UMASS EXTENSION

# Vegetable Notes

For Vegetable Farmers in Massachusetts

Volume 18, Number 17 August 30, 2007

## Crop conditions

It's dry and we need rain. Everyone is very busy trying to keep up with harvesting, spraying, planting and weeding fall crops, getting cover crops in, and irrigating. A major corn earworm flight slipped into the region last weekend. Every corn grower needs to be treating silking corn, or you will see a lot of wormy ears. Hot weather returned (with a vengeance) which has been good for ripening up pumpkins and winter squash. Many potato fields have been harvested. Retailers are hoping for continued strong sales through (and after) Labor Day, but typically the demand for 'summer vegetables' drops when kids go back to school. Hopefully the 'farm to school' projects will encourage kids to get excited about vegetables even at school!

## Effective seeding dates for fall cover crops

Well-established cover crops are effective in taking up residual soil nitrate after the harvest of corn or other crops, and nitrate released from applied manure. They hence minimize the nitrate leaching to ground water during the fall and winter months. Numerous studies have also shown that effective cover crops prevent erosion and loss of reactive phosphorus in runoff from fall applied manure. Our studies and those of others have shown that cover crops also reduced nitrate leaching in subsurface soil layers. However, the ability of the cover crop to absorb nitrate from the soil is affected by the degree of colonization of the soil by roots.

Cover crop seeding date is important for adequate canopy and root development before cool weather slows or stops growth. In three studies (2004-2007) at the University of Massachusetts Agronomy Research Farm, and on farms, this critical date was shown to be mid-September or earlier for southern regions of New England. Earlier seeding dates (mid August and early September) showed higher levels of nitrate accumulation and better root development. In most years, seeding dates after mid September will result in less than adequate leaf growth to reduce the erosive force of rain and runoff, and the small root growth will not contribute much to stabilizing the soil or for nutrient accumulation. The mid-September seeding date as a standard for cover crops was established for its effectiveness for erosion control. Whether effective dates for erosion control are similar to effective dates for preventing leaching was unknown. We now know that seeding one to two weeks earlier will significantly increase nitrate accumulation. However, any delay in establishment of cover crops beyond the effective date will increase the amount of nitrate leaching.

Low fall temperatures are a major factor controlling growth and actual effectiveness of cover crops planted at different dates on ground water quality. It has been reported that cover crops planted in early September had 50% more nitrogen accumulation than cover crops planted in late September. Results from our studies seem to confirm these reports for both rye and oat cover crops. Rye retained more of the accumulated N through the winter than oat.

*--Stephen Herbert, Masoud Hashemi, Sarah Weis, and Ali Farsad, Dept Plant Soil and Insect Sciences, UMass Amherst*

## Harvest period, storage, and variety selection to optimize eating quality in squash

**Introduction:**

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* winter 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 $^{o}$Brix). 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 fresh 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 $^{o}$F 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 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.*

**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.

**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 pro-

duce 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.

*-Brent Loy, Department of Plant Biology*
*University of New Hampshire*

## BAITING *PHYTOPHTHORA CAPSICI* FROM IRRIGATION WATER

*Phytophthora capsici* has become a major problem in Massachusetts as it has in nearly all areas where cucurbits and peppers are intensively grown. Our best recommendation for controlling *Phytophthora* blight is to avoid growing susceptible crops on land known to be infested with the pathogen. Of course, this is not always practical for those with limited land or for those who only grow cucurbits and other susceptible crops. Another problem is that irrigation water can become contaminated and deliver the pathogen to either contaminated or uncontaminated land. The Plant Disease Diagnostic Clinic at UMass (415-545-3209) can help you determine if your irrigation water is contaminated. However, keep in mind that negative results do not guarantee that the water is free of *Phytophthora*, nor does it guarantee that it will not become contaminated after the bioassay.

*Lesion of Phytophthora on a green tomato used as a bait. Photo by Robert Wick.*

Green tomatoes, green pears and cucumbers are fairly good indicators for the presence of *Phytophthora*. If the fruit will float, it can be placed in an onion bag or other net bag, tied to a rope, and tossed into the water. If the fruit does not float, devise a flotation devise with Styrofoam that allows partial submersion in the water. A crate with Styrofoam blocks has worked well. Allow the fruit to stay in the water for 3 to 7 days. *Phytophthora* would be suspected on fruit that develops a firm lesion (the center of the lesion may be soft). Blot the fruit dry with a paper towel, wrap in newspaper and send next-day mail to the Plant Disease Diagnostic Clinic. If the fruit develops a soft rot (mushy) or has no lesions, do not send it to the Clinic.

Research carried out by Dr. Mary Hausbeck at the University of Michigan has shown that *Phytophthora* was most easily detected in water supplies during the month of August. This may be due to the fact that diseased crops are releasing spores of the pathogen in August that is subsequently entering into the water supply. We suggest you start baiting mid-July; if no firm lesions occur on the fruit, set up additional baits and evaluate the results. However it is not too late to test your irrigation source this season!

*-Robert Wick and Bess Dicklow, Dept of Plant, Soil, and Insect Science, UMass Amherst*

## CERCOSPORA LEAF SPOT OF SWISS CHARD, BEETS, AND SPINACH

This disease caused by *Cercospora beticola* occurs wherever table beets, Swiss Chard, sugar beet, spinach is grown and is one of the most important diseases affecting the Chenopodium group. It can result in significant losses, particularly in late summer when conditions are favorable (high temperatures, high humidity, long leaf wetness periods at night). Leafy greens become unmarketable, and beet roots fail to grow to full size when disease is severe.

**Identification.** Symptoms occur as numerous, initially small circular leaf spots (see photo). Spots have a pale brown to off-white center with a red margin. Lesions expand in size, coalesce, and turn gray as the fungus sporulates, and can result in extensive loss of foliage. Leaves at the center of the plant are often less severely affected. The pathogen produces sclerotia or stromata which can be seen with a hand lens as small, black dots in the center of lesions. Lesions may also occur on petioles, flower bracts, seed pods, and seeds.

**Source and survival.** *C. beticola* survives between crop cycles in residues from infected crops (as sclerotia), in weed hosts, and on seed. It can in the soil for up to two years. High levels of disease can result from just a few infected plants, since each lesion produces numerous conidia. Several cycles of infection and conidium production may occur with favorable environmental conditions. Spores can penetrate the leaf directly through open stomates. The pathogen is favored by high relative humidity and temperatures between 75-85˚ F and is spread by rain splash, wind, irrigation water, insects, workers, and equipment. Leaf wetness during the night, even with dry conditions during the day, encourages disease. Successive plantings made close together can allow disease to move from one planting into the next.

*Small, circular leaf spots with gray centers; symptoms of Cercospora leaf spot.*

**Management.** Plant resistant cultivars, if available. Bury infected crop residues and destroy volunteer plants and weed hosts. Start with certified, disease-free seed or treat seed with hot water or fungicides. Rotate to non-host crops (not in the Chenopodium family) for 2-3 years. Do not cut chard or spinach for regrowth if disease is present. Avoid planting succession crops close together. Avoid overhead irrigation if it will result in prolonged leaf wetness periods (eg, through the night); irrigate mid-day when leaves will dry fully or use drip irrigation.

**Chemical controls.** Apply registered fungicides according to label instructions prior to infection and symptom development. Pathogen populations resistant to sterol demethylation-inhibiting (DMI's, FRAC Group 3) fungicides have been reported, so use products with other modes of action. Registered fungicides for leafy vegetables include azoxystrobin (Quadris), trifloxystrobin (Gem), chlorothalonil (Bravo), and Dithane (mancozeb).

*-by Bess Dicklow, Rob Wick, and Ruth Hazzard; UMass Plant Soil and Insect Science Dept.*

# VERTICILLIUM WILT

A discussion of Verticillium wilt should also include Fusarium wilt because these two diseases are widely reported and well known at least by name among gardeners and growers alike. The symptoms of these two diseases are very similar, and the cause of disease cannot be reliably determined in the field. An important distinction between these two is a generalization but a useful concept for disease management. The generalization is that the fungus *Verticillium* has a wide host range (infects many unrelated plants) and *Fusarium* has a very narrow host range; that is, a particular strain can only infect one species such as tomato. For example, the *Fusarium* that infects tomato cannot infect basil and visa versa. This is an important distinction for vegetable growers in particular because it helps growers plan an appropriate crop rotation. An important feature that both *Verticillium* and *Fusarium* share is that they are both soil-borne fungi and once introduced will survive in the soil for many years.

*Wilting in eggplant caused by Verticillium wilt. Photo by Robert Wick*

*Verticillium* has a wide host range; that is, an isolate from potato may infect maple trees. Therefore one may not want to develop a nursery in an old potato field. If *Verticillium* wilt on eggplant develops in your field then many vegetable crops would potentially be affected on the same site. The list of crops susceptible to *Verticillium* is very long and includes vegetables, flowers, herbaceous perennials and trees. Nevertheless there is some specialization with some strains of this fungus. For example, the strain that attacks peppers appears to be restricted to peppers (we have not seen this strain in the eastern U.S.). Unfortunately, there is no simply way to determine the host range of *Verticillium*. When we confirm *Verticillium* as the cause of disease we can only advise to plant crops that are known to be resistant; usually this means corn or other grasses.

Eggplant is very susceptible to *Verticillium* and therefore is a very good indicator that the fungus is present. Growers are advised to rotate eggplant around land they own or rent to determine where *Verticillium* is present. A plant infected here and there does not mean an epidemic will occur. The fungus is soil-borne and does not easily move around the field. Plowing and harrowing will extend the fungus down the row a bit but it does not easily spread like fungi that infect the above-ground parts of plants. Nevertheless, continuous planting of susceptible crops will build up the population density of *Verticillium* (or

*Vascular discoloration caused by Verticillium wilt in eggplant can be seen by cutting the stem lengthwise. Photo by Robert Wick*

*Fusarium*) and reduce yield of subsequent crops.

Symptoms of *Verticillium* and *Fusarium* wilt are similar. Early stages of disease result in a one-sided yellowing, wilting or scorching. In contrast, *Pythium, Phytophthora, Rhizoctonia, Sclerotinia* and other root and crown rot pathogens result in the entire plant wilting more or less uniformly. The reason for the difference is that Fusarium and Verticillium enter into a limited section of the root system and colonize the water conducting cells that feeds water to a section of the plant. Therefore early symptoms of disease (wilting, scorching) are localized because only a localized section of the plumbing system is colonized by the fungus. With the crown and root rot pathogens, the vascular system is shut down more uniformly resulting in a uniform wilt.

*Verticillium* and *Fusarium* generally cause a discoloration of the vascular system, especially at the base of the stem. The discoloration can be observed by splitting the stem down the middle; the vascular system is just under the outside of the plant, not in the center. A combination of vascular discoloration and one-sided wilt is a fairly reliable symptom of these two vascular wilt fungi.

We encourage you to send specimens to the Plant Disease Diagnostic Clinic where the exact cause can be confirmed. Identification of the cause of disease will help you plan how to rotate your crops (or rent land) for next year.

*-Robert Wick, Plant, Soil, and Insect Science Dept, UMass Amherst*

## LAST IPM FIELD SCHOOL FOR 2007: SEPT. 18TH AT HOWDEN FARM IN SHEFFIELD, MA

September 18 (Tues) 3-6 pm

Bruce Howden and David Prouty grow a range of vegetable and small fruit crops and raises livestock on 250 acres in the beautiful Housatonic River Valley. Howden Farm is the source of the well-known Howden pumpkin and the farm is still involved with pumpkin breeding as well as growing pumpkins for retail and wholesale. In 2006 the farm installed a 1-kilowatt photovoltaic system to power the pump for their drip irrigation system.

In mid-September the harvest of winter squash and pumpkins is in full swing, and fruit rots are a major concern. Needless to say, the farmers are hoping that we do not find any fruit rots to observe! We will have an opportunity to scout for late season disease, weed and insect pests, discuss harvest and post harvest handling of winter squash and pumpkins, and view the photovoltaic system.

**Directions:**

Take Mass Pike (I-90) take Exit 2 for Lee/Pittsfield. Turn left off the ramp onto Rte 20, then bear right on 102. Follow 102 (4.6 mi) into Stockbridge and turn left on Rte 7 south. Take Route 7 south through Gt. Barrington and Sheffield center. Bear right onto 7-A (Ashley Falls Rd.). After 0.4 miles bear right on Rannapo Rd. Farm is one-half mile down on the right, 303 Rannapo Rd.

Cost: $20/person per Field School; $15 if more than 2 per farm.

Pesticide Applicator Training Credits: 2 contact hours will be given for each field school (private applicator category).

For more information or to register contact: 413-577-3976 or umassvegetable@umext.umass.edu

## VEGETABLE TWILIGHT MEETING AT UNIVERSITY OF RHODE ISLAND SEPTEMBER 13, 2007

4-7pm at the URI Agronomy Building and Fields, Plains Road, Kingston, RI

Kristen Dame, from the University of Rhode Island Cooperative Extension will lead a tour of the University's specialty squash and brassica. Guest speakers Ruth Hazzard (UMass) and Jude Boucher (UConn) will share squash/brassica growing strategies and pest information.

Participants will receive a sit-down supper as well as 2 hours of pesticide credits. Cost: $10 per person. Make checks payable to URI.

PLEASE RSVP to Kristen Dame by September 7th: (401) 874-2967 or (401) 935-7308 or kdame@mail.uri.edu to ensure we have enough food for everyone. See you there!

## CORN ALERT: MAJOR CORN EARWORM FLIGHT

CEW flight spiked suddenly this week, after a major weather system moved through last weekend. In Hadley 103 moths were caught in two nights (Sunday-Monday) and 130 were caught in seven nights in Amherst. Captures were high in CT, RI, coastal NH and Maine as well as throughout Massachusetts. Even Vermont growers are experiencing high CEW flights for this time of year. Counts have exceeded 50 per night in some locations. With trap counts this high, traps should be checked a least twice a week and ALL silking corn should be sprayed with pressure this high. Growers who are catching over 13 moths per night (90 per week) should be on a 3 day spray schedule (see table below). Traps should be in fresh silk at all times. Monitoring this pest is critical to achieving good control all season. Using two traps per field is recommended. To determine when to start insecticide sprays and how often to spray, use the average moth counts per trap then divide by the number of nights since the last count was taken.

Conditions are very dry and irrigation is needed to produce the best quality ears with good tip fill. High temperatures this week have exacerbated the dry conditions, and are also speeding up caterpillar development. Once CEW eggs are laid on the silks, hatch will occur in slightly over two days if average daily temperature is above 85 degrees Farenheit. The newly hatched caterpillars tunnel into ears by moving down the silks. Once in the ears, caterpillars cannot be reached with insecticide sprays making control impossible. Check traps twice a week if possible to keep a close watch on flight patterns and the potential for egg laying. Don't put your sprayers away yet! We can expect any new storms to bring up more CEW and possibly more FAW over the Labor Day weekend

Organic growers using oil treatments to the silk should note that the recommended day of application (6-8 days after 50% of field in silk) is based on balancing the time needed for corn earworm egg hatch with ear pollination and ear development. For proper timing of the oil application, look for evidence that pollination is nearly complete: wilted silks outside the ear, and (inside the husk) detachment of silks from the kernels along the ear, except possibly at the very tip. Treat as early as possible after this stage is reached to avoid letting earworms get down into the ear prior to treatment.

The European corn borer flight has dropped off throughout the state so new eggs are not expected. **Pepper growers** can safely stop spraying for ECB control.

Fall armyworm captures were zero at most locations with spikes in Hatfield, Northbridge and Litchfield. Keep traps up to catch any new flights that may move into the area. CEW sprays should take care of any FAW that remains in silking corn. If you still have corn that is pre-silk you may want to do a scout for new FAW damage and spot treat any infested areas.

*--Amanda Brown and Ruth Hazzard*

**CORN EARWORM THRESHOLDS**

| 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 day | 3.5 - 7 | 5 days |
| 1.0 - 13.0 | 7 - 91 | 4 days |
| Over 13 | Over 91 | 3 days |

**Sweet Corn Trap counts for August 30, 2007**

| Location | ZI | EII | Total ECB | CEW | FAW |
|---|---|---|---|---|---|
| South Deerfield | 0 | 0 | 0 | - | - |
| Deerfield | 1 | 2 | 3 | 53 | 0 |
| Whatley | 12 | 4 | 16 | 92 | 12 |
| Hadley (2) | 1 | 1 | 2 | 2 | - |
| Hadley (1) | 0 | 0 | 0 | 103 | - |
| Amherst (1) | - | - | - | 130 | - |
| Amherst (2) | - | - | - | 19 | - |
| Sunderland | 8 | 19 | 27 | 26 | 1 |
| Concord | 6 | 3 | 9 | 21 | 0 |
| Leicester/Spencer | 2 | 1 | 3 | 20 | 0 |
| Northbridge | 26 | 1 | 27 | 99 | 7 |
| Tyngsboro | 8 | 12 | 20 | 18 | 0 |
| Dracut | 21 | 7 | 28 | 21 | 0 |
| Lancaster | 8 | 9 | 17 | 42 | 0 |
| Still River | 1 | 2 | 3 | 242 | - |
| Mason, NH | 0 | 0 | 0 | 39 | 0 |
| Hollis, NH | 0 | 5 | 5 | 120 | 0 |
| Litchfield, NH | 4 | 5 | 9 | 69 | 9 |

**Pepper Trap Counts for August 30, 2007**

| Location | ZI | EII | Total ECB |
|---|---|---|---|
| Hadley | 0 | 0 | 0 |
| Amherst | 0 | 0 | 0 |
| Hatfield | 3 | 6 | 9 |

*--Thanks to our scouting network: R.Hazzard, P.Westgate, A.Brown, A.Lopez-Swetland, D.Rose, J.Golonka, S.Pepin, G.Hamilton, P.Willard, J.Mussoni*



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If you or your business would like to become a sponsor or make a donation, please contact the Outreach Development office at 413-545-4371.

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