UMASS EXTENSION

Vegetable Notes

For Vegetable Farmers in Massachusetts

Volume 17, Number 14 August 3, 2006

Crop conditions

Hot, hazy and humid with frequent thunderstorms has been the pattern, and there is no end in sight. Generally, our summer crop plants are doing well in temperatures in upper 80's and up through the 90's. Demand for water is high and irrigation systems have been running more in the past week, although rainstorms have been frequent enough to cover a lot of the crop need. Water management is key not only for crop quality but for disease prevention – see checklist on preventing Phytophthora capsici. Tomato ripening may seem delayed, but probably given the late, cool and wet start for many tomato fields, ripening is about on schedule as far as the plants are concerned. Fruiting crops as a whole are growing well and have set a good crop of fruit. Wholesale shipping of tomatoes, peppers, and eggplant has begun and will continue to pick up in the coming week or two. Onions are starting to dry down. Sweet corn quality was off in early plantings, for some farms, but has rebounded in blocks that did not suffer as much from May and June rains and demand is high. In general, demand for fresh vegetables is excellent.

Sweet corn and peppers

European corn borer trap counts continued on an upward trend this week. The Iowa strain (ZI) is catching up to the New York strain (E II) in counts. In the absence of other moths, ECB should be controlled with 6-7 day spray intervals on silk. Pepper growers should be on a regular spray schedule (interval based on product: see last week's article for details) by now, if ECB is a problem for them. We have seen small larvae in pretassel corn, though numbers are still low.

Fall armyworm captures were high in the Connecticut Valley and in Southeastern Mass. We are using the "PSU" FAW lure (produced by Scenty) that was developed at Penn State which is doing a good job of capturing moths. This is good news because until several years ago, pheromonetraps were not doing a good job of providing an early warning for FAW. High captures could be partly related to this improved lure, but that's clearly not the whorl (I mean, the whole) story, because you don't catch moths if they are not there. Furthermore, armyworms are showing up in whorl-stage fields. A five day spray schedule would be recommended on silking corn wherever this moth is being captured at >3 moths per week. Note that there are look-alikes that come to the trap. Be sure to use a vaportape strip to kill moths before their wings are shredded beyond recognition. Look for blotchy, lighter or darker markings on the buff colored wings, especially a diagonal white patch on each forewing.

Given high temperatures, expect rapid egg hatch and larval growth. We saw that very clearly this week in whorl stage corn that looked clean as a whistle last week and, one week later, showed the damage of fall armyworm larvae that had hatched, chewed on several plants in a row, and dropped to the soil to pupate – all in one week. Scout your whorl-stage and pretassel corn for combined FAW and ECB caterpillars. Add the # plants with FAW and the # plants with ECB and divide by the total plants you sample. Treat if > 15% of plants are infested.

Corn earworm captures dropped slightly after a spike of fresh moths last week. In various locations all over the state, we found numbers in the 0.6 to 1 per night range, calling for a five day spray schedule. Shorter spray schedules would be recommended where captures were between 1.1 and 13 moths per night, which also occurred in all regions of the state (Still River, Northbridge, Feeding Hills, Rehobeth, one farm in Hadley). The variation may reflect what date the trap was checked as well as variations from farm to farm. People checking these traps are careful to keep their traps in fresh silk. Seekonk approached the 13

per night, which warrants a three day schedule. Best to check traps at least twice weekly to know if new flights arrive.

European Corn Borer Thresholds

.Pre-tassel-Silk: 15% or more of plants scouted are infested .

Silk: 5 or more moths caught in pheromone traps in one week, or 5% of plants are infested.

Corn Earworm Thresholds

Moths/Night	Moths/Week	Spray interval
0-0.2	0-1.4	no spray
0.3-0.5	1.5-3.5	every 6 days
0.6-1	3.6-7	every 5 days
1.1-13.0	7.1-91	every 4 days
Over 13	Over 91	every 3 days

Fall Armyworm Spray Thresholds for Pheromone traps and Feld Scouting

Whorl Stage: 30% or more of plants are infested

Pre-tassel stage toemerging tassel 15% or plants are infested (add # plants infested with with ECB)

Silk: 3 or more moths captured per trap per week: Spray silk every five to seven days; five days if captures continue to be over 3 moths per week.

Location	Z I	E II	CEW (per night)	FAW
Sheffield	4	5	0.57	-
Pittsfield	-	-	0.6	-
S. Deerfield (UMass)	4	33	-	10
Deerfield	16	156	0.1	94.5 average
Whately	1	7	1.5	-
Hadley (1)	5	15	0.8	51
Hadley (2)	5	41	0.75	39
N. Hadley	3	141	0.25	11
Sunderland	1	31	0.71	5
Easthampton	7	1	0.8	3
Still River	0	3	5.21	-
Dracut	1	2	2	-
Rehobeth	6	5	3.85	
Seekonk	-	-	12.71	83
Sharon	-	-	5.7	-
Concord	3	1	0.57	1
Leicester/ Spencer	3	6	0.75	1
Northbridge	17	9	1.13	2
Tyngsboro	21	2	0.28	0
Coventry, RI	12	29	0.43	-
Mason, NH	0	5	1.28	2
Hollis, NH	0	34	0.85	16
Litchfield, NH	1	12	1.28	14

TOMATO HORNWORM

Late July and early August are usually the time when we see tomato hornworms. These large caterpillars typically appear in small numbers and cause their impressive feeding damage to just a few leaves or plants. Larvae consume large amounts of foliage on peppers, tomatoes, eggplant, potatoes, and related solanaceous weeds. Now is the time to scout, by searching leaves for damage, frass or larvae. Often one sees defoliated stalks or the characteristic dark-green droppings (fecal pellets) before the caterpillar is located.

There is one generation per year in northern areas. The adults are large moths, predominately gray or gray-brown with lighter markings. They are commonly referred to as sphinx, hawk, or hummingbird moths. The adult tomato hornworm (*Manduca quinquemaculata)* is known as the five-spotted hawk moth while the adult tobacco hornworm (*Manduca sexta)* is called the Carolina sphinx. The wingspread may reach five inches and the hairy, robust abdomen has yellow spots. They emerge from over wintered pupae in the soil in late spring or early summer. The moths are commonly seen at dusk, hovering hummingbird-like over beds of petunias and other flowers with long corollas. Nectar is extracted through their long, coiled, tube-like mouthparts.

The spherical greenish-yellow eggs are deposited singly on the undersides of host plant leaves. The eggs hatch in approximately one week and larvae begin feeding on foliage. Larvae feed for 3-4 weeks, molt five times, and may reach four inches in length and 1/2 inch in width when full grown. Both species are green with a distinct “horn” on the top of the tail end. The sides of the tomato hornworm are marked with a series of white marks resembling a “v”

Parasitized Tomato Hornworm Larva, with Braconid Wasp Pupae Attached

laying on its side and pointing toward the head. The white marks on the sides of the tobacco hornworm form a series of seven diagonal lines. The tip of the tomato hornworm's horn is black while that of the tobacco hornworm's is red.

Full-grown larvae burrow 3-4 inches into the soil and form dark brown, two-inch long pupae. A sheath for the mouthparts projects from the head of the pupa and curves downward, resembling the handle of a pitcher.

A parasitic Braconid wasp is an important and fairly common natural enemy of the hornworms. The wasps lay their eggs inside the body of the caterpillars. After feeding within the caterpillar body, the larvae of the wasps eat out through the skin and spin the cocoons on the caterpillar surface. The adult wasps later cut out circular lids and escape from the cocoons to attack other hornworms. If one is hand-picking hornworms, those with cocoons of parasitic wasps on their back should not be killed.

Controls: There is no set economic threshold for this pest in tomato. Where damage is unacceptable, or if there are high numbers, foliar sprays can be used. Use a selective material that will conserve beneficial insects, because those predators and parasites are very likely keeping your aphid populations under control. Insecticides include *Bacillus thuringiensis* (Bt) kurstaki or aizawi strain (Dipel DF, Agree, or Xentari, etc.), indoxycarb (Avaunt), tebufenozide (Confirm 2F), or spinosad (SpinTor 2SC or Entrust). Several synthetic pyrethroids are also labeled (note: these could result in aphid outbreaks). Although Bt usually works best on small larvae, in this case it will work very well even against large hornworms. In peppers, any controls used for European corn borer should control hornworms.

-R. Hazzard Thanks to sources: Utah Sate Univ.Extension Fact Sheet # 74, Purdue Vegetable Crops Hotline # 409 (Frankie Lam)

DOES SPRAYING FOR APHIDS CONTROL VIRUS? WHEN SHOULD I SPRAY FOR APHIDS?

Several years ago I was talking with a vegetable grower who mentioned that he thought it was about time to start spraying for aphids. I asked if they were starting to build up in the field. He didn't know, but said he wanted to use preventive treatments to control aphids so they would not bring a virus disease into his crop. We checked plants randomly throughout the field and found no aphids. The grower decided not to spray at that time. This saved him a few hours of time, the cost of material and equipment operating costs. It only took us about ten minutes to check the field.

This is not an uncommon situation. Throughout July and August, aphids show up in many crops, and growers are concerned about whether and when to spray. Many growers feel they must have a rigorous spraying program for aphids to protect their crops from viruses. All too often this practice is not effective in preventing the occurrence of virus diseases, and can cost the farmer money as would have been the case in the above situation.

I think it would be helpful to briefly review some of the basics of how viruses are spread. Virus diseases require a living host, and when the host plant dies, any virus within the host plant cannot survive. (An exception is tomato/tobacco mosaic, which can survive in dead host tissue.) For the most part, viruses survive the winter in certain perennial weeds. During the growing season, viruses can be transmitted from perennials to a susceptible vegetable crop.

Most vegetable virus diseases that are important in New England are spread by insects. Cucumber beetles, thrips, leafhoppers, and nematodes can spread certain viruses, but aphids are the most important vectors (carriers). Viruses can be classified as **persistent** and **nonpersistent.** This is related to the manner in which the virus is spread by insects and is important to know in choosing the appropriate management strategy.

An insect must feed for a minimum of ten minutes to an hour to pick up a **persistent** virus from an infected host. The virus must then undergo a dormant period of at least 12 hours within the insect before it can be transmitted to another plant. Aphids will remain infective (able to vector a virus) for at least a week and maybe throughout their life. A good insect management program can be very helpful in dealing with persistent virus diseases.

Aphids pick up **nonpersistent** viruses by merely probing (exploring) an infected leaf. This happens rapidly--within seconds or minutes. A dormant period is not required and the aphid can immediately transmit the virus by probing another plant. Aphids remain infective with nonpersistent viruses for a short time (minutes).

Systemic materials are generally the most effective insecticides available for aphid control. Systemic insecticides are taken into the plant and become present in the plant juices. Aphids feed by sucking juices from the plant, and when they do so they also ingest some of the insecticide. However, when just probing a leaf an aphid is not feeding and does not ingest plant juices or insecticide. In fact, the presence of an insecticide may actually stimulate probing and cause aphids to move from plant to plant in an effort to fine a suitable feeding site. This can increase the spread of nonpersistent viruses. For this reason nonpersistent viruses are very difficult to manage. There are no pesticides that kill viruses and, as we have seen, they may actually make matters worse.

Eradication of perennial weeds around fields can reduce the source of the virus. The green peach aphid is not the

only aphid that transmits viruses, but it is important because it is a universal vector. Prunus species (peaches, cherries etc) are attractive to green peach aphids. Removal of wild cherry trees from around fields can make the area less attractive to green peach aphids.

Reflective mulch such as aluminum foil on paper has been used successfully to repel aphids and thus can be effective in reducing virus problems. However this material is expensive and tears easily when laying. Row covers such as Remay can keep aphids off a crop, but they are generally used during the cool days of spring whereas aphids are most active during warm weather. (In fact, use of row cover over a crop that is already infested with a small number of aphids can result in an outbreak of aphids, because the natural predators are excluded while aphids reproduce rapidly in the high temperature.)

Direct damage from aphids: Besides spreading virus diseases, aphids in high numbers can cause economic damage by their feeding activities. Leaf curling and yellowing or deposits of honeydew on leaves or fruit can affect crop quality or yield. For this reason it is important to manage aphids even if viruses are not a concern. However, beneficial insects such as ladybeetles, lacewings, and parasitic wasps often keep numbers low enough to prevent direct damage. Early sprays targeting aphids may actually result in further aphid outbreaks, because the natural enemies that keep them in check have been killed.

Scouting across the field gives you an estimate of current numbers. If aphids are present, check back in a few days to see if the numbers are increasing or decreasing. Take note of which natural enemies are present. Check undersides of leaves, including lower and mid level leaves. The following thresholds can be used to determine if insecticides are needed (sampling routine in parenthesis):

--**Pumpkin and winter squash**: 20% of leaves have more than 10 aphids (based on 50 leaves).

--**Pepper:** 10 per leaf (based on 4 leaves per plant, 25 plants).

--**Tomato**: 6 per leaf (based on 2 leaves per plant, 25 plants).

--**Potato**: 4 to 10 per leaf (based on 25-50 compound leaves; higher threshold near harvest).

--**Sweet corn:** 50% of plants with >50 aphids at emerging tassel (based on 100 plants).

When spraying for aphids, whenever possible select a systemic insecticide, or a selective insecticide that wilh not harm natural enemies.

--John Howell, Rob Wick, Ruth Hazzard

Caterpillars in Brassicas

All three of the key caterpillars pests of Brassica crops have been found this week – including a few cabbage loopers. Its not surprising to see cabbage looper at this time of the year, especially when other migratory moths are also arriving on storm fronts. Loopers, along with imported cabbageworm and diamondback moth – generally known as 'worms in cabbage' – are more attracted to the waxy crops such as cabbage, broccoli, cauliflower, and collard than to the 'glossy' leaved Brassicas such as Bok choi and Chinese cabbage – but they can be found in all of these. Diamondback moth and imported cabbageworm have several reproductive cycles each year, and you may see new flushes of moths or butterflies, eggs, and then caterpillars, in a single crop.

Imported Cabbageworm Caterpillar

Scout undersides of leaves to look for fresh damage and to catch the caterpillars when they are small and damage is slight. Check heading brassicas as soon as heads start to form. Greens such as collards, kale, and Chinese cabbage should be scouted at all growth stages.

Quick ID Cues: **Diamondback moth catperillar**: very wiggly when poked, pointed on both ends, not fuzzy, only grows to about ½ inch. You may find white silken cocoons, with a green full-grown catperillar or a brown pupa inside. **Imported cabbageworm:** gray-green, slightly fuzzy, and sluggish. Grows to > 1 inch and favors the center of the head as it gets larger. Produces wet green frass (droppings). **Cabbage looper**: light green, smooth, 'loops' up like an inchworm as it moves, grows 1 ½ to 2 inches. Eats big holes in leaves.

Cabbage Looper Caterpillar

The following thresholds are based on checking 25 plants. If you find one caterpillar per plant, it's considered "infested".

Action thresholds for caterpillars in

Brassicas:

Crop & Stage	% Infesed Plants
Cabbage & Broccoli, Cauliflower pre-cupping (before head formation begins)	35%
Cabbage & broccoli head formation to maturity	15%
Cauliflower After heading (before tying)	10%
Kale, collards & other greens	10-15%

See *2006-2007 New England Vegetable Management Guide* for insecticides. There are many effective options! Use selective products to maintain the natural enemies that keep aphids in check!

Phytophthora capsici Checklist

Now that *Phytophthora capsici* weather is upon us (hot, humid, wet), what can growers do to check this disease in check? A brief review of cultural practices that will help to minimize the impact of this disease:

Irrigation Management: Both rainfall and irrigation have large impacts on the time of onset and severity of Phytophthora Blight epidemics. Disease incidence can be very high after heavy rainfall and frequent drip irrigation. Irrigation frequency, duration, and the mode of irrigation can all impact disease severity.

Disease onset is earlier and severity higher with frequent irrigation. A less frequent irrigation schedule of 21 days versus 7 days resulted in less Phytophthora Blight without a reduction in yield.

Alternate row irrigations where furrow irrigation is used can reduce disease incidence.

Placement of drip irrigation emitters can have a large impact on disease severity; avoid drip irrigation close to plant stems and crowns. Subsurface (6 in below ground) drip irrigation results in the most efficient control of the pathogen.

Maintenance of an irrigation water source free of the pathogen is an important management strategy; do not irrigate from a pond that contains water drained from an infested field.

Improve Drainage during the growing season:

• If necessary, subsoil after heavy rainfall events. Subsoiling along the edges of driveways may be a good idea as disease symptoms often appears first along the edges of driveways.

•Avoid standing water in your fields. Do not make compaction worse by driving on wet soil.

Monitoring and Sanitation:

• Scout fields for symptoms on a regular basis, especially after heavy rains. Pay special attention to areas of poor drainage.

• When symptoms are located in a small section of a field, disk the area in to clean it- up. Begin with a border of healthy appearing plants around the affected area.

• Do not discard cull fruit in or near the field, whether diseased or healthy.

• Harvest healthy fruit from infested fields promptly; especially before a rain forecast.

• Check fruit after harvest for developing symptoms; discard infected fruit before the fungus spreads further.

• Don't save seed from a field where Phytophthora Blight occurred.

• At the conclusion of the growing season, promptly till under all plant debris to reduce in-field spread and late season infection of plants and fruit not harvested.

Chemical Management:

Fungicides can be a valuable tool in managing Phytophthora Blight; however, no materials tested to date in University trials have been so effective that they can be relied upon as the sole management tactic for this disease.

Fungicide applications must be initiated before symptoms are observed or at planting and repeated at 7-10 day intervals, especially when conditions are favorable for disease development (warm, wet conditions).

For specific materials, see earlier issues of Vegetable Notes

--Bess Dicklow, UMass Extension

CUCURBIT UPDATE – PLECTOSPORIUM BLIGHT AND DOWNY MILDEW ALERT

Plectosporium blight, caused by the fungus *Plectosproium tabcinum*, has been in prior years primarily a problem for pumpkins, but zucchini, some summer squashes, and Cucurbita maxima winter squashes (buttercup, kabocha, hubbard) are also very susceptible. It has been found in many fields, in both New Hampshire and Connecctict, on both pumpkin and zucchini. The fungus prefers warm wet weather (it's happy this summer). Spores survive in the ground on decaying plant material, and are splashed by rain and wind. The key diagnostic feature is elongated diamond-shaped (some say spindle-shaped) white/tan lesions along the petioles of the leaves, which expand until vines collapse completely. Fruits have little white blisters or russetting that eventually can cover the whole fruit and provide entryways for other pathogens.

How to control it. Diagnosis is key – if you know you have it, the best control is to rotate away from summer

Plectosporium on Zucchini

squash and pumpkins for at least 2 years. UMass research has shown that some varieties are less susceptible, but none are immune. It's also best to choose sunny, well-drained sites for cucurbits. Avoid pockets where air and water don't drain well. The disease can also be controlled with fungicides applied at the first sign of symptoms. Chlorothalonil (e.g. Bravo) and strobilurins (e.g. Cabrio, Flint, Pristine, Amistar/Quadris) are very effective for Plectosporium; sterol inhibitors (Nova, Procure) are not.

Powdery mildew has shown up on summer squash, zucchini and butternut in many fields in Massachusetts and New Hampshire. Hot weather in late June probably helped it along. Resistant or tolerant varieties may do much better this year as a result. Growers following a fungicide program should begin to treat as soon as the first symptoms are seen. Scout by looking at undersides of leaves for the characteristic white sporulation.

Leftovers that didn't sell? Do not return culls to your fields! This holds true if you are buying in zucchini, summer squash or pumpkins from Southern regions. You may be importing Plectosporium, scab, or even worse, Phytophthora, to create a long-term problem. Even though thorough composting will destroy most pathogens, there's no guarantee that all will be killed.

Downy Mildew

This is a serious disease that is carried by storms to more northern locations as the season progresses. New reports of this disease include southern New Jersey and Long Island, with continued outbreaks in northern Ohio and Michigan. This is getting closer and warrants close attention to disease forecasts (if you use the Web, do a search for 'downy mildew forecast' to reach the North Carolina disease forecast website) as well as regular scouting and a preventative spray program. See July 20 issue of Vegetable Notes, and www.umassvegetable.org, for photos of symptoms and scouting details.

If you think you may have it, call the Disease Lab – for your own sake, and so that the presence of the disease in New England can be reported.

A basic fungicide program. To control the major cucurbit fungal pathogens (powdery mildew, downy mildew, Plectosporium blight, and black rot), scout and apply fungicides when you first see any signs of the disease. Once you decide to treat, apply every 7-10 days, depending on weather. According to Jude Boucher, CT growers have had good luck with a 10-day schedule. Always follow the label instructions, and do not apply sulfur or copper when the temperature is above 90F.

An organic fungicide program - apply every 7-10 days, alternate between:

1. potassium bicarbonate (Kaligreen, Milstop)
2. copper (Champion)

A conventional fungicide program - apply every 7-10 days, starting with:

1. a strobilurin (Cabrio, Flint, or Quadris) WITH copper
2. a sterol inhibitor (Nova, Procure) WITH chlorothalonil (Bravo)
3. sulfur (Microthiol disperss) WITH chlorothalonil (Bravo)
4. repeat sulfur + chlorothalonil as long as needed.

Make sure to use strobilurins and sterol inhibitors only ONCE each per season, and use with a protectant like copper or chlorothalonil each time. The above programs should control powdery mildew, Plectosporium and black rot. If downy mildew control is needed, additional materials are needed. You'll want to tailor this program to your specific needs.

To help you choose among the fungicides, see the tables printed in the July 20 issue of UMass Vegetable Notes and in the August issue of New Hampshire Vegetable, Berry and Tree Fruit Newsletter at http://extension.unh.edu/Agric/AGFVC/Docs/August06.pdf:

--Adapted from Becky Grube, New Hampshire Vegetable, Berry and Tree Fruit Newsletter, August 2006 Volume 2:6. Thanks also to Rob Wick, Bess Dicklow (UMass), and John Mishanec (Cornell).

UPCOMING BRASSICA SERIES TWILIGHT MEETING

Brox Farm, 1276 Broadway Rd. (Rte. 113), Dracut, MA
Tuesday August 15, 5 pm to 8 pm
Host: Dave Dumaresq

Part of the Brassica Twilight Meeting Series, highlighting Broccoli production.

Special Highlights: NRCS EQIP projects for farmwide

drip irrigation and IPM; Sweet corn IPM projects.

Dave Dumaresq has leased Brox Farm on Rt. 113 in Dracut for ten years. In 2003 he also began leasing the East Street Farm in nearby Tewksbury. Last month he acquired his own farm in Dracut. In addition to selling his fruits vegetable and flowers at his two farm stands he also sells at eight farmers markets in the northeastern part of the state. A small array of wholesale accounts round out the sales venue.

As a participant in the Brassica project, Dave set the goal of expanding his fall broccoli harvest season both earlier (late August) and later (November through Thanksgiving). He is testing different planting dates and varieties. We will discuss UMass Extension's trials of both heat and cold tolerant broccoli and get a hands-on view of IPM and scouting in fall brassicas.

In sweet corn, Dave has used pheromone traps and scouting to help him time his sprays in sweet corn for many years. For the past two years he has tried biological control, using Trichogramma wasps as well as reduced-risk insecticides to reduce European corn borer.

Dave also grows several specialty crops for ethnic markets, including calabasa, aji dulce, and jilo eggplant. We will visit aji dulce peppers set out for fall harvest in a greenhouse. Robert Bernatzky, UMass plant breeder, will discuss his breeding work in aji dulce.

The NRCS EQIP program has helped Brox Farm design and install a drip irrigation system to serve six separate fields, supplied by three shallow dug wells and multiple hydrants. Grass strips and other erosion controls have also been installed on sloping fields. Now Dave will be able to rotate crops more easily and provide drip or overhead to every field on the farm. We will tour these systems and Dan Lenthall, District Conservationist at the NRCS Westford Field Office, will discuss how EQIP works

Please arrive promptly by 5 pm and park by the farmstand. We will stop for light refreshments in the shade part way through our tour. Refreshments will be provided by the Mass Association of Roadside Stands.

Contact hours for pesticide applicator re-certification: 1 hour

For more information please contact Ruth Hazzard, UMass Extension Vegetable Program, 413-545-3696 or rhazzard@umext.umass.edu

Directions: Take Rt. 93 North from I-495 to exit 46 (the second to last exit before the NH line) go around rotary to RT 113 west. Brox Farm is 2.5 miles on right. Park in rear of parking lot.

Special Thanks to our Sponsors and Partners:

•UMass Extension Agriculture and Landscape Program and the University of Massachusetts College of Natural Resources and the Environment

•Northeast SARE Research and Education, (Project LNE04-202 Achieving High Quality Brassica Crops on Diversified Vegetable Farms)

•Connecticut Agricultural Experiment Station

•New England Vegetable and Berry Growers Association and EPA Region I; (Grower Evaluation of Alternatives to Synthetic Pyrethroids for Control of Insect Pests in Corn)

•Northeastern IPM Center, Partnership Grant to the Northeast Vegetable IPM Working Group (Advancing IPM in the Northeast: Tools and Resources for IPM Implementation on Northeast Vegetable Farms.)

•Massachusetts Association of Roadside Stands and Pick Your Own Operations

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