UMASS EXTENSION

Vegetable Notes

For Vegetable Farmers in Massachusetts

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In this issue:

Crop conditions,

The heat and rain were welcomed by growers across the state this week. Vegetable and fruit crops responded well to the weather and are growing fast. Weeds are also germinating and growing rapidly. Insect pests are moving into planted fields, and numbers jumped suddenly this week. The first Mexican bean beetles and potato leaf hoppers showed up in early bean crops this week. Striped cucumber beetle is out in force in cucurbit fields and some growers are spraying for control. Harvest of spinach, radishes, greens, rhubarb, and lettuce continue, while the first summer squash, broccoli and kohlrabi have been harvested this week.

Wilting of cool season early crops has occurred in some locations where temperatures were high and little rain fell. Irrigation was needed in parts of central and eastern Massachusetts where Tuesday's storm passed by without delivering much if any rain. Farmers have been busy transplanting and making successive plantings of various vegetable crops, controlling weeds, and monitoring for pests.

Managing Colorado potato beetle

Colorado potato beetles (CPB) adults and eggs are being found in potato and eggplant crops. The bright yellow eggs are laid in clumps with about 30-35 eggs each, generally on the undersides of leaves. As with most other insects and plants, there is a direct relationship between higher temperatures (in the range between about 55 and 90 degrees F) and faster rate of development. That includes egg-laying, egg hatch, larval growth, and feeding rates. So, the heat wave just past drove a rapid burst of adults, eggs, and (coming soon!) egg hatch.

Now is the time to scout for adults, eggs and egg hatch.

CPB eggs

Walk your fields and look for CPB adults and eggs. The economic threshold for adult beetles in potato is 1 beetle per 2 plants (or per 2 stalks, in mid-season). Damage to eggplant seedlings from adult feeding is often severe enough to warrant control of the adults. In potato, adult damage in rotated fields may not be significant, so you can wait for egg hatch to kill both adults and larvae.

Look on the undersides of leaves for the orange-yellow egg masses. The fresher the eggs, the brighter orange the eggs will appear. Eggs hatch in 7-10 days, depending on temperature. If you want to know when the earliest eggs are hatching, you can flag the earliest egg masses you find with bright tape or flags, and then keep an eye on the hatch. Hatched larvae go through four stages before they become adults. In the first stage, the larvae are about the same size as the eggs and in the second stage they are about an eighth of an inch long. As the larvae get bigger, they do more feeding. The fourth, or largest, stage does 85% of the feeding damage. It's a good idea to prevent beetles from ever reaching the fourth instar!

After larvae complete their growth, they drop to the ground and burrow into the ground to pupate. About ten days later the next generation of adults emerges – ready to feed. If they emerge before August 1, they will lay more eggs. After August 1, they feed and head to overwintering sites. Good control in June prevents problems with CPB in August.

CPB larvae. Photo by Jude Boucher

Cultural Controls

Crop Rotation is the single most important tactic for CPB management is to rotate potatoes or eggplant to a field that is at least 200 yards from the previous year's fields. Barriers such as roads, rivers, woodlands, and fields with other crops are helpful. Rotated fields tend to be colonized 1-4 weeks later in the season. Also, the total population of adult beetles is lower, producing fewer larvae to control.

Perimeter treatments or perimeter trap cropping can be applied to potato. One approach is to plant a barrier crop between overwintering sites and this year's crop and get it in earlier than the main crop; then control early-arriving beetles with a systemic or foliar insecticide. Another approach is to plant three to five rows of potatoes treated with a systemic insecticide (for example, Admire or Platinum– assuming resistance is not a problem) in a perimeter around the field to be planted to potato, tomato, or eggplant; this treated crop will kill up to 80% of the colonizing beetles. In eggplant or tomato, the perimeter border can be an Italian eggplant type, which is more attractive to both CPB and flea beetles. Treat only the border, as soon as beetles arrive.

Late planting. Another strategy for beating the beetle is to plant late. CPB adults that do not find food leave the field in search of greener pastures. Planting after mid- June, using a short season variety, often avoids CPB damage and eliminates the need for controls.

Straw mulch. It has been well documented that when potato or eggplants are mulched with straw, fewer Colorado potato beetle adults will settle on the plants and fewer eggs will be laid. This can be accomplished on larger plantings by strip planting in a rye mulch, followed by mowing and pushing the rye straw over the plants after they emerge. For smaller plots, straw may be carried in.

Resistance management must be part of every potato grower's plan.

Colorado potato beetle has a remarkable capacity to develop resistance to insecticides. Based on a fifty-year track record, we can expect that any insecticide that is used repeatedly on the same population of Colorado potato beetles (that is, those in the same field or a farm with nearby fields) will lose its efficacy within 2-4 years. One insecticide after another has been lost to resistance, and we are now seeing this happen with Admire. Carbamates and synthetic pyrethroids have been ineffective for years in Massachusetts, due to high levels of resistance that developed in the 1970's and 1980's.

In some regions, CPB has become resistant to spinosad (Spintor and Entrust). This has not been reported in Massachusetts yet, but this presents a serious problem to organic farmers who have no alternative chemistries available (since none of the Bt products that work against CPB have a commercial organic formulation on the market).

Wherever possible, growers should rotate classes of insecticides and avoid using the same chemistry more than once per year or even better, once every other year . Do not use the same chemical class on successive generations in the same year. There are enough different classes to allow this, if you plan carefully. Note that in the New England Vegetable Management Guide, as well as on all pesticide labels, each insecticide has a Group Number, which indicates which chemical class it is in. Avoid using insecticides from the same group.

Groups (chemical class) and products registered for Colorado potato beetle include:

Group 4:(Nicotinoids) thiomethoxam (Platinum, Actaram, Cruiser), imidacloprid (Admire 2F or Admire Pro, Provado 1.6F, Gaucho), dinotefuran (Venom 70SG), acetamiprid (Assail 30SG), imidacloprid + mancozeb (Gaucho MZ)

Group 6: Abamectin, (AgriMek * 0.15EC, Abba* 0.15EC)

Group17: (Insect growth regulator) cyromazine (Trigard)

Group 16B: (Insect growth regulator) novaluron (Rimon 0.83EC)

Group 5: (naturalyt) spinosad (SpinTor 2SC, Entrust)

Group 11:Bacillus thuringiensis tenebrionis (Novodor FC)

Group 9B: cylolite (Kryocide)

Group 3A: (synthetic pyrethroids and pyrethrin) (note: CPB is resistant in Massachusetts) cyfluthrin (Baythroid* 2), deltamethrin (Decis* 1.5EC), esfenvalerate (Asana* XL), permethrin (Pounce*) and pyrethrin (PyGanic EC5.0)

Group 2A: (carbamate) endosulfan (Thionex* 50W)

Group 1A: (organophosphate) oxamyl (Vydate* L) (note: CPB is resistant in many areas of Massachusetts)

Group 1B: (organophosphate) phorate (Thimet* 20G)

Group 26: indoxacarb (Avaunt)

To prevent resistance, alternate among classes of insecticides in each generation, and throughout the season. The following insecticides each have a different mode of action and provide good options for alternate insecticides that provide effective control:

Spinosad (SpinTor 2SC, a liquid formulation or Entrust, an organic formulation, dry powder) gives excellent control of all stages of CPB at a 3.5 to 4.5 fl oz rate. Will control adult CPB and also European corn borer if a grower has that pest on early potatoes. It is currently the only effective CPB insecticide approved for organic growers.

Abamectin (AgriMek 0.15EC, Abba) is mainly a contact material, which controls larvae. It may be best used early in the season, when good coverage is easier to obtain. Rates of 5-6 fl oz per acre gave effective control in commercial fields in trials on Long Island. The lowest labeled rate is 8 fl oz.

Novaluron (Rimon) is a relatively new pesticide chemical belonging to the class of insecticides called insect growth regulators (IGR). IGRs slowly kill the insects over a period of a few days by disrupting the normal growth and development of immature insects. Novaluron acts as an insecticide mainly by ingestion, but has some contact activity. IGR insecticides are comparatively safer to beneficial insects and environment. Target applications to the beginning of egg hatch when larvae are small. Use higher rates for larger larvae. Does not control adults.

cyromazine (Trigard): Insect growth regulator for small larvae just after egg hatch. Does not control adult beetles. Low rate will provide suppression only.

Btt, Bacillus thuringiensis subspecies tenbrionis (Novodor FC) controls small larvae, through the third instar. Time applications to begin when 30 percent of the eggs have hatched. Where fields are densely populated and eggs are hatching continuously, reapply every 5 to 7 days. Currently there are no commercial formulations of Bt tenebrionis products that are approved for organic use under the National Organic Program. You can check with the MASS organic certification program (MICI, 978-297-3644) for more details.

Nicotinoid insecticides may be soil or trickle applied, foliar applied, or applied to seed pieces. In the Connecticut Valley, there are fields where CPB resistance to imidacloprid (Admire) is 300 times that of susceptible populations. Control requires higher rates, does not last as long, or does not happen at all. There is cross-resistance among products in the nicotinoid group. For resistance management, do not use a product in this group on more than one generation per year. A single foliar application is less likely to cause resistance than a soil applied systemic, because it only affects part of the population and only one generation.

Spray timing and thresholds.

Timing and selection of products depends on the population pressure and whether you need to control adults, small larvae, and/or large larvae. Here are some options:

Use spinosad, which control adults and larvae, for the first spray, followed by Novodor, Rimon or Trigard to kill emerging young larvae, and if needed a third spray of the one you did not use before or Agrimek to control all stages of larvae.

Start with a product that controls mainly small larvae (Novodor, Trigard, Rimon), and make the first application when 20-30% of the eggs have hatched and the largest larvae are less than half grown.

Start with a product that controls larger larvae (with or without adult controls) such as Spintor 2SC, Entrust, Provado, or AgriMek. Wait until the oldest larvae reach the beginning of the fourth stage (instar), and are about 1/3 inch long. Applications made at this time will kill all the larvae that have hatched up to this point.

If you used a nicotinoid at planting, this will control adults and larvae in the early season unless resistance is a problem. Use other types of classes to control larvae or second-generation adults only if they exceed threshold.

The spray threshold for potatoes: small larvae is 4 per plant; for large larvae, 1.5 per plant (or per stalk in midseason), based on a count of 50 plants or stalks. **Controls are needed on eggplants** when there are 2 small or1 large larvae per plant (if plants are less than six inches) and 4 small larvae or 2 large per plant (if plants are more than six inches) In eggplant, in addition to defoliation, beetles sometimes clip the stems of flowers or flower buds. This directly reduces fruit formation and marketable yield. Potatoes can tolerate 20% defoliation without reduction in yield (or even more, depending on time of the season and cultivar)

- R Hazzard; (sources including: D Ferro (UMass Amherst), J. Mishanec (Cornell University), J Boucher (Univ. of Connecticut), New England Vegetable Management Guide)

CULTURAL AND ORGANIC METHODS FOR STRIPED CUCUMBER BEETLE CONTROL

Striped cucumber beetles roared into action with the arrival of hot weather this past week. Managing cucumber beetles is best accomplished by using a combination of cultural practices, with insecticides used in ways that minimize cost and environmental impact. At the end of May (Vegetable Notes, Vol. 19:4, May 29, 2008), we wrote about managing striped cucumber beetle with conventional insecticides using foliar sprays or soil-applied systemics. This week we will discuss transplants, which are becoming more widely used by many growers, row covers, and information for organic growers on Perimeter Trap Cropping and organic insecticide.

Crop rotation. Because beetles spend the winter in field borders close to last year's crop, planting into the same field encourages rapid invasion by high numbers of beetles. Rotating to a field at a distance from last year's cucurbits reduces beetle numbers significantly. Of course, crop rotation has many other benefits as well – in vine crops, its critical for disease management. Any barriers between the fields – woods, buildings, fallow fields or other crops, roadways and waterways – help delay the arrival of beetles.

Using Transplants. Several studies in the Northeast have shown that three-week-old transplants, set out in the field at the same time as a direct-seeded crop, will produce not only earlier but higher yields. These studies were done with both summer and winter squashes. Transplants have multiple benefits. Germination of untreated seeds in cool soils can be spotty, while transplanting ensures a good stand. Transplants provide a jump on the weeds. Plants are bigger when cucumber beetles arrive so that they are less vulnerable to both feeding damage and to wilt. An insecticide or repellent can be applied to flats before plants are set out, making it less costly. Planting dates are more flexible; for some crops, it may be possible to delay planting until late June and avoid the worst of the beetles. Plants can be held inside to avoid late frost or growers can wait until fields are dry (or wet) enough to plant. Of course, it is not advisable to hold transplants too long. If they are already flowering or have been stressed when they are set out, they tend to develop into small plants with early but small fruit. Standard seedling production methods work well for vine crops, but large cell sizes (72, 36 or 24) or peat pots are recommended as roots should not be disturbed when transplanting.

Row Covers. Floating or spun-bonded row covers are very effective barriers that keep beetles off the crop during the critical early growth stage. They have the added benefit of enhancing growth and reducing wind damage in the early season for an earlier yield. Studies have also shown an increase in yield with row covers. Covers must be removed at flowering to allow for pollination. Wire hoops are very helpful to prevent damage from abrasion. The hoops these are usually used on single rows, but can also be used under wide sheets of 15 or 25 or 50 feet. Black plastic adds to the warmth and helps to solve the problem of weed management under the covers.

Perimeter Trap Cropping (PTC) A technique that is gaining popularity in the Northeast is planting trap crops around the border of the field. See May 15 2008 issue for more details. Cucurbit crops that are being planted or transplanted in June

(pumpkin, butternut, summer squash, cucumber) can benefit from using a perimeter trap crop, most likely Blue Hubbard or buttercup squash. The following suggestions for managing the border apply to organic and conventional growers, except that the choice of insecticides is much broader for conventional growers:

• Scout the trap crop at least twice weekly and spray the border with an insecticide (e.g., Pyganic) as soon as beetles are found. Don't wait for beetles to build up in the borders or chew them down. It is important to maintain healthy border plants. Scout again to determine if repeat sprays are needed in the border. One to 3 sprays may be needed as beetles continue to colonize.

• An alternative organic control, for those who don't want to use sprays, is suction. A reverse leaf blower can be used (at least twice weekly) to suction beetles off the border plants. One grower who tried this last year was pleased with the results and noted that the blower chopped up the beetles nicely and though it did some damage to the border plants it kept beetles out of the main crop.

• For diversified growers who don't have large acreage of any single cucurbit crop, it is possible to grow a mix of crops inside the border. However, watch out for relatively attractive crop that might need additional sprays. For example, zucchini is more attractive than summer squash and may need to be sprayed even if it is inside a blue hubbard perimeter.

• Where heavy infestations might be expected, such as borders along woods where beetles may have overwintered, use a wider perimeter of 2-3 rows.

• If you know the amount of Blue Hubbard needed for the border is far more than you need, consider using other C. maxima crops, such as buttercup, kabocha, Red Kuri, Prizewinner, or Cinderella Pumpkin to create the perimeter border. A mixed border has worked well where growers have tried this approach.

Organic insecticides. Insecticides available for organic growers for use in cucurbit crops include kaolin clay (Surround WP), pyrethrin (Pyganic Crop Spray 5.0 EC, a contact poison), and spinosad (Entrust, a contact poison and feeding toxin).

There have been studies done in Massachusetts which showed that spinosad is effective against striped cucumber beetle; in fact, it worked better than Pyganic. For this reason, it might be worth a try against this difficult pest --especially in a situation where cultural controls are not working or where a border spray is needed in a PTC system. Control may vary according to coverage and timing. It is legal to use a pesticide on a crop in Massachusetts as long as the label includes that crop; this is true even if the specific target pest is not listed. Cucumber beetle is not specifically listed on the Entrust label, but it is labeled for use in cucurbit crops.

Surround WP should be applied before beetles arrive because it acts as is a repellent and protectant, not a contact poison. Beetles do not "recognize" the plant and so do not feed; also they clay particles stick to their feet and antennae and are irritating. This product can be tricky to mix and use. One approach is to mix a slurry in a bucket and then add the slurry to the tank, as the dry powder can cake if added directly to the tank mix. Another approach is to add the powder to water and allow it to settle slowly. Once the powder is fully wet, agitate gently. Regular agitation is needed during spraying. With direct-seeded crops, apply as soon as seedlings emerge if beetles are active. Transplants can be sprayed before setting out in the field. Surround can also be used on the main crop of a PTC system, creating a "push-pull" dynamic. Ensure good coverage of the foliage (it will look like it was sprayed with white latex paint), including, if possible, the undersides of leaves (not easy when cotyledons are close to the ground). Reapply after a heavy rain and on new growth. And, wear a respirator or mask when mixing and spraying. Although kaolin is very safe in terms of skin exposure or ingestion, handlers should take precautions to avoid breathing the powder.

BEE TOXICITY OF INSECTICIDES REGISTERED FOR CUCUMBER BEETLE IN SQUASH AND PUMPKIN

The following list of insecticides are registered for use on cucumber beetle in pumpkin and squash as listed in the 2008-2009 New England Vegetable Management Guide (www.nevegetable.org).

Below are the bee toxicity values of these products, from the Environmental Impact Quotient (EIQ) tables posted at the Cornell Integrated Pest Management Program website: http://www.nysipm.cornell.edu/publications/eiq/default.asp

A Method to Measure the Environmental Impact of Pesticides

Authors: J. Kovach*, C. Petzoldt, J. Degni**, and J. Tette, IPM Program, Cornell University, New York State Agricultural Experiment Station Geneva, New York 14456 *current address: Dept. Entomology, Ohio Agricultural Research and Development Center, 1680 Madison Ave., Wooster, OH 44691-4096 **current address: Cornell Cooperative Extension, Lewis County, Lowville, New York 13367

Higher values indicate greater toxicity to bees.

Bee Toxicity Value	Insecticide
No info avail.	**kaolin (Surround WP):** 12.5 to 25 lb/A (0 dh, REI 4h, Group 25). Suppression/repellence only. White residue may need to be washed off if applied after fruit set. Stop applications when fruit is 1/4 expected size at harvest. OMRI listed.
3	**pyrethrin (PyGanic EC5.0):** 4.5 to 18 oz/A (0 dh, REI 12h, Group 3A). OMRI listed.
3	**pyrethrins + piperonyl butoxide (Pyrenone):** 1 tsp/gal, or 1 to 12 oz/A (0 dh, REI 12h, Group 3A).
9.0	**endosulfan (Thionex* 50W):** 1 to 2 lb/A (2 dh, REI 24h, Group 2A).
15	**bifenthrin (Capture* 2EC):** 2.6 to 6.4 oz/A (3 dh, REI 12h, Group 3A).
15	**deltamethrin (Decis* 1.5EC):** 1.5 to 2.4 oz/A (3 dh, REI 12h, Group 3A).
28.5	**cyfluthrin (Baythroid*2):** 2.4 to 2.8 oz/A (0 dh, REI 12h, Group 3A).
28.5	**esfenvalerate (Asana* XL):** 5.8 to 9.6 oz/A (3 dh, REI 12h, Group 3A).
28.5	**imidacloprid (Admire 2F):** 1 to 1 1/2 pt/A (21 dh, REI 12h, Group 4). Systemic insecticide used as an in-furrow, banded, drench, or drip irrigation application to the seed/seedling root zone during or after planting/transplanting operations. DO NOT apply as a foliar spray. Note: Provado IS NOT registered for use on cucurbits.
28.5	**imidacloprid (Admire Pro):** 7 to 10.5 oz/A (21 dh, REI 12h, Group 4). Systemic insecticide used as an in-furrow, banded, drench, or drip irrigation application to the seed/seedling root zone during or after planting/transplanting operations. DO NOT apply as a foliar spray. Note: Provado IS NOT registered for use on cucurbits.
28.5	**thiamethoxam (Platinum):** 5 to 8 oz/A (30 dh, REI 12h, Group 4). CT and MA only. Systemic insecticide used as an in-furrow, banded, drench, or drip irrigation application to the seed/seedling root zone during or after planting/transplanting operations. DO NOT apply as a foliar spray.
45	**oxydemeton-methyl (MSR*):** 1 1/2 to 2 pt/A (3 dh for summer squash, 14 dh for pumpkin and winter squash, REI 48h, Group 1B). DO NOT apply more than once per season.
75	**carbaryl (Sevin XLR Plus):** 1 qt/A (3 dh, REI 12h, Group 1A). Very toxic to bees; do not apply during blossom time, apply in the evening. Observe plant response precautions. Do not apply to wet plants.
75	**permethrin (Pounce*):** 4 to 8 oz/A (0 dh, REI 12h, Group 3A).

For comparison with some other widely used insecticides, Bacillus thuringiensis (kurstaki) is rated at 3, Spintor is rated at 15, and Warrior is 28.5.

-Information compiled by R. Hazzard, University of Massachusetts, July 2007

WATCH FOR POTATO FLEA BEETLE ON EGGPLANT AND POTATO

From the perspective of a farmer surveying the crops, different types of flea beetles do not look much different – they all look small and black, they all hop away when you approach the plant, and they all make small round holes in the leaves. Eggplant and tomato transplants and young potatoes can be hit hard by flea beetles, which appear as soon as plants are set out or emerge from the ground. In New England, this damage is usually caused by the potato flea beetle, Epitrix cucumeris.

Chunky and hairy. In contrast to crucifer flea beetle, the potato flea beetle is shorter and broader (more 'chunky'), has a more pitted and hairy body surface, and is less shiny, though both are all black. They also have a distinctly different diet, as crucifer flea beetle feeds only on Brassicas. Their life cycle is very similar: adult beetles spend the winter in leaf litter near the crop where they were feeding in late summer, and search out new food plants in the spring. Eggs are laid in the soil, larvae feed on roots, and after a pupal stage a new flush of adult beetles will emerge. These feed and then move to a protected spot for the winter. Thus there two major flushes of damaging adults.

Potato flea beetle has also been reported to feed on cucurbit crops as well as bean, lettuce, radish, turnip and sunflower. It feeds on solanaceous weeds (jimsonweed, ground cherry, black nightshade) as well as redroot pigweed and lambsquarters.

Leaves that are heavily fed may be riddled with holes. Growth may be stunted, delayed, or plants may succumb altogether. Potatoes, once well established, can withstand considerable feeding damage. Eggplants are more vulnerable even at later stages. Damage is probably the best measure of flea beetle populations, since they often feed on the underside of leaves and hop away when disturbed. The point where sprays are needed to reduce yield depends on the crop, crop stage, and other stresses on the plant.

Controls. Floating row covers, well sealed, can protect eggplant seedlings. Covers should be placed over hoops or other supports to prevent crop injury.

Most insecticides registered to control Colorado potato beetle will control flea beetle. See the 2008-2009 New England Vegetable Management Guide for specific products.

Several synthetic pyrethroid and carbamate insecticides can be used. There are nicotinoid insecticides that can be used as a soil drench or transplant drench to give early season control, or as a foliar spray. Do not use nicotinoids for both soil and foliar applications.

For organic growers, spinosad and kaolin are options. In Massachusetts, Entrust has a special supplemental label for control of flea beetle in fruiting crops, cole crops and okra. Kaolin (Surround WP) protects seedlings by acting as a feeding deterrent. We have observed effective control from applications of a mixture of kaolin and spinosad. We have not documented whether this mixture is better than either one alone.

Location	Z1	EII	Total ECB
Bershires/Champlain Valley			
Pittsfield	-	-	-
CT Valley			
South Deerfield	3	5	8
Sunderland (1)	-	-	-
Sunderland (2)	1	4	5
Whatley	8	54	62
Hadley (1)	9	10	19
Hadley (2)	6	4	10
Amherst (1)	1	6	7
Amherst (2)	0	2	2
Granby	2	12	14
Easthampton	7	2	9
Nantucket County			
Nantucket	0	2	2
Central & Eastern MA			
Dracut	-	-	-
Rehoboth	0	9	9
Still River	0	3	3
Concord	-	-	-
Leicester/Spencer	-	-	-
Northbridge	-	-	-
Tyngsboro	-	-	-
Lancaster	6	4	10
NH	-	-	-
Litchfield, NH	-	-	-
Hollis, NH	-	-	-
Mason, NH	-	-	-

Corn report

Corn plants responded well to the high temperatures, humidity and rainfall this week. Early plantings are at least 12-18 inches tall, with some now reaching pre-tassel stage. The rain has helped to deliver side-dressed fertilizer to the root zone and plants are dark green and flourishing as a result. Row cover has been removed from early fields and later succession plantings are going in including bare ground and transplants.

European corn borer flights have risen at most trapping locations throughout the state this week. Trap counts are extremely variable between locations; for example, combined trap captures were 62 in Whatley and only

2 moths at a farm in Amherst. As expected, warm nights have sped up insect development and we have now reached enough growing degree days that the first generation of adult moths are beginning to lay eggs in early corn fields. Within days after flight begins; females start to lay white egg masses on the underside of leaves. Eggs will hatch in about a week depending on temperature so you can most likely put off scouting your early fields for another week. However, be aware that scouting season is just around the corner and now is a good time to start thinking about fitting scouting into your weekly routine.

The time to scout for ECB feeding damage is when the pre-tassel begins to form. Look for pinhole feeding damage, frass, or the small black-headed larvae. To scout, pull out the emerging tassels to look for tiny black-headed white larvae or frass (white to brown material about the size of fine sand). Or, pull back the leaves to search tassels. Before any insecticides have been applied, scouting is fast and easy because any sign of feeding is an almost sure sign of live larvae, so it's not necessary to spend time finding the larvae. After the initial insecticide application, feeding damage may be from a larva that has already been killed, so finding the critter is more important for an accurate estimate of the number of infested plants. A spray is recommended if >15% of the plants have borers.

The ideal time to control ECB is as the green tassel pokes up out of the whorl. Borers will leave the tassel as it opens up, and move down the plant looking for protected feeding sites. At that time, they are exposed and are more easily reached by pesticides. Before that time, borers are protected inside the whorl and after, may be protected inside the stalk. Scout again 3-4 days after spraying to see if infestation has decreased or if another spray is warranted.

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.