UMASS EXTENSION

Vegetable Notes

For Vegetable Farmers in Massachusetts

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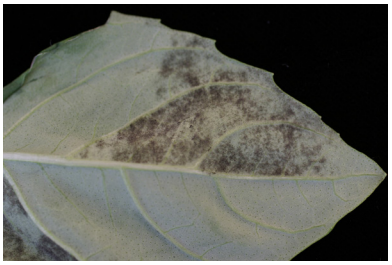
Crop conditions

Dry. Hot. Irrigation systems are operating full tilt but barely keep up with the water loss even in irrigated fields. Some growers have noted that at deeper soil levels there is still reasonably good moisture except in gravely soils, and that plants regain their turgor overnight. However we are in a critical period where more days of temperatures in mid 90's, relentless sun and no rain will certainly cause crop losses. Planting of fall crops and cover crops has been held back unless irrigation is plentiful. Harvest continues for corn, summer squash, zucchini, beets, peas, cabbage, lettuce, but successions are bunching up and extreme heat reduces either quantity or quality or both. Some growers report blossom drop in pepper, others note the fruit set is holding. Hot weather pests to watch out for include tarnished plant bug on lettuce, stink bug on tomato, potato leafhopper on eggplant and potato, aphids on corn, lettuce, cucurbits and other crops. Diseases observed this week include bacterial wilt in cucurbits, and Sclerotinia white mold in tomato.

Downy mildew of basil



Discolored patched on the bottom surface of the leaves are bounded by leaf veins

Downy mildew was first reported in Uganda in 1930. The disease did not attract international attention until it recently appeared in several new locations; Italy (2004), France (2005) South Africa (2006), Iran (2007) United States, in Florida (2007) and Argentina (2008). During 2008 and 2009, the disease occurred throughout the east coast in epidemic proportions both in the field and in greenhouses. Considerable economic losses occurred in Massachusetts during that time and we anticipate basil downy mildew will be a major disease of basil in the US in the foreseeable future. Long distance transport from FL to MA might be explained by aerial dispersal of spores but rapid transcontinental transport probably occurred via infested seed sold internationally. Although the downy mildew pathogen has been detected in basil seed; seed transmission is probably a rare event. Air-borne dissemination from infected plants is more likely.

Diffuse yellowing of the leaf tops

Infected leaves develop diffuse yellowing on the top of the leaf but distinctly vein-bounded patches on the bottom. When spores are produced, a characteristic gray, fuzzy growth on the underside of the leaves is evident. Symptoms of downy mildew on basil can easily be mistaken for a nutritional deficiency. The fuzzy growth of spores on the underside of the leaf looks as if soil had been splashed onto the leaf under-surface.

Management: The most important environmental factors favoring disease development are high humidity and extended leaf wetness. These factors can be reduced by:

- Toward evening, heat and vent the greenhouse, especially when warm days are followed by cool nights.

- Improve horizontal air flow by the use of fans.
- Reduce plant canopy density by spacing to speed leaf drying.
- Water in the morning, if practical, or water subirrigation rather than overhead.
- In the field, plant in well drained sites with good air drainage and orient rows with the prevailing winds.
- Control weeds and space plants to enhance leaf drying.

Relative susceptibility of basil types:

Field trials conducted in southern New Jersey in 2009 determined that commonly-grown sweet basil (Ocimum basilicum) cultivars such as 'Poppy Joe' and 'Nufar' were the most susceptible to downy mildew. The least susceptible basils included the lemon and spice types such as O. x citriodorum and O. americanum cultivars , 'Lemon Std', 'Lemon', 'Lime', 'Spice', 'Blue Spice' and 'Blue Spice Fil'.

Chemical control:

Few fungicides are labeled for herb plants and there are differences in registrations for field grown plants versus greenhouse plants. Copper products, phosphites, azoxystrobin, and mancozeb are labeled for use on basil. It is the grower's responsibility to read and follow label instructions. The label is the law and any recommendations made here are superseded by the label.

At the University of Massachusetts, we are investigating methods to control this disease with biological control agents. We are interested in collecting live, infected plants from residential gardens, greenhouses and field grown basil. If you think your basil plants are infected, please call or email Rob Wick, Department of Plant Soil and Insect Sciences; tel. 413.545.1045, rwick@pltpath.umass.edu.

- Robert L. Wick and M. Bess Dicklow, University of Massachusetts, Amherst

SUMMER BROCCOLI

Many vegetable growers in central and southern New England avoid growing summer broccoli because head quality suffers from the heat. Some grow it all summer but have to deal with lower quality and more head rot during the hottest part of the summer. Even 'early fall' broccoli, harvested in early September, may be subject to summer heat during critical growth periods.

Growing quality broccoli through the hottest part of the summer is a tricky proposition, and while there isn't a silver bullet that will ensure a perfect crop, there are numerous ways that you can mitigate your risk and ensure the best possible broccoli crop all summer long.

Research done by Thomas Bjorkman at Cornell University, using the cultivar Galaxy, found that the critical period for heat sensitivity in broccoli only lasts for roughly ten days. This 'window' of sensitivity corresponds to the time when the growing tip shifts from vegetative growth to flower bud initiation. This is a period of about 10 days prior to when a tiny crown is visible in the center of the plant. Temperatures above 35 degrees Celsius (95 degrees Fahrenheit) for more than four days during that period causes uneven bud development at the bud initiation stage, resulting in heads that were uneven and poorly shaped. Other references suggest that temperatures above 85 degrees can cause heat injury.

Other factors in addition to heat can cause reduced head quality and increased susceptibility to disease. Uneven or inadequate soil moisture exacerbates heat stress. Trickle irrigation may be helpful for supplying water on a regular, steady basis without increasing the risk of water sitting on the head. When individual buds or areas of the head are killed by heat stress, this allows entry of pathogens. Uneven heads also allow water to remain longer on the surface of the head, which increases the likelihood of disease development.

Inadequate nutrients and improper nutrient balance affect both head and stem quality. Boron deficiency increases likelihood of hollow stem, which is often not noticeable until harvest. However, hollow stem can also be exacerbated by excessive nitrogen fertilizer, imbalance of nitrogen and boron, or rapid growth after head initiation. Cauliflower, turnip and rutabaga are also very sensitive to boron deficiency. Conventional fertilizers can be purchased with added boron. For

broccoli, use 2-3 lb. actual boron if the soil test level is low (0 to 3.5 ppm), or half that much if the soil test is medium (0.35 to 0.7 ppm). There are a number of soluble sources of boron, including Solubor and Fertibor, which are OMRI listed. Solubor is 20% B so you'd need 10 lb per acre to achieve 2 lb actual. If you are broadcasting an organic blended fertilizer, ask if your supplier will add boron to the mix. Another way to apply it is to mix it in water, spray it on the soil with a boom sprayer, and incorporate it into the soil.

In general, even moisture and fertility are important in producing high quality broccoli heads. Avoid large doses of nitrogen directly after head initiation.

Postharvest. Broccoli is one of the more challenging crops for postharvest handling. Harvesting in the early morning is key, so the crop comes in from the field as cool as possible. For best quality and shelf life broccoli needs to be cooled to 32 degrees Fahrenheit rapidly under conditions of high humidity. Rapid cooling is the key to preventing yellowing of broccoli. In addition, broccoli is sensitive to ethylene so it is important that the florets are not stored in a cooler with other vegetables or fruits that emit ethylene.

The main challenge for many vegetable growers is the lack of facilities to quickly cool down the florets. Most growers have ONE cooler where they store vegetables, and they also use the same cooler to remove field heat from the vegetables. This type of setup is inadequate for rapid cooling and the vegetables and fruits often remain warm even after storing in the cooler for 48 hrs. Ideally, broccoli should be pre-cooled in a different facility before being brought into cooler where all of the produce is stored - not only so that the broccoli will have already reached the target temperature, but also so that it will not raise the temperature of the storage room.

There are many different ways to pre-cool fruits and vegetables, vacuum cooling being one of the methods. The least expensive methods are force-air cooling and hydro-cooling. The latter cools down the vegetables faster than the former. The mister method, which can include using a mister inside the cold room to ensure high relative humidity during cooling, works as it is similar to hydrocooling. It will be even more effective if the water temperature is chilled. Vacuum cooling is very effective but is one of the most expensive investments of all of the pre-cooling methods available.

In the case of broccoli, the florets need to be chilled to near 32 Fahrenheit as soon as possible and they should be stored and transported at that temperature. Higher temperatures will cause the floret to turn chlorotic very quickly so maintaining a cold chain throughout the postharvest period is critical.

-Andy Cavanagh, John Howell, Susan Han, Ruth Hazzard (UMass), and Thomas Bjorkman (Cornell University)

CUCURBIT DISEASE MANAGEMENT OVERVIEW

The list of diseases affecting cucurbit crops is long, and management of these diseases is complicated by the presence of different types of pathogens which require different classes of materials for effective control, and the danger of fungicide resistance developing in pathogen populations. The dry weather we've been experiencing has helped to slow the onset and development of many of these diseases, but as the season progresses they will certainly become more prevalent. This article will help you prepare for the challenge of managing these diseases effectively.

If Plectosporium, black rot, or scab are detected before powdery mildew, apply a recommended contact fungicide on a weekly basis until powdery mildew is found. In unusually wet weather or in unrotated fields, you may want to start your disease program at fruit set even if disease symptoms are not yet present. Apply a recommended contact fungicide every 7-10 days until powdery mildew is found during weekly scouting trips. Then follow the powdery mildew program detailed below.

If powdery mildew is detected first, begin your spray schedule with a systemic that is effective against powdery mildew. Remember to mix this systemic material with a contact fungicide. Follow this with another systemic or single mode of action material from another FRAC group, also mixed with a contact fungicide. Fungicide applications should be applied on a 7-10 day schedule and systemic or single mode of action fungicides should be limited to a single application per season for each FRAC group.

Downy mildew overwinters in the deep south and is carried north each year on storm fronts. In recent years it has also

overwintered in greenhouses in Ontario, which means it can also reach us from the north or west. The progress of downy mildew epidemics can be monitored on-line at http://www.cdm.ipmpipe.org/ or through the University of Massachusetts Vegetable Notes Newsletter to better time scouting. A contact fungicide can be used alone when the forecasted risk of downy mildew is moderate and before downy mildew has been found in the area. By the time downy mildew arrives this far north, you may already be applying a contact fungicide to control other diseases. Systemic and single mode of action fungicides specific for downy mildew should be reserved for when risk is high or when the disease has been reported in your area or found in your field. For organic growers, the options are more limited. Copper and Sulfur are traditionally the most effective materials available to organic growers for managing the diseases that occur on cucurbit crops. There are also numerous biological and biorational materials allowed for organic production, though their efficacy may be more variable. Check with your certifier or state extension service for information about which formulations are currently approved for organic production.

The roster of effective systemic and single mode of action fungicides is always changing as older materials are lost to fungicide resistance and new products are developed. Here is a partial list of materials, see the New England Vegetable Management Guide (www.nevegetable.org) for a more comprehensive list of fungicides that are registered for use on these diseases.

Contact or multi-site general fungicides:

chlorothalonil (Bravo Weather Stik): 2.0-3.0 pt/A (0 dh, REI 12h, Group M5). Powdery mildew will not become resistant to Bravo but it is not systemic so coverage is critical.

sulfur (Microthiol D): 5-10 lb/A. (0 dh, REI 24h, Group M2). Sulfur can injure plants, especially when temperatures reach 90° F. Do not apply to sulfur sensitive varieties.

maneb (Maneb): Rates vary depending on the formulation. See label for details. (5 dh, REI 24h, Group M3).

Fungicides for Powdery Mildew:

myclobutanil (Rally): 5 oz/A (0 dh, REI 12h, Group 3). Begin application at the first sign of disease development and alternate with a fungicide with a different mode of action. Observe a 30-day plant back interval.

pyraclostrobin plus boscalid (Pristine): 12.5-18.5 oz/A. (0 dh, REI 12h, Groups 11 plus 7). Use caution when applying Pristine in a tank mix (see label). Do not rotate with other Group 11 fungicides such as Quadris, Cabrio, or Flint.

quinoxyfen (Quintec): 4-6 fl oz/A. (10-14 dh, REI 12h, Group 13). Tank mix with a multi-site contact fungicide. Alternate with a non-Group 13 fungicide.

triflumizole (Procure 50WS): 8 oz/A. (0 dh, REI 12 h, Group 3).See label for restrictions on rotational crops.

Fungicides for Downy Mildew:

cyazofamid (Ranman): 2.1-2.75 fl oz/A. (0 dh, REI 12h, Group 21). Alternate sprays of Ranman with a fungicide with a different mode of action.

cymoxanil (Curzate 60 DF): 3.2-5.0 oz/A. (3 dh, REI 12h, Group 27). Use only in combination of a labeled rate of a multi-site contact fungicide (copper, chlorothalonil).

dimethomorph (Forum): 6 oz/A. (0 dh, REI 12h, Group 15). Apply only in combination with a labeled rate of another non-group 15 fungicide. Do not make more than two sequential applications of Forum before alternating to a fungicide with a different mode of action.

famoxadone plus cymoxanil (Tanos): 8 oz/A (3 dh, REI 12h, Groups 11 & 27). Application should begin prior to disease development on a 5-7 day schedule. Tank mix with an appropriate multi-site contact fungicide with a different mode of action (Chlorothalonil, Copper, or Maneb).

fenamidone (Reason 500 SC): 5.5 fl oz/A. (14 dh, REI 12h, Group 11). Do not rotate with other Group 11 fungicides such as Quadris, Cabrio, or Headline.

fluopicolide (Presidio): 3-4 fl oz/A. (2 dh, REI12h, Group 43). Must be tank mixed with another fungicide with a different mode of action.

fosetyl Al (Aliette WDG): 2 to 5 lb/A (0 dh, REI 12h, Group 33). Apply when conditions for disease are favorable. Use the high rate when Phytophthora blight is active. Do not tank mix with copper.

propamocarb HCl (Previcur Flex): 1.2 pt/A. (2 dh, REI 12 h, Group 28). Alternate with a multi-site contact fungicide (copper, chlorothalonil, maneb, sulfur).

pyraclostrobin (Cabrio EG): 8 to 12 oz/A (0 dh, REI 12h, Group 11). Apply at the first sign of disease and alternate with chlorothalonil after 7 to 14 days if necessary.Do not make more than one application before alternating with a non-Group 11 fungicide. Do not rotate with other strobilurins such as Quadris.

Where trade names or commercial products are used, no company or product endorsement is implied or intended. Always read the label before using any pesticide. The label is the legal document for product use. Disregard any information in this newsletter if it is in conflict with the label. For a more complete list of fungicide recommendations, see the New England Vegetable Management Guide (www.nevegetable.org).

UPDATE ON POTATOES, TOMATOES AND EGGPLANT

Colorado Potato Beetle

Outbreaks of Colorado potato beetle (CPB) are being observed in potato and eggplant at various farms. The heaviest feeding damage comes as larvae grow larger. Adults may be mixed in also, though the adults that survived the winter are dying out. It won't be long before we will start to see the emergence of summer adults from the soil, where pupation occurs. Look for small round holes in the soil as signs of emergence. If we have an early flush of summer adults that emerge before August 1, there will be another round of egg-laying and larvae. There's a good chance this will happen in 2010 since all heat-driven growth, both plants and insects, is ahead of schedule this year.

For insecticides, look for new chemistry on CPB if possible. If you are making a purchase, it can be helpful to look for products that would have multiple uses on the crops that you grow. There is some relatively new chemistry available for CPB, which is good news when trying to control a pest that has a stunning reputation for rapidly becoming resistant to insecticides. Coragen has been shown to be very effective against both adults and larvae and can be applied through drip or as a foliar. Radiant is a 'second generation' spinosyn, similar to Spintor, also a newer chemistry which controls both larvae and adults. Insect growth regulators such as Trigard and Rimon are useful against populations of smaller larvae because they disrupt insect growth. Avaunt is another newer chemistry that is registered for CPB and can also be used on caterpillars in Brassicas and sweet corn.

You are likely to see poor control from older chemistries such as pyrethroids and organophosphates, as CPB developed resistance long ago. Resistance to neonicotinoids such as Admire has developed in Massachusetts, so using this group may require high rates and should be limited to one application per season. Nicotinoid insecticides may be soil or trickle applied (Admire, Platinum, Venom), foliar applied (Actara, Assail, Leverage, Provado, or Venom).

Do not use the same chemical class on successive generations in the same year. There are enough different classes to allow this! Note that in the New England Vegetable Management Guide, (www.nevegetable.org) as well as on all pesticide labels, each insecticide has a group number, which identifies chemistries with the same mode of action. Avoid using insecticides from the same group.

For organic controls (OMRI listed products), spinosad (Entrust) and azadiractin (various neem products) are the main options. Beauvaria bassiana (Mycotrol O) has been shown to suppress CPB populations, though it does not provide immediate control. Cultural controls are key to reducing dependence on this limited number of products, but sometimes a rescue treatment is urgently needed.

Potato Leafhopper

Hopperburn is showing up where leafhopper has been allowed to build up. Look for adults that fly when the foliage is shaken, and bright green wedge-shaped nymphs skittering around on the leaves. If you notice the browning leaf tips, leaf

curling, and increasingly unthrifty look of the plant before you have noticed the leafhoppers themselves, you are likely too late to really reverse the damage. However, better knock them back as soon as possible. See last week's issue of Vegetable Notes for more details. The symptoms will be aggravated under the dry conditions of this season, as leafhopper toxicity plugs the vascular system. Early red potatoes show PLH damage earliest and are the most susceptible; late varieties such as Kennebec and Katahdin are more resistant. Eggplant is also susceptible to damage.

Late Blight Update

There were no new late blight reports in New England, New York or Pennsylvania for the week of 6/30-7/6. That means that we don't have any confirmed source of inoculum in the region. Lack of clouds, high temperatures, dry soils, relatively short dew periods, no rain – all of this creates unfavorable conditions for late blight. While the new strains of the pathogen tolerate higher temperatures than those that have been occurring on potato, current high temperatures are thought to be too high, especially since temperature has been high during the night as well as day. Late blight has been confirmed this season in 7 counties in PA. All detected cases have been on tomato transplants or in home/community gardens. There have been no detections in PA in commercial fields of tomatoes or potatoes. Even in Maine where weather has been cooler and rainy, no late blight has been found. Nonetheless a 10-14 day spray schedule for early blight and Septoria is needed to suppress these diseases, which occur every year and can develop under current conditions.

-- Ruth Hazzard. Drawing from regional sources including Margaret McGrath(LIHREC), James D. Dwyer and Steven Johnson (UMaine Extension), Abby Seaman (late blight network, Cornell CE)

SCARAB BEETLE UPDATE: JAPANESE, ORIENTAL AND ASIATIC GARDEN BEETLES ARE ACTIVE

Japanese Beetles have been flying for the past week or two. Oriental Beetles and Asiatic Garden Beetles are also actively flying now and, though less damaging, may appear in vegetable fields as well. All species are feeding and starting to lay eggs now.

There are four species of scarab beetles that are common in New England turf, fruit and vegetable crops. None are native to the US. Japanese beetles are the most common and widely distributed but Oriental and Asiatic Garden beetles are expanding their range and activity. Below are brief descriptions.

JAPANESE BEETLE adults are about half an inch long, with a metallic green head. The wings are shiny copper or bronze color, and there are a few tufts of white "fur" along the side of each wing when it is folded back over the body. The adults are active in daylight and feed on many different kinds of trees, fruit and flower crops. Fruit and ornamental plants are preferred, but beetles can congregate in vegetables also. In vegetables, adults can cause silk clipping in corn, and leaf damage in sweet basil, collards, other greens, green beans, eggplant, asparagus, rhubarb, and peppers. Though numbers may be high, there is no need to treat unless actual feeding damage is significant. In corn, if there are more than two Japanese beetles per ear and corn is less than 50% pollinated, an application may be warranted to reduce clipping and ensure adequate pollination.

Japanese Beetle

Asiatic Beetle

ASIATIC GARDEN BEETLES are about half as long as a Japanese beetle adult, and somewhat more "plump" or domed in appearance. They are reddish-brown or copper-colored. They often are found near roots of plants when one is weeding. Adults feed at night, so one may find damage without seeing the beetles. During the day they hide in the loose soil or mulch around the base of the plants. Scout with a flashlight at dusk or during the night, or sift through soil to find them. Larvae feed on beet, carrot, corn, lettuce, onion, Swiss chard, and strawberry. Adults feed on carrot, beet, parsnip,

pepper, cabbage and turnip.

ORIENTAL BEETLES fly at night, but are very active during the day as well. The beetles are smaller than Japanese beetles, and usually are a rather mottled gray with black splotches. The pattern and color varies. The antennae are branched and are quite striking if you take a close look. Oriental beetles have a long flight period – through early August – and are very mobile. Adults tend not to feed heavily in vegetable crop foliage but show up in many crops. Grubs damage may be worse in drought years and in weedy fields, but is not commonly a problem in vegetable fields and crops, though this is not well studied.

Oriental Beetle

A fourth species may also be found: EUROPEAN CHAFERS, which are slightly larger than Japanese beetles and are a fairly dull brown or tan in color. They are night fliers but can be seen in large numbers just at sunset, when they congregate in large numbers in favorite trees (such as locust or willow). Adults are not foliage feeders and grubs are mostly a turf problem.

Life Cycle

The life cycle of the Japanese beetle fits most of the species of grubs we encounter in New England, with minor variations. They have a one-year life cycle, with adults emerging from the soil in early July in most of Massachusetts (later farther north) to feed and mate. The females burrow into the soil (often in or near wide expanses of grass or sod) to lay eggs which hatch into tiny grubs (cream-colored larvae, C-shaped, with brown heads) that feed on roots of grasses and other plants (especially corn). Grubs molt twice by the middle of September, and continue feeding until the soils begin to cool down. In late fall the grubs migrate downward through the soil profile, staying below the frost line throughout the winter. In the spring as the soils warm up, the grubs move back into the root zone and resume feeding for about six weeks. By the middle of June, most grubs have completed their feeding requirements and pupate (still in the soil) for about a week before emerging as new young adults.

Management

On turf, insecticide controls normally target young grubs just as they begin to emerge from eggs. In vegetables, managing the grub stage may not be feasible (or necessary) since the grubs are most likely feeding elsewhere. Vegetable growers could run into problems with grub damage if turf or sod is plowed under in fall or spring and followed by a spring vegetable crop. A fallow or very weedy field may generate a hefty population of Oriental or Asiatic Garden beetles the following year.

Insecticides may be needed to control adult beetles if numbers are high and damage is significant. The 2010-2011 New England Vegetable Management Guide lists products for Japanese and/or Oriental Beetles in basil and sweet corn. For controls in a crop where these beetles are rarely a pest and therefore not mentioned in the Guide, check the label of commonly used broad spectrum synthetic pyrethroids, carbamates, and neonicotinoids (as foliar spray). Organic options include neem products and pyrethrin.

- R. Hazzard, adapted from Turf Management Update, Pat Vittum, Turf Entomologist, UMass, Beth Bishop, Michigan State University, Michael Seagraves, Cornell Cooperative Extension, and Ann Hazelrig, University of Vermont.

CORN REPORT

Irrigating continues throughout the state through this heat wave we are experiencing. Corn plants are growing fast and ears are maturing faster than anticipated in many locations. Prices have dropped some in the past few days but sales are still up.

The first generation of European corn borer flight is over with trap counts at zero or slightly above. We are between ECB flights, expecting the second flight to begin within the next 7-14 days. Scouting of tasseling corn continued this week with many fields below threshold, but "clean up" from the first generation may be needed. Look for feeding damage, frass or

ECB larvae, making sure to check the entire stalk of plants to see if borers are starting to move down towards the developing ears. Drop nozzles can be used to hit silks directly to control borers before they enter the ears.

This is the time of year when sweet corn pest management switches from European corn borer to corn earworm. We should expect trap counts to rise as the weeks if any storms arrive from the southern states. Know what you are looking for: Adult moths are light tan with a distinctive dark spot on each forewing. Live moths have bright green eyes. CEW larvae may be brown, tan, green or pink with light and dark longitudinal stripes. The head capsule is always plain golden brown, and the body is rough with small bumps and hairs.

Keep in mind that trap capture thresholds are much lower for CEW than ECB. See table below for thresholds. At 2 or more moths per week, growers need to be on a 6 day schedule in silking corn. Flight monitoring is the best way to protect your fields from an earworm infestation. Place two traps per field in areas where fresh silk is present. Move traps weekly to ensure that they remain in fresh silk in order to attract adult moths as soon as they arrive. Remember to changes lures every two weeks. Growers are beginning to put up traps for fall armyworm though no flight has been captured. A universal moth trap can be used to monitor for FAW. Place traps in whorl stage corn at the height of the plants. Lures for FAW should also be changed every other week and can be purchased from Great Lakes IPM. For details about scouting procedures, pest ID and monitoring, thresholds and other aspects of sweet corn scouting download a copy of the Sweet Corn IPM Scouting Guide from our web site www.umass-vegetable.org or call our office for a free copy 413-545-3696.

Location	ZI	EII	Total ECB
CT Valley			
South Deerfiled	0	0	0
Sunderland	0	0	0
Hadley	0	0	0
Southwick	0	0	0
Hatfield	2	0	2
Feeding Hills	0	0	0
Central & Eastern MA			
Rehobeth	0	1	1
Concord	1	0	1
Northbridge	0	0	0
Spencer	0	0	0
Still River	0	0	0
Lancaster	0	0	0
Littleton	0	0	0
Dracut	6	0	6
Tyngsboro	0	0	0
Sharon	0	0	0
Framingham	0	0	0
Berkshire County			
Sheffield	3	1	4
NH			
Litchfield, NH	0	0	0
Hollis, NH	0	0	0
Mason, NH	0	0	0

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