



VEGETABLE IPM MESSAGE

June 14, 2001

Volume 12, Number 5

CROP CONDITIONS

Growing conditions are excellent. More rains this week, along with heat and sun have helped crops pull out of the effects of the late May cold and wet period. Some areas of the southeast had more rain and are dealing with waterlogged fields. Peppers and tomatoes that had a slow start getting established in wet ground and cold temperatures are taking off. Pumpkins and butternut crops are popping up and early summer squash and zucchini growing by leaps and bounds. Earliest plastic corn and transplanted corn is showing silk (though sometimes at waist height) or the first emergence of tassel. Harvest of lettuce, chard, brassica greens, and broccoli is underway, and early cabbage is heading. Weeds are doing great (don't turn your back!). With daily highs in the 80's (or higher), we can expect rapid development of insect pests. Leafhoppers (probably aster leafhopper) are present in lettuce and other leafy greens. Potato leafhopper, a different species, has arrived in potato and beans. Onion thrips were observed on one farm.

TWILIGHT MEETING REMINDER: MONDAY JUNE 25 AT CALABRESE FARMS

6:00 - 8:30 p.m.
257 Feeding Hills Rd., Southwick, MA
Contact: John Howell (413) 545-5307
Pesticide applicator recertification credits: 1 hour.

The Calabrese Farm was started in 1948 by Joe and Eleanor Calabrese. It is currently operated by their son Tom and his wife Donna. Joe is still active with the farm as are Tom and Donna's children Joey, Michael and Danielle.

Today the farm consists of 150 acres of vegetables and fruit including sweet corn, peppers, tomatoes, summer and winter squash, pumpkins, cabbage, strawberries, blueberries, raspberries, peaches and Christmas trees. They also manage 80,000 square feet of greenhouse where they produce bedding plants, and tomatoes, peppers and cucumbers. They employ 25 people during the growing season. They operate a retail stand and utilize wholesale markets. They are increasing their emphasis on retailing.

As with many growers, they have been dealing with **Phytophthora** on peppers, tomatoes and vine crops. We will discuss cultural practices they are using to manage this disease.

Irrigation trailer: A trailer will be present that has all the basic components for trickle irrigation: portable pump, four types of filters, and a fertilizer injector. Growers will be able to see this trickle irrigation system in action and experts will be present to answer questions.

Directions: Go south on I-91 through Springfield. Take the Exit for Rts 5 north and 57 west. After crossing the Connecticut River take the Rt 57 exit. Follow Rt 57 west to Southwick. (Rt 57 starts out as a divided highway, but after several miles becomes a two lane road which changes direction a few times--follow signs). Calabrese Farm is on the left shortly after crossing into Southwick.

CUTWORMS ON TRANSPLANTS

We have had numerous reports of cutworm damage in transplants of brassicas, peppers, tomatoes, and eggplants. Typical damage includes clipped stems as well as leaf feeding,

indicating that these cutworms are climbing up into foliage. If the soil near the plant is searched during the day, one or more cutworms can be found curled up in the soil. There are many species of cutworms that attack vegetables; the most common in this region are reported to be black cutworm (*Agrotis ipsilon*) and variegated cutworm (*Peridroma saucia*); others may include dingy, spotted, dark-sided, or glassy cutworm. Both black and variegated cutworms climb onto foliage. Cutworms can be difficult to identify. Variegated cutworm has some pale yellow markings on its back, while black cutworm is nearly uniform gray to black with a greasy, rough appearance.

Adults of all cutworms are moths with dark gray forewings, often with various lighter or darker markings, and lighter hindwings. They are in the same large group of moths (noctuid moths) as the corn earworm, fall armyworm, and cabbage looper, but with very different life cycles and habits. The moths are capable of migrating long distances but in this region it is very likely resident populations which are causing problems. Some cutworms have one generation per year, but both black and variegated cutworm have at least two generations per year in this region, and up to four per year.

Life cycle. The winter is spent in the larval stage or the pupal stage for both black cutworm and variegated cutworm, as deep as 5 inches (12 cm) down in the soil. Overwintered larvae feed on early spring transplants and are probably the cause of damage at this time. Adults emerge from overwintered pupae in May or June, and from pupae of spring-feeding larvae later in the season. Females lay hundreds of eggs on grass leaves, weeds, or the soil surface. Attractive habitats include weedy or grassy areas, and alfalfa. Black cutworm in particular is reported to select low spots in the field or land that has been waterlogged or flooded for egg laying. Eggs hatch in 5-7 days and young larvae feed on plant foliage. Older larvae feed on stems near the soil line during the night and descend into the soil during the day. They clip stems of young seedlings and are reported to feed on the wilted plant material. Larval development takes about a month (28-34 days).

Monitoring. Scout weed borders before plantings go in. Check newly transplanted crops to assess presence and

severity of cutworms before the damage is severe. If you find clipped transplants, you can usually find the larva in the soil near the plant. Estimate % stand loss to determine need for a spray.

Adult moths of the black or variegated cutworm can be monitored with bucket traps (the Unitrap or Multiplier trap, baited with the appropriate lure, with a vaporstrip to kill moths) placed in fields or weedy areas near the field. This would indicate high levels of moth activity, help predict egg laying, and warn of future problems. Trap sources: Great lakes IPM (800-235-0285) or Gemplers (800-382-8473).

Cultural Management. Weedy land harbors the most cutworms, as the adult moths seem to prefer dense plant cover for egg laying. Crop residues may also attract higher populations. Therefore, crops that follow weedy crops, alfalfa, or no-till crops are more likely to be damaged by cutworms. Plant early transplants into fields that had low weed pressure the previous year, or where crop residue was tilled under in the fall. Plow fields in spring and keep weed free for at least two weeks before planting to starve young larvae and reduce egg-laying. Avoid planting susceptible crops close to sod, alfalfa or fallow areas. Summer plowing disturbs eggs and larvae and raises them to the soil surface where they are more vulnerable to predation and desiccation. Fall plowing will do the same. Plan rotations to avoid row or hill crops following a grassy sod, and plow sod fields in later summer or early fall. Cultivate frequently to injure and expose hiding cutworms to predators.

We would all like to know more about the relationship between cover crop systems and cutworms. Outbreaks seems to be unpredictable and it is not clear if they are related to particular cover crops. I would welcome any observations or research information on this topic.

Another suggestion is to plant a thick "trap crop" of sunflower, a favored host, around the perimeter of the field, then find and kill cutworms in this crop.

Biological management. Several predators and parasites have been identified, however none have been commercialized for release against these pests. At Iowa State University, a new

virus has been isolated from black cutworm which is highly active and has potential as an alternative to chemical control. Work is ongoing to evaluate this unique strain of baculovirus and the most effective way to use it in the field. Soil applications of nematodes have also been suggested but I don't have information on efficacy. Daily search and destroy missions -- by hand -- are a time-honored "biological" management for small plantings!

Chemical Management. Directed applications (banded or directed to soil surface) of insecticides (carbaryl, methomyl, endosulfan or synthetic pyrethroids such as Warrior and Pounce) will control cutworms. Carbaryl baits may also be used. Diazinon is labeled for preplant incorporated applications. For best results apply in the evening just prior to active feeding. Check *New England Vegetable Management Guide* for specific materials and **follow label instructions for the target crop (crop registrations do vary!)**.

This is a tough pest for organic growers as no effective broad-spectrum products are available. Strategies such as cardboard or tinfoil collars are impractical on a commercial scale. Eric Sideman, technical advisor for Maine Organic Farming and Gardening Association (MOFGA) reports that insecticidal baits have been effective. He recommends a recipe using a very concentrated solution of Bt, mixed with bran and a bit of molasses. It can be sprinkled on the ground near the crops or made into patties that are placed along the rows. Bt sprays (ie, *Bt aizawi* or *kurstaki* directed at plant stems and foliage) are reported to work sometimes, but not consistently. It may be difficult for large cutworms to ingest a big enough dose of BT to stop feeding and die before they have caused damage.

--Ruth Hazzard with input from Vern Grnbinger, Brian Caldwell & Eric Sideman

PRE-SIDEDRESS NITRATE TEST: BAGS MAKE IT EASIER TO MAIL IN SAMPLES!

Many crops have reached or will soon reach the stage when it's time to decide whether, and how much nitrogen to apply as a side dress or top dress. The pre-sidedress nitrate test (PSNT) (also known as the June Nitrate Test) can help you to determine the current level of nitrogen in the soil. If you have

a soil probe (available from many ag suppliers), the sampling takes about 20 minutes per field. The amount of nitrate-N (reported as parts per million $\text{NO}_3\text{-N}$) in the soil is a good indicator of whether more N will be needed to complete crop growth.

To take a sample for nitrate testing, take 15 to 20 subsamples or cores from the field. Sample slices or cores should be taken to a depth of twelve inches if possible. Avoid sampling fertilizer bands or other areas which have high concentrations of N fertilizer. Generally the best place to sample is between the rows. If plastic mulch is used, samples should be taken from under the plastic. Mix all the samples together and submit about one cupful to the **UMass Soil Testing Lab, West Experiment Station, University of Massachusetts, Amherst MA 01003.**

This year, **cloth bags are available for sending PSNT samples to the Soil Testing Laboratory.** These bags are more convenient to use because it is not necessary to dry the samples, as long as they are received by the laboratory within four days. With other bags you should dry the samples unless you can deliver them within 24 hours. The lab will do the PSNT within one working day of receipt and inform you of the results. There is no charge for the bags, but you must send payment along with the samples. The charge for this test is \$6.00 (include a check made out to the University of Massachusetts). Be sure to request a Nitrate (PSNT) test. To obtain bags, contact either Frank Mangan at (978)422-6374 or John Howell at (413)545-5307. They are also available to consult with growers about the test results.

The PSNT is a tool growers can use to optimize N application. Research conducted for several years at UMass, along with several years of on-farm experience, indicates that an appropriate threshold for peppers and winter squash is about 30 ppm nitrate-N. Above this level, sidedressing or topdressing supplemental N would be of no value and will likely decrease yield of butternut squash and peppers. Research in Connecticut has shown similar results in pumpkins. For sweet corn, the threshold is 25 ppm. Using the PSNT can save money and time, improve crop yield, and reduce the likelihood of N leaching and water contamination.

Barring unusual weather conditions, PSNT levels in a field tend to be fairly consistent from year to year. Once these values are known for a field, a grower probably does not need to test every year. As a tool, the PSNT should be used along with a grower's experience and knowledge of fields.

Interpretation of PSNT results should be made with regard to weather conditions such as leaching rains or soil temperatures.

--John Howell, Frank Mangan & Ruth Hazzard

SWEET CORN: SCOUT FOR BORERS

European corn borer flight is still on the upswing, and borers are beginning to show up in tassels. For any early plantings pushing silk this week, weekly cover sprays are recommended. Scout pretassel corn, as soon as the developing tassels can be seen inside the whorl. ECB caterpillars feeding in the young tassel are those that may move into ears later on. Check 50-100 plants per block, in groups of ten plants. Look for signs of feeding (holes, tan frass) in the florets, and look inside the florets for the small white larvae with a black head. Before any insecticides have been applied, scouting is fast and easy because any sign of feeding is an almost sure sign of live larvae, and it's not necessary to spend time finding the larvae. After the initial application, feeding damage may be from a larva that has already been killed, so finding the larva is more important for an accurate count.

The **threshold** for applying insecticide is **15% of plants infested**. Early corn scouted in southeastern Mass. showed from 6% to 44% infestation -- so larval hatch has begun. Moths are more active at warmer temperatures (females do not lay eggs when night temperatures fall below 55 oF), in calm air, and at high humidity. Recent night temperatures have been suitable for moth activity. Eggs hatch in 3-14 days (100 Degree Days), depending on temperature.

Even where ECB pressure is high, insecticide applications to whorl stage corn have not resulted in improved control when compared with **one or two well-timed applications at tassel emergence**. Larvae are more exposed to the insecticide application when the tassel emerges and starts to open up than they are when feeding in the whorl. Larvae will leave the tassel as it opens up and no longer provides a moist, protected

feeding environment, and move down the plant looking for protected places to feed. Insecticide applications need to be timed to kill larvae before they bore into a new feeding location where they will be again protected from insecticide applications. In fields with uneven development, two applications may be necessary, one when approximately 25-50% if the tassels have emerged, and again when 75% of the tassels have emerged, if the field is still over threshold. See *New England Vegetable Management Guide* for recommended products.

Small numbers of corn earworm (1-2 moths/week) were captured in the Southeast. Weekly sprays for ECB during silking should give adequate control of CEW at these capture rates.

Trap Captures and Scouting Data June 7-13

Site	Date	ECB I (Z)	ECB II (E)	Total ECB	% ECB*	CEW
South Deerfield	6/13	4	16	20	--	--
Hadley	6/12	2	8	10	--	--
Southwick	6/12	36	36	72	--	--
Hopkinton	6/11	2	3	5	--	
Swansea	6/12	16	20	36	8%	1
Rehobeth	6/13	4	18	22	12%	2
Seekonk	6/13	11	33	44	6%	2
Rochester	6/12	5	202	207	44%	2

--R Hazzard, R Cook, M Yates, D Riggs, A Seaman

CUCURBITS: BEETLES ACTIVE

Striped cucumber beetle is active and hungry. Unprotected transplants and newly emerging seedlings are being attacked, especially in non-rotated fields. Scout frequently to catch infestations early, before damage is severe. Squash bug adults and eggs were observed this week.

Downy mildew watch. The cucurbit downy mildew national forecasting program tracks the movement of this disease northward each year. Since this disease moves northward annually, New England is about the last to get it. Thus we are mostly beneficiaries of this national forecasting service. However, it is important to report first occurrences each year. Rob Wick reports to the national forecasting service for Massachusetts and New England. During the season, please

contact Rob Wick at 413-545-1045 if you think you see downy mildew in vine crops and he will confirm any sightings observed in Massachusetts or New England.

WANTED: FARMERS TO GROW LAVENDER

The Lavender and Herb Growers of Franklin County has 8 members that grow and market lavender in food and craft products, sachets, bouquets and essential oils. The market demand is currently greater than the local supply. Therefore, this group is interested in working with growers who are interested in growing lavender to sell through them. If you are interested in pursuing lavender as a crop, contact Tina Smith, UMass Extension Floriculture Program at 413-545-5306 or John Howell, UMass Extension Vegetable Program at 413-545-5307. A meeting will be set up with the Lavender Association and growers to discuss lavender as a crop.

Lavender is a small shrubby perennial that is native to the Mediterranean region of Europe. In keeping with their native environment, lavenders need very well drained soil and a soil pH of 6.0-8.0 to grow well. Plants will not tolerate waterlogged soil conditions. Lavender suffers from few pests or diseases, although crop health problems such as root rots leading to plant death may arise in wet environments. Spittle bug can also be a problem.

The Lavender and Herb Growers of Franklin County is sponsoring a Lavender tour on July 9th. for anyone interested in lavender and lavender products. The tour will begin at Old Deerfield Garden Center, (Rte. 5&10, Deerfield) where tickets and a map can be purchased for \$5. The tour will feature lavender gardens, and a restaurant that features lavender food products. There will be lavender products for sale and a seminar on aromatherapy. Although this tour is primarily for home gardeners, potential growers may want to attend to view the variety of value added products that this group sells. For more information on the herb tour, contact Gerry McCarthy, Association President and owner of Leyden House (which manufactures aromatherapy products) at 413-772-0858.

--Tina Smith, UMass Extension

USING KAOLIN CLAY

A kaolin clay product, Surround WP (Englehard Corp.), is currently labeled for fruiting vegetables (tomato, eggplant and pepper), onions and cucurbits. This is one of the few products which is approved for certified organic growers, that can suppress flea beetles on fruiting crops, onion thrips on onions and cucumber beetles on vine crops.

Kaolin clay has sufficiently low toxicity that EPA has listed it as "generally regarded as safe" (List 4). It could be used as a food additive up to 2.5%, and is exempt from food tolerance requirements. The REI is 4 hours and it can be used up to the day of harvest; however, it leaves a residue which must be washed off any parts of the plant that will be harvested.. Leaves and fruit turn white as if sprayed with paint, but photosynthesis and growth are not inhibited. For harvest, it is unlikely that it could be washed off of leaves or soft fruit like summer squash, but can be used against leaf-feeding insects that attack early stages, before fruit is formed. Insect groups controlled include beetles, thrips, leafhoppers, flies, and soft bodied insects such as pear psylla.

Kaolin has several modes of action:

1. repellency - hides visual and tactile cues that the pest uses to recognize host plants, hence it does not feed.
2. irritation -- particles adhere to insect body parts.
3. mortality -- by covering small, soft-bodied insects with particles.

Use rates are high, about 6-25 lb/acre in airblast or boom sprayers. In backpack sprayers, use a dilution of ½ lb per gallon. It is advisable to **mix a slurry first**, in a bucket or smaller container, then add this to the spray tank with agitation running. Adding powder directly to the spray tank may result in clumping or clogging of filters.

This material has moderate rain-fastness, but may need to be re-applied after a heavy rain. Allow leaves to dry before determining need for re-application Since repellency ('hiding the leaf') is the main mode of action, good coverage of leaf surfaces is important.

-R Hazard

POTATO AND EGGPLANT: ITS CPB TIME

Colorado potato beetles (CPB) have been colonizing potato fields and laying eggs. Scout fields to estimate numbers of adults and egg masses per plant, and determine hatch timing. Use a V or W-shaped path and count the number of adults and larvae on individual plants. Eggs hatch in 5-10 days, depending on temperature.

It is not necessary to kill every beetle in the field. The threshold which has been widely used in potato IPM programs is One adult or 1.5 large larvae or 4 small larvae per plant. Plants can tolerate 20% leaf damage without yield loss. Materials which may control adults (depending on the level of resistance) include imidacloprid (Admire or Provado), Vydate, Pounce or Asana with PBO, Guthion, or Thiodan. Rotate classes of insecticides in each generation.

In recent years growers have relied heavily on imidacloprid (Admire or Provado) for CPB control. There are several very effective products available and growers should make use of their range of choices to reduce resistance development for any single product. CPB is renowned for rapid resistance development and we are seeing this now wherever imidacloprid has been used for several years in the same field. In 1999, and 2000, populations from fields where imidacloprid has been used repeatedly were 20-25 times more resistant than the most susceptible populations. Conserve this product for the long term by rotating with other materials! Here are some options:

Spinosad (SpinTor) gives excellent control of CPB at the 4.5 fl oz rate. For a heavy population, two applications about 10 days apart, with the initial application when third instars occurs, will control the first generation.

Abamectin (AgriMek 0.15EC) is mainly a contact material which controls larvae. In trials conducted on by Dale Moyer on Long Island, the first application provided better control than the second application, possibly because of better contact

and coverage when the plants are smaller. Because the product is very expensive, lower than label rates were tested and it was shown that the 5-6 fl oz rate per acre is very effective in commercial fields. In research plots they obtained effective control at 4 fl oz. The lowest labeled rate is 8 fl oz.

Bt tenbrionis (M-Trak, Novodor) or ***Bt tenebrionis/kurstaki*** (Raven) control small larvae, through the third instar. Time applications to begin when 30 percent of the eggs have hatched. For best timing, flag 10-20 early egg masses with surveyor's tape on the petiole, and return every 1 or 2 days to assess hatch. Where fields are densely populated and eggs are hatching continuously, reapply every 5 to 7 days. Management strategies for CPB should use crop rotation and alternate classes of insecticides in each generation of the beetle. For example, use abamectin for the first spray after larvae hatch, followed by spinosad. Or, use Spinosad for the first spray, followed by a Bt to kill emerging young larvae.

Cryolite (Kryocide, Prokil cryolite) controls all larval stages.

Similar strategies and products apply to **eggplant**. An egg parasitoid, *Edovum putlerii*, is effective in eggplant.

See *New England Vegetable Management Guide* for more details.

Vegetable IPM Message, Ruth Hazzard, Editor. The *Vegetable IPM Message* is published weekly from May to September and includes contributions from the UMass Extension Vegetable Program faculty and staff, growers, and private IPM consultants. Authors of articles are noted; author is R. Hazzard if none is cited. Send comments or questions to rhazzard@umext.umass.edu, 413-545-3696

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.