



UMASS
EXTENSION



Vegetable Notes

For Vegetable Farmers in Massachusetts

Volume 15, Number 10

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CROP CONDITIONS

Crop growth continues at a great pace. Central and south-eastern MA is especially dry, and irrigation is being used throughout the state. Cultivation and side dressing are big jobs this week including final cultivation in winter squash and pumpkin before the vines take off. Late plantings of cucumbers, sweet corn, brassicas and lettuce continue. Remember that the pre-sidedress nitrate test ("June" nitrate test) can be done by the UMass Soil Testing Lab with a 24-hour turnaround, to give you information on whether side-dressing is needed (see June 10 issue). First harvests started this week in cabbage; continued harvests are happening for zucchini and summer squash, beets, peas, radishes, lettuce, greens, herbs. Strawberries are just about done. The earliest sweet corn is coming in this weekend, but only for those pockets of extra-early corn near the CT River. Most areas have silking corn and fortunately moth flights are low. Potatoes are getting their final hilling as vines fill in and tuber set gets underway. In the beetle department, cucumber beetle pressure has dropped, Colorado potato beetle egg laying has dropped off, but flea beetles are still going strong. Powdery mildew was observed in zucchini. Market prices are good for early crops. Cool nights with low humidity are keeping diseases at bay, though we can expect that to change as we move into July. Growers have been calling the UMass Disease Diagnostic Lab (413-545-1045) to get help with identification of various crop symptoms. We urge growers to use the lab since accurate identification is the most important step in good control. Call first; samples can be sent in overnight mail from anywhere in the state.

TWILIGHT MEETING REMINDER: **WEDNESDAY, JULY 14**

Czajkowski Farms, Hadley
5:00-8:00 p.m. Contact: Ruth Hazzard,
(413)545-3696 or Anne Carter (413)545-5216

See a well-managed, forward-looking farm in the heart of the Connecticut Valley. Joe and Wally will host this tour of their 170-acre farm where they are the third generation to grow vegetables, berries and tobacco. Most of their produce is shipped wholesale but they also grow pick-your-own strawberries and brambles. They grow

organic butternut (13A) and machine-picked green beans. The tour will start at their new storage facility and with their washing, peeling and packing line. Butternut is peeled from October through March, carrots are peeled year-round. We will hear about a new marketing effort to sell directly to public schools, then look at several fields where the Czajkowski's are working with UMass to test perimeter trap cropping in butternut and pumpkin, and to compare IPM strategies in no-till and conventional tillage systems in pumpkins. We'll see a new PYO field of brambles and other small fruits. Refreshments served at 5:00. Pesticide re-certification credits: 1 hour.

DIRECTIONS FROM THE WEST: Turn off I-91 at Rte 9/Northampton exit, turn right (east) across the bridge. Follow Rte 9 east to North Maple St (across from the malls). Turn left. At the stoplight go straight. Opposite the UMass Horse farm, turn left on Mt. Warner Rd. Go ½ mile, turn left into driveway, storage barn is at the end of the driveway.

FROM THE NORTH: Take Rte 116 over the CT river and go straight through the lights in the center of Sunderland. Continue to the next traffic light. Turn right onto Meadow St. After about 1 to 1.5 miles, turn right opposite the UMass Horse Farm onto Mt. Warner Rd, then follow directions above. (Note: North Maple St. and Meadow St. are two sections of the same road.)

SQUASH BUGS IN VINE CROPS

Squash bugs are being observed in cucurbit fields. Typically squash bugs do not reach pest levels in vine crops. However some growers have found high numbers and resulting crop damage in recent years. Squash bugs can cause both leaf and fruit injury if numbers are high. The threshold recommended by Cornell University is one egg mass per plant. Higher numbers are found in summer squash and zucchini, pumpkin and hubbard squash. In Kentucky, hubbard squash has been used as a trap crop to keep squash bugs out of muskmelon. Squash bugs do not prefer and do not survive well (hence, do not usually become a pest) on cucumber, watermelon and muskmelon. If summer squash gets away from you and gets too big to harvest, squash bugs will move in and feed on the unharvested fruit. If populations go unchecked, they will begin feeding on good fruit, especially pumpkins.

Adult squash bugs are flat, gray-brown, and usually found on the underside of leaves or in cracks in the soil. Squash bug eggs are laid in tidy clusters (usually on undersides of leaves in the notch between leaf veins) and change color from yellow to bronze shortly before hatching. Nymphs are light gray with black legs and go through 5 molts as they grow to adults. There is one generation per year. Adults over winter in crop residues and protected sites in or near the field.



Squash bug eggs and nymphs

Feeding, which is done by piercing the plant tissues with stylets, interrupts xylem transport and causes wilting in leaves, stems, and vines that are beyond the feeding site. The injury may appear as light-colored areas that later turn brown and die. These symptoms are similar to bacterial wilt symptoms. If you see symptoms and are not sure of the cause, look for presence of squash bugs, and also contact the Disease Diagnostic Lab (413-545-1945) to send a sample for diagnosis.

In many vine crops, squash bugs do not build up to damaging levels. If you find egg masses at above threshold levels, target sprays to control nymphs as soon as they hatch. The contact insecticides available are most effective against young nymphs. Adult squash bugs and older nymphs are more difficult to control because they develop a hard exoskeleton as they mature. In addition, since squash bugs are secretive, they can be difficult to reach with insecticides. Sevin, Ambush, and Asana are labeled for use on this pest in winter squash and pumpkin; the list also includes Capture and Thionex for cucumber, muskmelon and watermelon. I don't have any specific organic materials to recommend as being effective against this pest.

Cultural practices may influence squash bug numbers. We have observed higher numbers in fields with hay or straw mulch and in low-till or no-till situations where cover crop residues are high.

The tendency of squash bugs to hide and congregate in protected locations can be used, in small



Adult squash bug

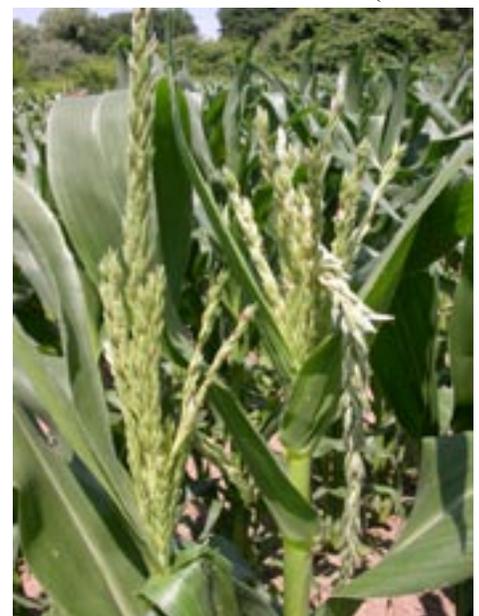
plantings, for trapping purposes. Place some boards on the ground and check underneath them in the morning; destroy bugs found underneath.

-R. Hazzard

SWEET CORN UPDATE

Corn earworm moth captures were zero at all locations except for a catch of 3 moths/week in Dighton, Bristol County. Seekonk in Bristol County captured zero. European corn borer captures dropped further this week at most locations. Many are now below 20 moths per week --even in high pressure areas where peak flights were over 100 per week. Corn borer pressure in fields just pushing tassel is likely to remain high for another week or two, with larvae from previously laid eggs feeding in the emerging tassel. Scout new fields that are reaching the point where tassels are emerging. If infestation levels are high, time sprays for tassel emergence sprays. Fields may need more than one application at the tassel emergence stage to bring the numbers below threshold; scout and respray if 15% of plants still have live larvae. The idea is to kill larvae moving out of the tassel before they get a chance to bore into another part of the plant.

Broken tassels are a sign of ECB feeding – but usually they tell what has already happened, not what needs to be done next. For blocks entering the silk stage now, where ECB has most likely been controlled with earlier sprays, don't depend on broken tassels to tell you if further sprays are needed. If ECB larvae are present, they will be moving down the stalk and tunneling either into the stalk or into the ear. Their favorite site for entering the ear is between the ear and the stalk so that's the place to look (see photo). Given low flights of ECB (<20 moths per week) and absence of CEW, if blocks are clear of infestations (below 15%) at the silk stage, further sprays are not needed at this time. IF ECB flights are over 20/week, weekly sprays are recommended. CEW at 3 moths/week warrants a 5-6 day spray schedule. The map insert shows sites where flights are reported this week. We greatly appreciate the cooperation of growers and



Broken tassels indicate ECB was feeding in stem of the tassel



The hidden spot between stalk and ear where ECB enters – the place to scout in early silk

USDA agency staff, who are collecting and providing this information weekly. This network benefits sweet corn growers throughout central New England. For farmers who are using traps and collecting trap counts once or twice a week on your farm, we invite you to contribute to this network. If you are interested, please contact Amanda Duphily or Ben Hunsdorfer at 413-545-3696. We ask for regular reporting of trap numbers on Wednesdays by phone, fax or email.

moving past the five-leaf stage so that damage and infection with bacterial wilt are less of a concern. Try to time the last cultivation so that weeds are cleaned up just before vining.

Powdery mildew has been observed this week in summer squash and zucchini. Scout by searching upper and lower



Powdery mildew on squash leaf

leaf surfaces on about 50 leaves – picking groups of 5 leaves in 10 locations throughout the field will give you a good sample of the field. Look for light green to yellow blotches on the upper surface, or a white to gray, powdery covering on the upper or lower leaf surfaces. These powdery areas most often start on the underside of the leaf, often as small as a quarter. Powdery mildew shows up first in zucchini and summer squash. Usually we do not see it in pumpkin

and winter squash until the last week of July and first two weeks of August.

Recommendations are to begin fungicide applications as soon as powdery mildew is observed, and continue at approximately 10-day intervals. However it is not certain that powdery mildew necessarily causes economic losses in zucchini and summer squash, especially where concentrated picking occurs in a short period. If fungicide is used, include a broad-spectrum fungicide (eg chlorothalonil) because powdery mildew will not develop resistance. With good coverage, these provide adequate control of powdery mildew as well as other diseases. These may be combined or alternated with systemic fungicides. The advantage of systemic fungicides is their ability to penetrate to the lower sides of the leaves where spray coverage is difficult. However, resistance to the systemic fungicides has been observed in other regions and when it happens, it tends to be a high level of resistance. Rotate among classes of systemic fungicides. Rotate strobilurins (eg Quadris, Cabrio or Flint), with Nova (also a systemic but with a different mode of action) or with Topsin M. Avoid overuse (not more than once or twice per season per class of fungicide), rotate to other classes, and use a non-systemic fungicide at the same time to reduce the chance of resistance. For more information on fungicides see the 2004-2005 New England Vegetable Management Guide. Overall, striped cucumber beetle numbers are down. Watch for squash bug adults, eggs and nymphs.

Downy mildew warning

Lures can be provided if needed.

Town	Date	ECB Z1	ECB E2	Total ECB
Berkshires/ Champlain Valley				
Westminster, VT	7/1/04	2	4	6
CT River Valley				
S. Deerfield	6/30/04	0	0	0
Feeding Hills	6/29/04	2	0	2
N. Hadley	6/30/04	3	3	6
Hatfield	6/30/04	29	7	36
Hadley	6/30/04	19	1	20
N. Andover	6/24/04	4	3	7
Ipswich	6/25/04	3	1	4
Leicester/ Spencer	6/30/04	1	0	1
Northbridge	6/30/04	3	2	5
Tyngsboro	6/28/04	4	4	8
Monson	6/30/04	2	2	4
C.&E. MA				
Concord	6/28/04	2	0	2
Dracut	6/29/04	24	54	78
Dighton	6/28/04	4	12	16
Still River	6/30/04	5	4	9
Seekonk	6/29/04	5	5	10
Sharon	6/29/04	6	10	16

--R Hazzard, A Duphily, P Westgate, D Rose, P Willard, J Galonka, T Harlow. W Kinglsey.

CUCURBITS: INSECTS AND DISEASES

Winter squash and pumpkins are reaching the vining stage, while zucchini and summer squash harvests have started on some farms and are getting underway on others. Cucumber beetle pressure is down and even later-planted crops are

Downy mildew is a destructive disease of cucurbit crops. The fungus does not survive the winter in New England and must move north each year from the deep south. For this reason, downy mildew does not usually occur in New England until September. However, downy mildew has recently been reported in New Jersey and southerly weather systems may move the pathogen to New England much earlier this year. Yellow spots on the upper side of the leaf occur opposite angular spots on the bottom of the leaf. A downy growth of mold may be visible on the bottom of the leaf. North Carolina State University has a wealth of information on their web site: <http://www.ces.ncsu.edu/depts/pp/cucurbit/>. Bravo, Ridomil Gold/Bravo, Ridomil/MZ will control this disease. Bravo will also help control powdery mildew. Alette will also control downy mildew but not powdery mildew.

-R.Hazzard

TARNISHED PLANT BUGS

Tarnished plant bug adults and nymphs are being found in several vegetable crops, and in some fields they are causing significant damage. There are European tarnished plant bugs (*Lygus rugulipennis*) and American tarnished plant bugs (*L. lineolaris*), as well as many other species of *Lygus* bugs. Adults are about 6 mm long (1/4 inch), brown or tan or greenish with darker markings on their wings and back. Nymphs are bright green and progress through 5 molts (instars) from first hatch to the adult stage. They can be mistaken for aphids, but move much faster when disturbed. Overwintered adults lay eggs in spring, depositing eggs in stems and leaf ribs in host plants. These adults and nymphs attack strawberry flowers in May. A new generation of adults (which is what we are seeing now) will produce another brood in the late summer, for a total of 2 or possibly 3 generations per year.



Adult tarnished plant bug

Feeding

Adults and nymphs have piercing sucking mouthparts (stylets) which are used to penetrate plant tissues and suck up

cellular contents. TPB select succulent, nutritious tissues such as new growth or newly forming fruits (just after blossoming). While feeding, the bugs secrete a toxic substance from their salivary glands which kills cells surrounding the feeding site. Usually the first signs of damage are small brown spots on young leaves. As the tissue grows, healthy tissue expands while dead tissue does not, which results in holes and distorted, malformed leaves, buds or fruit. Terminal shoots and flowers may be killed.

Damage

In strawberry, this distorted growth of fruits is known as

cat-facing. In celery, feeding on tender stalks produced large, brown colored wilted spots and blacking of joints, known as "black-joint". In beans, feeding on flowers causes them to drop, and feeding on seeds in young pods causes pitting and blemishing of pods. In tomatoes, eggplants and peppers, feeding may occur on flowers and stems, causing flower drop. Fruits may also be attacked leading to indentations, bumps, or yellowing of the flesh where the fruit is "stung" by the piercing mouthparts of nymphs or adults. These could be confused with stink bug damage, but they do not have the white pithy areas beneath the skin that is typical of stick bug damage. It is not common to see this damage, but if the damage occurs it may help to determine the cause. In pepper and in basil, feeding in emerging leaves causes distortion and browning of leaves. In apples, adults feed on fruit buds and cause fruit dimpling and scabbing, or dropping off (abscission) of the buds.

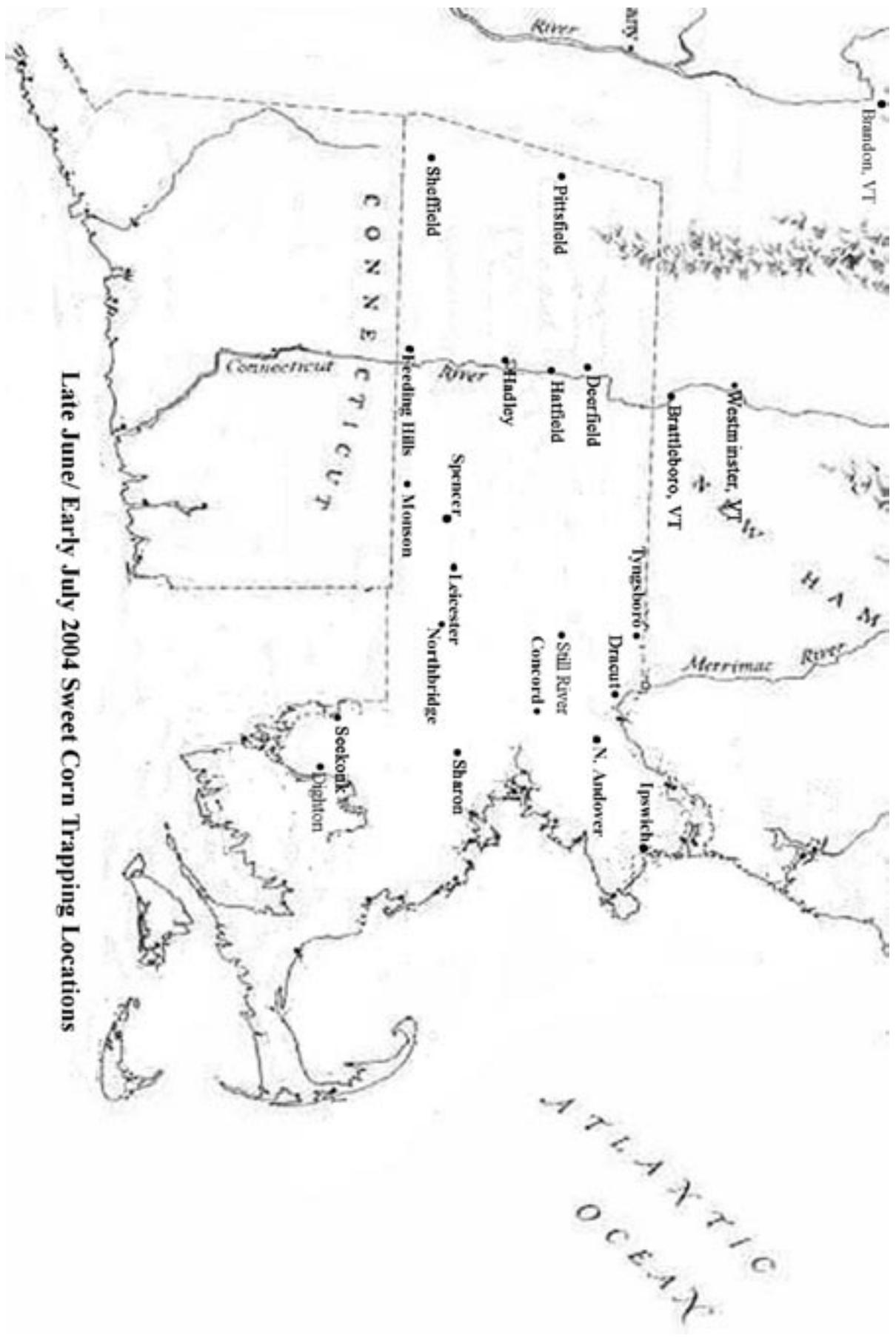
We have been finding TPB damage in water spinach, which is being grown as a succulent green for Asian markets. TPB feeding occurs in the tiny new leaves in internodes. Holes are punctured in the folded tiny leaves and cells are killed, and as these leaves open up this results in symmetrical holes and distortion of the leaves. Brown scars occur in the internodes. Plants develop more branches in response to dead terminals, which makes them less marketable. Markets want long, single stems with as little branching as possible.

Weeds are also host plants

Tarnished plant bugs attack a large variety of crops weeds, flowers, and orchard crops. Weed hosts include wild carrots and other umbelliferous crops, redroot pigweed (and other amaranths), lambsquarters, mustards, shepardspurse, rocket, goldenrod, and mullein. Alfalfa is a favored host, and harvesting alfalfa often stimulates major *Lygus* migrations. Other legume hosts include vetch, lupine, and fava beans.

Management

Whole farm management should include removing sources of infestation outside the crop. Disk or rototill weeds along field borders to reduce weed hosts, or keep them mowed all season. However, disturbing non-crop areas by mowing can encourage movement of TPB into your crop, so it should be avoided at critical periods when the crop is vulnerable. There are natural enemies of TPB, including a parasitic wasp which was released for control of TPB in alfalfa (*Peristenus digoneutis*). This was released in New Jersey and has spread throughout the northeast, and can cause up to 50% mortality. However, it currently does not reduce the numbers sufficiently to prevent damage in key crops. Most vegetable crops can sustain a small population of TPB without economic injury. We have observed economic damage in water spinach and Thai basil. Unfortunately it is difficult to find insecticides which are labeled for these crops. Synthetic pyrethroids and dimethoate are labeled



Late June/ Early July 2004 Sweet Corn Trapping Locations

for TPB in apples and provide effective control; dimethoate is preferred because it has less impact on mite predators in apples. Labels often list “lygus bug” instead of specifically “tarnished plant bug”.

-Ruth Hazzard

Vegetable Notes, Ruth Hazzard- editor and Ben Hunsdorfer- Assistant Editor. *Vegetable Notes* is published weekly from May to September 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 is R. Hazzard if none is cited.

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