

Vegetable IPM Message

July 13, 2000

Volume 11, Number 9

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Crop Conditions

Cool nights, sunny days and low humidity have dominated the weather for the past 10 days. This is a big change from June, and quite unusual for July. Most crops are about 10 days behind schedule. Early sweet corn is slowly beginning to appear at farmstands.

Early cabbage, zucchini, summer squash, greens and greenhouse tomato harvest are in full swing. Fields are drying and many growers are ready for some rain. PSNT tests are showing low N levels and a need for side-dressing nitrogen in many fields.

Night temperatures in 40's and 50's have slowed growth in corn, peppers, and other crops -- not a big help when crops are already delayed. The plus side is, early blight of potato and tomato does not develop when leaf wetness periods (ie, dew or rain) occur at temperatures below 55 °F. Similarly, bacterial leaf spot of pepper is halted by periods of several nights at <55 °F. In general, foliar diseases are slowed by low humidity and cool nights. However, since it's July, don't count on this lasting too long!

TWILIGHT MEETING REMINDER:

MONDAY JULY 17 -- BERKSHIRE COUNTY

Ioka Valley Farm in Hancock, MA

is hosting the next

Massachusetts Summer Twilight Meeting

on

Monday, July 17, 5:30-8:00 pm.

Come out to beautiful Berkshire County to see a creative, successful operation! The tour happens rain or shine, includes refreshments, and offers 1 credit hour for pesticide applicators.

Ioka Valley Farm, run by the Leab family for two generations, has shifted from dairy into diversified crops including maple syrup, strawberries, pumpkins, Christmas trees, and hay. They draw in retail customers by highlighting seasonal crops and entertainment -- from "Uncle Don's Barnyard" to pick-your-own strawberries and pumpkins, homemade bakery products, cider and apples, hayrides, and Christmas trees.

We will see their strawberry and pumpkin fields and discuss cucurbit IPM. They are installing a trickle irrigation system and we will have the UMass Extension Trickle Irrigation Trailer on hand to view the workings of a trickle system close-up. We will also discuss nutrient and manure management for dairy, vegetable and berry growers. The

Leabs will also share with us some of the planning that went into this major change in their operation.

Directions to Ioka: From the Mass Pike (I-90): Cross into New York to Exit B-3 and take NY Rt. 22 north to Rt. 43. Turn right on Rt. 43 which crosses back into Mass. Farm is about 4 miles on the left.

From Rt. 9: Go to Pittsfield, MA and take Rt. 7 north through Lanesboro. Take a left on Brodie Mtn. Road. Follow the road to the end where it intersects with Rt. 43. The farm is directly across Rt. 43.

From the North: Take Rt. 43 south from Williamstown. The farm is on the right about 8 miles south of the intersection of Rtes. 43 & 7.

Contacts: J. Howell, (413) 545-5307 & C. Touchette, (413) 529-0386

SWEET CORN

The **corn earworm** flight that came in late June has dwindled. Southeastern sites and one location in Berkshires still report damaging numbers that require a 5- 6-day spray interval. **European corn borer** flight is also low in most areas (except for the same exceptions). The first flight has been over since last week, and second flight has not begun yet. This means that until the new arrival of corn earworm or second-generation ECB, silking corn is not at risk. ECB moths are no longer laying new eggs in silk (except where flight continues, weekly sprays are needed). But be ready for any moving air masses from the South that could bring more earworm.

However, pretassel corn is full of borers! Virtually every site scouted is well over the 15% threshold. Catch these as the tassels emerge. Scout 2-3 days after spraying to see if a second spray is needed. One private consultant reported scouting a field that had been treated with Spintor and finding 100% mortality of corn borers. The field had been 16% infested. As **corn leaf aphids** arrive, fields are filling up with aphid predators. If aphids are building up, you have two choices: use a broad-spectrum material that kills aphids and corn borers and natural enemies, such as methomyl (Lannate), or use a broad-spectrum material that kills corn borers but leaves enough natural enemies to have a chance at suppressing the aphids, such as spinosad (Spintor) or Bt. If you choose that latter, you still have time to knock out aphids if they turn out to be winning the battle.

SWEET CORN TRAP CAPTURES

and Field scouting reports

FOR WEEK ENDING JULY 14, 2000

Town	Date	ECB Z1	ECB E2	TOTL ECB	CE W	FAW	PT % ECB**
Berkshire Region							
Eagle Bridge, NY	12-Jul	9	0	9	0		40-80
Pittsfield	12-Jul	10	3	13	4		40-80
Conn. River Valley N to S							
Walpole, NH	12 Jul	0	0	0	1	0	16
Plainfield, NH	12 Jul	2	0	2	0	0	16
Whately	10-Jul	0	0	0	0	0	33

South Deerfield	13-Jul	0	1	1	2*		
Sunderland	10-Jul	0	1	1	0	0	18
Hadley	10-Jul	0	0	0	0	0	21
Feeding Hills	10-Jul	0	1	1	0	0	14
East/Central MA N to S							
Haverill	11-Jul	0	0	0	0	0	23
Ipswich	11-Jul	0	0	0	0	0	8
Dracut	11-Jul	3	9	12	1	0	
Concord	9-Jul	0	0	0	0	0	24
Northbridge	12-Jul	0	0	0	0		12
Munson	12-Jul	0	0	0	0	0	8
Lancaster	9-Jul	0	2	2	1	0	11
Leicester	12-Jul	0	1	1	0	0	22
Millis	10-Jul	2	1	3	0	0	12
Hopkinton	10-Jul	3	0	3	2	0	21
Seekonk	6-Jul	10	5	15	1		18
Rehoboth	7-Jul	2	6	8	4		50
Rochester	7-Jul	5	5	10	5		
Swansea	6-Jul	20	4	24	4		35

* Note: captures were 0 at SDF after 7/10

** % infestation with European corn borer in unsprayed, pretassel corn.

Final note on sweet corn: after all it has taken to get that first harvest of corn this year, don't give it away! This week I paid \$4.50 a dozen at a farmstand in Hadley for early corn. That was a first, but for me (and apparently for others who were filling their bags) it was worth it. Ears were small, but absolutely unbeatable in taste. That taste is what the public has been waiting for. Encourage them to pay what its worth!

TOMATO

Tomato crops are looking good, although first harvest will be late. The next 4-6 weeks is an important time for good fungicide protection, with spray intervals depending on how favorable conditions are for early and late blight and bacterial disease. Recent cooler, drier weather allows longer spray intervals. However, don't wait for disease symptoms to appear before applying fungicide protection!

Bacterial canker has been confirmed in one house of greenhouse tomatoes. The major symptom was marginal scorching of leaves.

Crucifers

We are seeing on-going hatch of small caterpillars in scouted fields, which put some blocks over threshold. These have all been **imported cabbageworm** and **diamondback moth**. Cabbage looper has not arrived yet but watch for larvae which could appear if

migratory flights arrive from southern regions.

Black leg (*Phoma lingam*) has been found in one field of collards in the Connecticut Valley. This fungal disease can infect stems, from seedling stage on, or leaves. Leaf symptoms are circular light brown to gray spots, often with tiny black dots (spore-producing bodies). Stem symptoms are light brown or black sunken areas with purplish or black margins near the soil line. The source of the disease may be infected seed, cruciferous weeds, or previous crops. Surface water, wind and rain can spread the fungal spores from one field to another; working the crop when wet can spread them within the field. This disease is fairly rare here; the long periods of soggy soil probably contributed to the outbreak in this field this season.

Flea beetle in brassica

We are still monitoring flea beetles in brassica crops. The two species of flea beetles most commonly found on crucifers in Massachusetts are the **crucifer flea beetle** and the **striped flea beetle**. The crucifer flea beetle is all black with no markings and the striped flea beetle is black with a crooked yellow stripe on each wing cover. Striped flea beetles showed up later in the spring than crucifer flea beetles and were much less common. We began the season monitoring the damage on several brassica cultivars that were seeded on six farms in eastern Mass and four in western Mass. The damage was most severe on plants that were seeded in fields that have had brassica, and therefore flea beetle, in the past few years. Damage was much less on plants that were put in rotated fields. There are some flea beetle present in these rotated fields, which could be due to wild brassica in the area. I recently visited a farm with a 15 acre field of pumpkins that had a heavy infestation of wild mustard as the dominant weed species. The wild mustard were loaded with flea beetle.

We have been checking yellow sticky traps in brassica fields for flea beetle the past few weeks. We have been catching high numbers of flea beetle adults in fields that have had heavy feeding damage. Trap numbers have declined sharply in the past two weeks, as overwintered adults are dying off.

We probably have one generation of flea beetles in the Northeast, although it looks like two because the overwintering adults are active from May into July and the new summer adults emerge in late summer. Overwintered adults feed and lay eggs in the soil at the base of plants. The larvae feed on the roots of brassica for 3 or 4 weeks, then form earthen cells in which they pupate. The new adult flea beetles begin emerging later in the season. These adults may feed on the fall brassica greens, although growers report much less damage in fall crops. Feeding may continue into mid-October. However, by mid-September, most adults usually enter a dormant, overwintering phase. If you are seeding some brassica for the fall, it may be worth putting these in a field that has not seen much brassica lately, if possible. Plan for rotation in next year's crop.

--F. Mangan, R. Hazzard.

POTATO

Colorado potato beetle is reaching the end of first generation. Watch for new summer adults which can be expected within the next 2 weeks. They emerge hungry and can be especially damaging to eggplant. We have observed excellent control of CPB larvae with Bt's where timing was good. Avoid using imidacloprid in the second generation if it was used for first-generation control because you will select for higher and higher levels of resistance.

Potato leafhopper numbers are high and hopperburn is being observed where leafhopper was not controlled early. More than one spray may be needed as fields seem to be recolonized after the first spray. Leafhoppers were observed in an Admire-treated field this week so these fields should be checked as well. Monitor (methamidophos) will control leafhopper and aphids without selecting for CPB resistance. Most materials registered for CPB will control leafhopper, with the exception of Bt products. Organic options are limited; growers report reasonable control with a rotenone/pyrethrin mix if coverage is thorough but check with certifiers on specific products. Kennebec seems to be more able to withstand leafhopper invasions than many other varieties. Watch for buildup of **green peach** and **potato aphid**, which typically occurs in mid-July.

CUCURBITS

Early summer squash, zucchini are being harvested, early cucumbers are nearly ready, and early winter squash and pumpkins that survived the soggy June are vining and in flower. Meanwhile, the late-planted crops are popping up or into 2-3 leaf stage. **Striped cucumber beetle** numbers are down, but **bacterial wilt** is showing up in summer squash, zucchini, cucumbers, and pumpkin. This disease is only spread by beetle feeding and can't be controlled in already-infected plants. Focus control efforts on suppressing any cucumber beetle found in later plantings of succession crops such as cukes and summer squash, since beetle feeding in the early stage is the most serious.

Powdery mildew was observed in summer squash in Berkshire County and pumpkins in southeastern Mass. It's time to check leaves for the small white fuzzy growth on upper or lower surfaces, especially in older leaves, that indicate powdery mildew. If powdery mildew is found, begin fungicide applications to prevent its spread. This sometimes coincides with the development of 2-4 inch fruit in winter squash and pumpkins, which is the recommended time to begin protectant fungicides for black rot control. See outline on last page for further recommendations.

Angular leaf spot is showing up in some fields. The symptoms of this bacterial disease are leaf spots (round at first, growing until they are limited by the leaf veins and become angular spots). Initially they look water-soaked or brown, then the tissue becomes translucent and dead, or may fall out as the leaf ages or grows. This disease attacks cucumbers, squash, and watermelon. Warm, humid conditions are favorable for this disease.

Generally, this disease has not significantly affected yields in New England. If you think you have a significant amount of angular leaf spot, or it appears to be spreading, then copper applications may be warranted. It is not certain that copper applications are effective in preventing spread of the disease. If you do apply copper, use a boom sprayer. Do NOT use an airblast sprayer, which spreads the bacteria throughout the field. When using copper products -- especially with young vine crops -- avoid higher than label rates and wait for cooler temperatures if possible, as high rates at high temperatures have some risk of phytotoxicity.

Squash bug is present in many fields, usually at low numbers (1-3 squash bugs or egg masses per 25 plants) but occasionally higher (1/plant). Adults are dark brown mottled with gray on the back and yellow underneath. They are hardened, longer than they are wide (about 3/4 inch long), flat on the back, and give off a disagreeable odor when crushed. Like all the true bugs, they have needle-like mouthparts. Adults overwinter in debris near the field. They have now entered cucurbit fields, are mating and laying eggs.

Eggs are in orderly groups on the underside of leaves, often in the angle of the veins, and are orange-yellow at first, turning bronze as they age. Nymphs will hatch in 7-14 days. They will be light gray, with black legs.

Generally squash bugs are not a damaging pest of cucurbits but high numbers could cause some problems. Heavy feeding on the underside of leaves can cause yellowing of leaves or wilting of vines, similar to bacterial wilt. Fruit damage can occur, especially in summer squash. If control is needed, target newly hatched nymphs which is the stage most susceptible to insecticides. Adults are difficult to kill. Pumpkins, hubbards and summer squashes are reported to be more severely attacked, while butternut is not affected.

DISEASE DIAGNOSTICS UPDATE

Samples have started streaming into the diagnostic lab. On cucurbits, we've seen **angular leaf spot** (caused by the bacterium *Pseudomonas lachrymans*), as well as **leaf spots** and **blights** caused by the **fungi Septoria, Alternaria and Didymella** (the **black rot** pathogen). While angular leaf spot and Septoria leaf spot are generally not considered serious in this region, the other fungal pathogens can affect fruit quality later in the season if left untreated. Alternaria leaf blight may cause enough defoliation to leave fruits vulnerable to sunscald. Didymella can infect fruit directly, resulting in black rot both in the field and post-harvest. Fortunately, both diseases can be effectively controlled with preventative applications of chlorothalonil (which also controls anthracnose - see below). Many cucurbit samples have come in with **bacterial wilt**, which is not surprising given the high levels of cucumber beetles seen in those fields. The key to control of bacterial wilt (caused by *Erwinia tracheiphila*) is control of the cucumber beetle, which vectors the bacterium. Other diseases we've encountered are **anthracnose** (caused by the fungus *Colletotrichum*), which infects fruit and cause moderate losses if not treated.

Cruciferous crops are exhibiting their share of weather-related diseases as well. While the warmer, drier weather is discouraging the spread of club root seen earlier in the season, both **Pythium root rot** and **Blackleg** (caused by the fungus Phoma) have been seen on samples from farms here in the Pioneer Valley. Although starting out as leaf spots, Blackleg can rapidly overtake entire plants and spread throughout a field. This disease, which is seed-borne, requires clean (hot water-treated) seed and a four-year rotation out of crucifers (also see crucifers, above).

As reported in previous newsletters, tomato and potato growers need to keep an eye out for **late blight**, caused by *Phytophthora infestans*, which has been seen in Albany County, NY. Send any diseased samples in to the Plant Disease Diagnostic Lab, Rm 109, Fernald Hall, UMass, Amherst, MA 01003 (Phone: 413 545-1045)

--J. Lerner, B. Lipke, R. Wick.

IPM for Winter Squash and Pumpkin: Outline of Key Management Practices

Site Selection

Rotation: at least two years out of cucurbits

Well-drained field; avoid planting in wet spots

Seedling stage: cotyledon to 4-leaf stage

Scouting - twice weekly

Check field edges near woods or fallow areas for influx of cucumber beetle

Check whole plants and soil cracks near plants (25 plants in groups of 5)

Count # of striped cucumber beetles/plant, estimate % of leaf area damaged

Thresholds for cucumber beetle:

*Where bacterial wilt is NOT a concern, treat when numbers reach an average of 2 beetles per plant or if feeding damage exceeds 20% of leaf area.

*Where bacterial wilt IS a concern, controls should be applied at a lower threshold: one beetle per two plants. Or, if beetles are concentrated on field edge, make edge treatments to prevent movement throughout the field. Systemic insecticide (imidacloprid) can be used as in-furrow or transplant treatment (see label for details) to prevent feeding damage and bacterial wilt.

Five leaf stage through maturity

At least a week before vines run, take pre-sidedress nitrate test (PSNT) to determine if more Nitrogen is needed. If results are <30 ppm nitrate-N, apply sidedressed N. If results are >30 ppm N, no additional N is needed and yields may be reduced if further N is applied.

Scouting - weekly

Check leaves including upper and lower surface, throughout canopy (50 leaves, in groups of 5 at 10 locations in the field). Observe blossoms and fruit development.

Aphids: count % of leaves with > 10 aphids per leaf. Note beneficials. Threshold for treatment: if > 20% of leaves have more than 10 aphids.

Squash bugs: note adults, eggs, nymphs. At early flowering stage, if there is more than one egg mass per plant, treat. Time sprays to target young nymphs.

Striped cucumber beetle: treat only if blossoms or leaves heavily damaged or feeding on fruit is occurring.

Black rot: when youngest fruit reaches 4" long, apply first fungicide to prevent black rot on fruit. Continue at 7-10 day intervals (combine with powdery mildew sprays after it arrives)

Powdery mildew: lesions may first appear on upper or lower leaf surface, usually in lower canopy. At first appearance (on 1 leaf out of 50 sampled), begin regular applications of fungicides at 7-10 day intervals until 1-2 weeks before harvest. Alternate classes of systemic fungicides, which have a high risk of resistance development (marked below with *), to prevent selection for resistance. Include contact protectant fungicide (eg chlorothalonil, Bravo). For example, use a rotation of:

- Chlorothalonil with benzimidazole fungicide* (Benlate or Topsin-M)
- Strobilurin fungicide* (Quadris, Flint)
- Chlorothalonil with DMI fungicide* (Nova)
- Chlorothalonil alone (good coverage of both sides of leaves is needed)

Harvest and storage

As soon as crop is mature, cut and move into protected place (protected from cold, moisture, soil pathogens, insects). Handle gently to avoid bruising.

Butternut: Avoid field chilling (<50 °F) which is cumulative and reduces storage life and quality.

Cure after cutting to harden wounds and dry outer cell layers. Ideal curing conditions: one to two weeks at at 70-80 °F. Can be done in windrows in the field (if weather is good) or in greenhouse or warmed storage.

Store at 50-55 °F, 50-70% relative humidity. Avoid chilling periods in storage (below 50 °F).

--R.. Hazzard

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.

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