathotypes but are very susceptible to compatible pathotypes.

*- adapted from Bess Dicklow, UMass Plant Disease Diagnostics Lab*

## **HARVEST PERIOD, STORAGE, AND VARIETY SELECTION TO OPTIMIZE EATING QUALITY IN SQUASH**

The record rainfall in many areas of the state has led to a boom in fruit rot caused by *Phytophthora capsici*. Given the wet conditions and high disease pressure we've experienced this year, it makes sense to get your winter squash and pumpkins out of the field as soon as possible. We encourage you to harvest the fruit and get it out of the field as soon as possible to

help reduce the risk of fruit rots. It can be difficult, however, to assess whether or not the fruit is truly ready for harvest – especially in dark green squash, such as acorn varieties. This article aims to provide some insight into judging the ideal time to harvest squash and pumpkins. Next week we'll provide more information on curing and storage.

There are three major species of squash that are grown worldwide – *Cucurbita pepo*, *C. maxima*, and *C. moschata*. The species *C. moschata* includes calabaza or tropical squash, round to oval pumpkins grown in the Midwest for pie processing, and the popular butternut varieties, highly regarded for excellent shelf life. The species *C. maxima* includes the large show pumpkins, Golden Delicious type processing squash, Hubbard varieties, and buttercup/kabocha varieties, the latter esteemed for their exceptional eating quality. Lastly, *C. pepo* is the species having the greatest variation in type, including hard-shelled gourds, summer squash, ornamental pumpkins, and squash. In North America, acorn is the most popular *C. pepo* squash, but striped Delicata and Sweet Dumpling varieties are known for having good eating quality. The demand for acorn squash has been adversely affected by generally poor quality of popular commercial varieties and the practice of harvesting squash before it reaches maturity.

### **Components of eating quality:**

People differ in their preference for flavor components and degree of moisture in squash. Nonetheless, connoisseurs of squash usually prefer a relatively dry squash that has a pasty, slightly moist texture after cooking and a high level of sweetness. High sugars not only contribute to a desirable sweet taste, but also mask undesirable flavor components associated with certain varieties. Sugar levels can be estimated easily by pressing juice from a small sample of flesh and measuring soluble solids in the juice with a hand-held refractometer. Relative sugar content is given in units of percent soluble solids (or oBrix). Soluble solids levels of 10% are passable, but generally levels of 11% or greater are considered necessary for good eating quality in squash. The pasty texture of squash is attributable to starch. At harvest starch comprises about two thirds of the dry matter of squash, so squash with high dry matter also have high starch content. Starch provides substrate for conversion to sugars during the latter stages of squash maturation and during subsequent storage. Squash with low dry matter, generally less than 16%, lack sufficient starch levels to produce the combination of pasty texture and degree of sweetness desired for acceptable eating quality. In varieties with low dry matter, starch is rapidly depleted during storage by conversion to sugars, and the texture of the squash becomes watery and fibrous.

### **Stages of squash development:**

To understand how harvest period, storage and variety selection can affect eating quality, it is necessary to understand basics of squash development and maturation. This process includes not only the development of flesh quality, but also the effect of seed development on maintaining flesh quality. Small-fruited varieties of squash, such as acorn, reach close to full size within 15 to 20 days after pollination (DAP) and subsequent fruit set. Dry matter and starch accumulation begins shortly after fruit set, but is most rapid between 10 and 20 DAP and reaches a maximum at 30 DAP. Sugar levels, on the other hand, are very low at 25 DAP, but continue to increase until maturation of squash at about 55 DAP. Some varieties, however, lack adequate sugar levels even at mature harvest, and need to be stored to develop sugar levels suitable for good eating quality.

Even though the dry matter of the flesh (mesocarp tissue) peaks at about 30 days after pollination, seed development takes much longer. If a squash is cut open at 20 DAP, the seeds appear to be full size. This is because the seed coat, the leathery covering over the embryo, reaches full size by this time. But if the seed is cut in half, the embryo is actually barely visible at this time, being about an eighth to a quarter of an inch in length. The embryo expands rapidly and largely fills the seed coat cavity by 35 days after pollination. However, dry seed biomass (seed fill) continues almost linearly until about 55 DAP. Thus, a squash fruit can be considered to reach full maturation when seed development is complete at about 55 days after pollination. If fruit are picked immature, seed development continues in stored fruit at about the same rate as in fruit left on the plant. Seed development in an immature, detached fruit occurs at the expense of depletion of nutrient reserves in the fleshy tissue, thereby reducing dry matter (mostly starch) and lowering eating quality.

Post maturation changes occur in stored fruit. There is a progressive moisture loss during storage, so fruit weight decreases. Respiration consumes carbon in the form of sugars, and starch continues to degrade to replace the sugar consumed by respiration. The eating quality of squash varieties with low sugar at harvest will initially be enhanced in storage because sugar levels increase. Eventually, however, long storage time will deplete starch levels to a point where the texture of the squash is compromised. To maximize shelf life, squash should be stored at 55 to 60 oF with moderately high relative humidity (50 to 70%).

Because seed maturation is not complete until 7 to 8 weeks after fruit set, it is important to maintain a healthy plant until at least 50 days after fruit set. This insures a continuous supply of photosynthates (carbon source produced from photosynthesis) to the developing fruit. Seeds are the primary sink for assimilates such as sugars, so if photosynthesis is impaired by disease or insect feeding, nutrients for the developing seed are withdrawn from the flesh, depleting starch levels and lowering eating quality.

### **Harvest period and eating quality:**

Because fruit and seed development are similar in all three species of squash, their recommended harvest periods are similar. Butternut squash do not reach their characteristic tan color until late in development, so premature harvest before starch accumulation and seed fill are complete is generally not a problem. With kabocha varieties, it is actually desirable to harvest them before complete seed maturation, about 40 to 45 days after fruit set when the fruit are still bright green. New Zealand studies indicate that rind hardness is maximum around 40 DAP, so fruit harvested at 40 days suffer less damage to the fruit surface, and in turn, less chance for disease entry during subsequent storage, than fruit picked during later stages. Kabocha squash are also susceptible to sunburn damage and changes in rind color to brownish green, so it is best to harvest the squash before fruit are exposed to direct sun as the vines die down. Kabocha squash have a high dry matter content, usually 20 to 30%, and a small seed cavity, so that any seed maturation following harvest has a minimal effect on depleting starch reserves in the flesh.

**Acorn squash present the most difficult problem with respect to determining harvest time.** Most modern acorn varieties not only reach near full size within two weeks after fruit set, but also develop a dark green to black mature color. For this reason, acorn squash harvested for the large wholesale markets are often picked immature. This can be easily observed in supermarkets by noting that the rind on the ground side of the squash is light green or light yellow rather than dark orange coloration of mature fruit. If these immature squash are sampled, they are found to have very low sugar levels. If such immature squash are left in storage, sugar content will increase, but the starch will be depleted both by respiration and movement of nutrients from the flesh to the developing seed, and this results in poor eating quality. The problem of poor quality in prematurely harvested squash is further exacerbated because most commercial acorn varieties and many of the newer striped varieties have inherently (genetically determined) low dry matter and starch levels.



*Acorn squash approaching maturity. One way to determine when to harvest acorn squash is to check the ground spot on the fruit, and not harvest fruit until the spot turns dark orange*

### **How do you determine when to harvest?**

Most acorn varieties are semi-bush and set most of the crown fruit within about a week period. Modern hybrids tend to produce some female flowers before male flowers appear and these usually abort unless there are other varieties of *C. pepo* nearby supplying pollen. But this is shortly followed by a period of both male and female flowering and fruit set. Some later fruit sets will occur on runners, but these fruit are usually undersized and lack quality, and so should not be harvested and sold. These late set fruit are a drain on photosynthates, and pruning these fruit off of the plant can actually increase quality of the crown set fruit.

By noting the initial flush of male and female flowers on a semi-bush squash cultivar, a grower can estimate the approximate time when fruit set occurred, and delay harvest until about 50 days or more from the fruit set period. Another approach is to check the ground spot on the fruit, and not harvest fruit until the spot turns orange. Some of the newer striped varieties of *C. pepo* will show some color changes with maturation, but the color change, say from white to tan between the stripes or stripes changing from green to orange, may occur well after the fruit are ripe enough to harvest. So with these, I think that it is better to keep track of the approximate date of fruit set. However, if you observe a color change that correlates with maturity in a particular variety, then you can use that as a harvest indicator.

How about variety selection? That is a tough call. I have found that most modern hybrids being commercially sold lack the eating quality of a good Sweet Dumpling or Delicata squash. UNH has developed some high quality acorn and sweet dumpling type varieties that are being released to the seed industry. High Mowing Organic Seeds offers a UNH-developed, sweet dumpling hybrid, Sugar Dumpling, which also has intermediate resistance to powdery mildew. Johnny's

Selected Seeds is in the process of producing one of my PMR mini-acorns, and currently sells an acorn hybrid, Tip Top, that has good eating quality. Cornell Bush Delicata is another variety in this class with good eating quality and powdery mildew resistance. There are several other varieties available that have reasonably good eating quality, so growers will just have to evaluate them to determine if they fit into their particular farm and marketing situation.

- adapted from Brent Loy, Department of Plant Biology, University of New Hampshire

## **LATE SUMMER LEGUME COVER CROPS**

Rising fertilizer costs have many of us thinking of alternatives that can help to keep costs down. Legume cover crops, if well managed, can provide as much nitrogen as 100 to 150 lbs per acre to the following crop. Mid-August through early September is the best time to establish a legume cover crop. There are many legume cover crops to choose from but hairy vetch and medium red clover are both reliable and economical. Hairy vetch is sown at 40 lbs per acre. A lower rate of 25 lbs per acre can also be used but weed suppression and nitrogen fixation is greatly improved with the higher rate. Additionally, hairy vetch usually benefits from a nurse crop to help reduce matting during spring growth and to keep weeds down. Small grains such as rye, oats or wheat are used as nurse crops and are sown at a rate of 40 lbs per acre. Both the vetch and the grain can be mixed together in the seed drill. Medium red clover is sown at 15 lbs per acre and can be broadcast or sown onto prepared ground. Medium red clover also works well being overseeded into a standing vegetable crop. This is usually done after the last cultivation as a broadcast at a rate of 20 to 25 lbs per acre. In the spring, hairy vetch is incorporated at early bloom, typically late May, but will vary from year to year depending on spring temperatures. Red clover provides the most benefit if allowed to grow for a full season but could be incorporated in spring. Timing of incorporation is important to minimize regrowth and maximize nitrogen fixation and, therefore, contribution to the following crop. Allow a couple of weeks for breakdown before planting your vegetable crop.

- adapted from Long Island Fruit & Vegetable Update, August 15 2008

## **COPPER PRODUCTS FOR ORGANIC**

With the arrival of downy mildew in cucurbits, the threat of late blight in addition to early blight on tomato, ongoing pressure from Cercospora leaf spot in chard and beets, and assorted other fungal and bacterial diseases that have a strong foothold in vegetable crops, it would be useful to have a readily accessible, allowed copper product for organic growers to use.

There has been considerable confusion over which formulations of copper hydroxide or copper sulfate are approved, or not approved, for use on certified organic farms. This season it has been virtually impossible to obtain OMRI-listed copper products in Massachusetts. Champion WP (copper hydroxide), which was OMIR listed (ie, allowed for organic production) in 2007, lost its approval due to a change in formulation that resulted in presence of an inert that was non-compliant. This problem will be fixed for the 2009 season, but that's no help right now. NuCop 50WP (copper hydroxide, Agri-Star/Albaugh, EPA registration #45002-7) and Basic Copper 53 (copper sulfate, Agri-Star/Albaugh, EPA registration # 45002-8) are both OMRI approved. However, NuCop 50WP does not have registration for use in Massachusetts. Pesticides may have a federal label through EPA but the manufacturer must apply for registration in each state; this was not done for Nucop 50WP in Massachusetts. This appears not to have been a problem in many other states. Basic Copper 53 is registered for use in Massachusetts. Suppliers that may be able to obtain or ship allowed product for growers anywhere in the state include Field Works (508-636-9336), Crop Production Services (413-665-2115) and Helena Chemical (413-247-3126).

If you have questions about a particular product or about how to solve this problem, contact your certifying agency. If your farm is certified through Bay-state Organic Certifiers, contact Don Franczyk, 978-297-4171.

## **SWEET CORN & PEPPER UPDATE**

Trap counts have decreased across the board this week. Corn earworm is still present, but counts were lower this week. One exception to lower flight is in

<b>Corn Earworm Threshold</b>		
<b>Moths/Night</b>	<b>Moths/Week</b>	<b>Spray Interval</b>
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

Location	Z1	EII	Total	CEW	FAW
<b>Bershores/Champlain Valley</b>					
Pittsfield	0	0	0	11	-
<b>CT Valley</b>					
South Deerfield	0	8	8	-	-
Sunderland (1)	0	1		0	0
Sunderland (2)	10	7	17	4.5	0
Whatley	0	2	2	6	-
Hadley (1)	0	8	8	1	0
Hadley (2)	0	6	6	3.5	0
Amherst (1)	1	2	3	2.5	0
Amherst (2)	0	2	2	0	0
Easthampton	0	0	0	1	-
Granby	0	1	1	-	-
<b>Nantucket County</b>					
Nantucket	0	0	0	25	16
<b>Central &amp; Eastern MA</b>					
Dracut	0	1	1	1	0
Still River	0	0	0	18	-
Concord	12	1	13	2	0
Leicester/Spencer	3	0	3	0	0
Northbridge	5	1	6	10	1
Tyngsboro	0	22	22	5	0
Lancaster	0	0	0	0	0
<b>NH</b>					
Litchfield, NH	0	12	12	37	0
Hollis, NH	0	37	37	30	0
Mason, NH	0	5	5	0	0

Pittsfield where the trap count was at 11 this week after a summer of no CEW flight at all! Overall no massive new flight has come in but CEW remains the driving force behind spray schedules in silking corn. Development will take longer with lower daily temperatures and lower night temperatures. This week, temperatures ranged from mid seventies to low eighties during the day and forties and fifties at night. This stretches the time that it takes for eggs to hatch to 5-6 days, and also slows down moth egg laying activity during the night. Thus, in addition to lengthening the spray interval because captures are lower, growers can add a day because of lower temperatures. Note counts and spray intervals in table below. Jude Boucher from University of Connecticut notes that the corn earworm spray intervals can also be lengthened one day if growers use Warrior, because of its long residual activity.

European corn borer flight has decreased to 17 in Sunderland and 8 in Hadley and is down to at or below threshold for silk sprays, which is 12 moths per week. The second generation seems to be tapering off, and night activity is lower due to cool temperatures. It is important to know that the ECB overwinters here in New England in corn stalks and stems of other host plants. If you are finished picking in a field make sure to chop stalks and till in the plant debris to cut down on next years population.

**Late season field management.** It is getting harder to find the late fields that are still in whorl or pre-tassel stage, while more and more early fields are tilled under and ready for cover crops. Make sure to get your cover crops in as soon as possible to conserve the nitrogen from crop residues. The sooner that rye or oats is planted, the more nitrogen you will recover from the soil and hold over for next year. Given the rising price of fertilizer, each extra week of cover crop growth will give you a worthwhile payback. Research conducted by Stephen Herbert of UMass has shown that planting rye or oat after September 15 dramatically

reduces the ability of the roots to reach the available N in the soil and to produce enough canopy to protect soil from erosion. Cover crops planted in August develop larger, deeper roots and more canopy – providing better Nitrogen uptake, less leaching, and more protection of soil from erosion. Planting legume cover crops along with oat or rye will provide additional nitrogen for next season. Hairy Vetch and red clover are two options.

### Peppers

As ECB flight declines, there is less need for regular sprays in pepper. Typically we have used a threshold of 20 moths per night at the end of the flight as the trigger for ending regular sprays. In some fields that typically experience significant

Location	Z1	EII	Total ECB
<b>CT Valley</b>			
Granby	0	1	1
Sunderland (1)	5	6	11
Amherst	1	2	3
Hadley (2)	1	2	3

ECB pressure, the weekly moth count did not exceed that number even during peak flight. The trend of declining flight indicates reduced egg laying and fewer ECB larvae hatching and entering fruit. In some fields, Phytophthora has caused major losses and this far outweighs the concern for ECB.

## **PHYTOPHTHORA IN TOMATO: PROTECT CROPS AGAINST BUCKEYE ROT AND LATE BLIGHT**

Tomato fruit has been found at two locations in the Connecticut Valley that shows symptoms of Phytophthora. The exact species has not been determined; it could be late blight, *P. infestans*, or it could be Buckeye rot. We know that late blight has hit potato crops throughout the region. Tomato foliage has been hit with Septoria and early blight, but to date we've not found late blight on tomato leaves. It is important to scout your crop and protect tomato fruit against all types of Phytophthora.

Buckeye Rot of tomato is caused by several species of Phytophthora, including *P. capsici*, *P. parasitica*, *P. drechsleri*, and *P. infestans*. The disease occurs in all parts of the world and is favored by high relative humidity, abundant soil moisture, and warm weather. The first fruit symptoms appear as a firm brown spot, on green or ripe fruit, most often where fruit is in contact with the soil or where mud splash has occurred. As the spot enlarges, concentric rings of narrow dark brown and wide light brown bands may appear. Initially fruit remains firm, but soon decays. Under moist conditions, a white, cottony fungal growth will occur.

Buckeye Rot is most often seen after periods of prolonged, warm wet weather such as we have had this season. The pathogen is spread by surface water and rain splash. Low areas of fields are most susceptible to Buckeye fruit rot. The use of raised beds, mulch, and staking may reduce this disease. Rotation with crops not in the tomato family aids in disease control. Fungicides applied for Late Blight may reduce losses from buckeye fruit rot.

*-B Dicklow and R. Hazzard*

## **UPCOMING MEETINGS**

**UMASS SEPTEMBER TWILIGHT MEETING IS BEING CANCELLED.** Bonanno Farm (Pleasant Valley Gardens) Twilight Meeting Wednesday, September 24, 4-7 pm has been postponed until 2009.

### **USING BIOLOGICAL CONTROL IN GREENHOUSES: SEPTEMBER 18, 2008**

**9:15 AM - 3:45 PM**

#### **Sturbridge Host Hotel and Conference Center, Sturbridge, MA**

More growers and retailers are using natural enemies to manage common greenhouse pests. Learn from two leading experts and a panel of wholesale growers and grower retailers about the "nuts and bolts" of implementing a biological control program to manage thrips, aphids, fungus gnats and spider mites in greenhouse crops. See examples of live specimens!

More details at: [http://www.umass.edu/umext/floriculture/ed\\_programs/flower\\_growers\\_meetings.html](http://www.umass.edu/umext/floriculture/ed_programs/flower_growers_meetings.html)

Sponsored by the University of Massachusetts Extension Floriculture Program, University of Connecticut Extension Program and Northeast SARE

Contact Tina Smith, 413-545-5306, [tsmith@umext.umass.edu](mailto:tsmith@umext.umass.edu), Paul Lopes, 508-295-2212 ext. 24, [lopes@umext.umass.edu](mailto:lopes@umext.umass.edu).



*Buckeye Rot on Tomato*

edu University of Massachusetts Extension.or Leanne Pundt, 860-626-6240, leanne.pundt@uconn.edu University of Connecticut Extension.

## **SAVE THE DATE! RENEWABLE ENERGY CONFERENCE FOR FARMS AND GREENHOUSES**

December 4, 2008

### **Sturbridge Host Hotel and Conference Center, Sturbridge, MA**

Sponsored by the University of Massachusetts Extension Floriculture Program, Extension Vegetable Program, Vegetable Growers Association and Massachusetts Flower Growers Association. Complete Program Coming Soon!

Contact Tina Smith, 413-545-5306, tsmith@umext.umass.edu, Ruth Hazzard, rhazzard@umext.umass.edu, 413-545-3696, or Paul Lopes, 508-295-2212 ext. 24, lopes@umext.umass.edu at University of Massachusetts Extension.

### **VEGETABLE NOTES WOULD LIKE TO THANK THE FOLLOWING COMPANIES FOR THEIR SPONSORSHIP:**



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## **Field Works**

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*If you would like to become a Vegetable notes sponsor, please contact Jessica Dizek at [jdizek@outreach.umass.edu](mailto:jdizek@outreach.umass.edu) or 413 545 1445*

*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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