



UMASS  
**EXTENSION**



# Vegetable Notes

For Vegetable Farmers in Massachusetts

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## CROP CONDITIONS

It continues to be an excellent growing year. MA vegetable crops have not been subject to the amount of rain and cold, wet weather as have some nearby states. However, growers are increasingly struggling with fungal diseases of all sorts. Growers of potato and tomato should be on the alert for late blight, which is wreaking havoc in central and western NY and Pennsylvania. Although we have not had reports in MA - yet- growers should be on a regular fungicide schedule in these crops. See article below. Temperatures were below average late last week and early this week, which favors late blight. Insect pest pressure is high in many crops including sweet corn, pepper, and brassicas. Vine crops are seeing a range of fungal diseases and regular spray schedules, with special attention to resistance management, is recommended. Downy mildew was found on one farm in CT last week but has not been reported yet in MA.

Organic farmers from across the Northeast are gathering the annual NOFA Summer Conference at Hampshire College in Amherst this weekend. Workshops are offered from Friday 1:30 pm through Sunday 2:30 pm One day, walk-in registrations are possible. For details see conference website at <http://www.nofa.org/conference/2004/workshops/index.php>.

## CORN EARWORM (TOMATO FRUITWORM) IN TOMATO CROPS

Growers are reporting some concern about possible fruit damage in tomato, especially in coastal areas of MA and RI, where corn earworm pressure is very high. Corn earworm (*Helicoverpa zea*) moths -- which claim the title of **tomato fruitworm** as soon as they enter a tomato field -- will lay eggs on leaves on the upper third of the tomato plant. Moths prefer corn as a host crop, over tomatoes, but if populations are high, corn fields have dry silk, and if tomatoes are handy, they may seek out tomatoes for laying eggs.

Eggs are round and creamy white and are laid singly on the underside of leaves. Eggs are usually laid on the upper third of the tomato plant, frequent on the leaf immediately below the uppermost flower cluster. Eggs hatch in 3-7 days

and larvae will feed for a short time on foliage before entering and feeding on fruit. Damage begins on green fruit; fruit less than one inch in diameter will usually abort if damaged by a larva. A single larva can injure several fruit in the course of its development. Larvae vary in color from light green to brown, with a yellow-gold head and light and dark stripes running lengthwise down the body. The body has small spines, unlike fall armyworm, which is smooth.



*Tomato fruitworm late instar on fruit*  
Photo: W. L. Sterling, Department of Entomology,

IPM methods for tomato fruitworm include pheromone trapping for moths, field scouting for eggs, and targeting sprays against small larvae before they enter the fruit. References from Midatlantic states note that 20 moths/week in pheromone traps would be cause to scout for eggs. In New England, we do not usually see damage to tomatoes until pheromone trap counts for CEW are far higher than 20



*Tomato fruitworm egg*  
photo: World Vegetable Center

moths per week; and even then, this pest does not necessarily move into tomatoes. However, if moth catches are high enough to warrant a 3-day spray schedule on corn, it would be advisable to scout for tomato fruitworm. Search for eggs on the first fully expanded leaf below the highest open flower cluster. Check one leaf on each

of 25-50 plants per field. If eggs or larvae are found, an insecticide application is recommended. Fruit can also be examined for damage or caterpillars, but the best control is achieved if insecticides are timed to coincide with egg hatch.

See the *2004-2005 New England Vegetable Management Guide* for details on products registered for fruitworm in tomato. Note that there are several alternatives to synthetic pyrethroids and carbamates, including Avaunt, SpinTor, and Intrepid. Pyrethroids are effective but could have the detrimental effect of reducing the beneficial insects that keep aphid populations in check. According to research conducted at the Virginia Tech Eastern Shore Agricultural Research & Extension Center, where tomato fruitworm is a regular late season pest, SpinTor, Avaunt, Proclaim, and Intrepid, provide effective control of fruitworm and can serve as alternatives to the pyrethroids, which also work well. The Bts also provided good control in their study. Note days to harvest (DH) intervals: which range from 0 dh to 7 dh. At this time of the year when tomatoes are picked daily or every other day, anything longer than 1 dh is problematic. Continue applications at 7-10 day intervals as long as trap captures and scouting indicate new fruitworm eggs are being laid.

Avaunt (indoxycarb) is an effective material in corn, peppers or tomatoes where fall armworm is a pest. It is also effective against ECB. It appears that few growers in New England have tried this material but it may be worth trying, especially for sweet corn growers who are battling fall armyworm in whorl stage corn, or pepper growers seeking control of ECB. This insecticide is labeled for use in corn before the silk stage. Because the toxin must be eaten, it is not highly effective against corn earworm in sweet corn; hence it is not registered for use during silking.

Intrepid is another relatively new material with a label that includes tomato and corn. The active ingredient in the product is methoxyfenozide, which is an insect growth regulator that mimics the insect molting hormone, ecdysone. The product has a very low mammalian toxicity and offers a much different chemistry for resistance management purposes. Trials have shown Intrepid to be a very effective product to control most all lepidopteran pests of vegetables. **Organic control** Organic growers who face fruitworm (or hornworm) problems in tomato can use Entrust or Bt's with good results.

--R Hazzard. *References: Thomas Kuhar, Eastern Shore Crop Pest Advisory, Virginia Tech Eastern Shore Agricultural Research & Extension; H. M. Linker et al., Scouting Staked Tomatoes in North Carolina, North Carolina State University.*

## **PEPPER UPDATE**

Where ECB is regularly a problem in peppers, such as the Connecticut River Valley and Southeastern Mass, growers should be on a regular spray schedule for control of European corn borer. ECB moth counts do not exceed the threshold of 7 moths per week in all areas of the state, and some growers in central and eastern Mass. do not typically

experience damage from this pest. It should be noted that where fall armyworm is very heavy, some damage from that pest could occur.

Spray intervals for effective control depend on which insecticide is used. Selection of what insecticide to use also depends on how often you are harvesting, since days to harvest intervals vary. Intrepid (1 dh) or Confirm (7 dh) can be used on a 7-14 day schedule. Orthene 97 (7 DH; maximum 2 lb ai/season) may also be used on a 7-14 day schedule. SpinTor/Entrust (1 dh) may be applied weekly and conserves aphid predators. Ambush (3 dh) may be used weekly but can result in aphid outbreaks due to loss of aphid predators. Bt products are effective when used twice weekly (3-4 day intervals); also include a sticker. Thus organic growers who need to spray have two options: Entrust or Bt. A note on Intrepid: because it is an insect growth regulator it stops larval feeding with hours but takes several days to cause complete mortality.

A report from T. Kuhar, Virginia Tech, notes that trials have shown that Orthene 97, SpinTor 2SC, Intrepid 2F, and Avaunt 30WDG are all excellent ECB materials for peppers. Avaunt is labeled for use in peppers against tomato fruitworm, beet armyworm and loopers, which typically do not cause problems in peppers in this state.

-R.Hazzard

## **TOMATO AND POTATO LATE BLIGHT** **UPDATE**

Late blight is being reported in many fields of western Pennsylvania, central and western New York, Maine, and the Maritime provinces of eastern Canada. Both tomatoes and potatoes are infected. Whole fields are being lost. While none has been reported yet in Massachusetts, it is quite possible that the disease is here. Even if it is not here yet, the possibility that spores will reach central New



*Late blight on tomato leaves and stem.*

*photo: David Graper and John Ball, Horticulture, Forestry, Landscape & Parks Department, South Dakota State University.*

England and infections will occur is high. This is an extremely destructive disease. Preventative sprays are critical. Growers of tomato and potato should be on a 5-7 day spray schedule with fungicides. Tighten spray schedules under favorable conditions such as cool, long leaf wetness

periods from combinations of dew, rain and poor drying conditions.

The recommendation to apply preventative sprays includes organic growers, who can use copper products (Champion ). This product is reported to be available locally from suppliers such as Helena and Crop Production Services.



*Tomato leaf with late blight sporulation*  
photo: South Dakota State University

It is also vital to find it early, have it confirmed, and alert other growers in the region. As one plant pathologist put it, late blight is a ‘social disease’. Spores spread readily and widely to neighboring farms. When a nearby farm has it, your own crop is more at risk.

Scout both stems and leaves of potatoes and tomatoes (both new growth and the lower leaves) as the disease could be in one area and not the others.

Scout carefully areas not reached well by sprays, fields with a stretched spray schedule and fields/areas that remain wet longest with dew or after rain. In the early morning while dew is still on the plants late blight lesions appear irregular and black with a fine white fuzz of sporulation. In the middle of a dry day lesions will appear brown with a distinct light green border. If you think you may have late blight call the Disease Diagnostic Clinic at 413-545-1045.

Because a late blight story has been in the newspapers, customers or reporters may be concerned and ask growers what to do. It is not uncommon for late blight to show up in home gardens, where protective sprays are not often used. There are fungicides available to home gardeners which homeowners could use. They could also contact the disease clinic, although it is primarily for commercial growers. They could also contact consultants at the Western Mass Master Gardeners Hotline in Stockbridge, MA (413-298-5355), or the Massachusetts Horticultural Society, Dover, MA (617-933-4929). It is also important to emphasize that, although this disease poses a risk to our tomato crop, at the moment growers are harvesting a great abundance of beautiful, healthy, delicious tomatoes – so, come and buy!

## **SWEET CORN UPDATE**

It’s a heavy-spray time in sweet corn.

Corn earworm Corn earworm counts are high ranging from 17 per week in the Berkshires to 79 per week in the Southeast. These levels require a four day spray schedule

throughout the region. Our report from one site in southern Vermont indicated 4 moths per week, requiring a five day schedule; however central Vt reports a catch of zero. (See below for recommendations for growers not using conventional sprays.)

What insecticide to select? Effectiveness is critical. The following assessments of efficacy are based on a review of experimental, published trials, extension recommendations, and grower reports. Many growers are using Warrior with good success vs corn earworm. Some Extension programs recommend that spray intervals can be extended for one day when this product is used. Capture, Baythroid, and Pounce were other pyrethroids that showed high efficacy vs CEW (note, Capture cannot be used in coastal counties). Larvin is another option that used to be widely used, is less widely used currently, but has shown excellent CEW control over the years. Lannate has in some cases shown poor control of CEW under high pressure situations and should not be relied on as the primary CEW control, though it does reduce aphids.

Are CEW resistant to pyrethroids? Reports this season from Virginia, where CEW caterpillars are collected and tested for resistance to synthetic pyrethroids, indicate that in that region little resistance is being found.

### **Fall armyworm**

Captures were lower in traps, but infestations at whorl stage were high. Growers in RI and southeastern MA including the Islands are finding high numbers of FAW – all sizes of caterpillars – in young corn. How do you know it’s fall armyworm? Look for the head capsule, which is dark with an inverted Y in white. Look for a smooth (not spiny) brown body with longitudinal strips. Look for feeding that starts inside the curled-up leaves of the whorl, and looks more ragged as the leaves open up. Look for light brown sawdust-like frass. After FAW are full grown, larvae leave the plant and pupate in the soil. It’s possible to find damage



*Fall armyworm*

with no worm.

Fall armyworm is best cleaned up at the mid to late whorl stage, or at pretassel stage at the latest. Scout mid whorl stage corn and spray if more than 15% of plants have armyworms. Growers near the coast are reporting multiple FAW per plant even at the seedling stage. Infestations reported in Central and Eastern Mass range from 8-38% infestation at pretassel stage. Growers who are battling a lot of fall armyworm might consider using synthetic pyrethroids (eg Warrior, Baythroid) or carbamate (eg Lannate); or an alternative. A review of trials showed that Avaunt was as effective or more effective vs FAW than the abovementioned materials. Intrepid, a growth regulator, is also effective vs. FAW. SpinTor/Entrust are moderately effective. Higher cost per acre may be justified if the level of control is high.

**European corn borer**

ECB second generation flight is going strong. Trap captures ranged from 2 (Berkshires) to 55 moths per week (Hatfield). Eggs were found late last week and this week in sweet corn at the whorl stage. Late blocks of corn that are now reaching pretassel stage should be scouted for newly hatched ECB larvae. Use the 15% threshold for ECB+FAW – combine the counts for the two species. In silking corn, egg masses are laid on leaves near the ear zone. Even if corn earworm were absent, silking corn should be sprayed at least weekly to protect from ECB larvae entering directly into the tip of the ear.

**Aphids**

Corn leaf aphid may build up in tassels, especially in late season when natural enemies are reduced by heavy spray schedules. Only at high levels, when colonies produce sticky ‘honeydew’ that covers the husks, or aphids move into the ears and get between the husks, are sprays specifically for aphids needed. Growers report that Lannate added to caterpillar sprays provides control. See NEVeg Mgt Guide for other recommendations.

**Organic Sweet Corn**

Growers need to be on the alert for all three caterpillar pests, at all corn stages. Whorl and pretassel stages should be scouted as described above. Even if you intend to use the Zealater at silking, remember that this will NOT control FAW and ECB that bore into the SIDE of the ear. These should be controlled with sprays of spinosad (Entrust) or a certified BT product (eg Dipel DF). A spray in early silk may also enhance the control of ECB, where ECB pressure is high. The number of ECB caterpillars that attack ears tends to go up from early August to mid September, so this remains important throughout that period. For oil treatments, apply oil+BT at 5-7 days after the field reaches 50% silk initiation. At this stage, silks are starting to wilt. If corn growth is very uneven, a second trip through the field may be needed to catch late-maturing ears at the proper stage. For the most part, one application is

sufficient.

A new fact sheet, *Organic Insect Management in Sweet Corn*, is available from the UMass Extension Bookstore (413-545-5717) or the Vegetable IPM Office (413-545-3696) free except for the cost of shipping and handling.

-R. Hazzard

**SWEET CORN TRAP COUNTS 8/9 - 8/11**

Town	Date	ECB Z1	ECB E2	Total ECB	CEW (Avg.)	FAW	%PT
<b>Berkshires/ Champlain Valley</b>							
Sheffield	8/10	0	2	2	17	0	0
Westminster, VT	8/10	3	6	9	4	1	0
<b>CT River Valley</b>							
S. Deerfield	8/11	10	8	18	0	1	0
Sunderland	8/11	9	12	21	66	0	0
Hatfield	8/9	29	26	55	16	0	0
Hadley (pepp.)	8/11	15	2	17	0	0	0
Feeding Hills	8/10	10	6	16	25	2	34
<b>C.&amp;E. MA</b>							
Dracut	8/						
Dighton	8/9	0	5	5	65	0	0
Still River	8/11	3	1	4	39	0	0
N. Andover	8/5	11	4	15	41	0	17
Concord	8/9	0	11	11	41	0	38
Ipswich	8/6	0	6	6	64	0	12
Leicester/ Spencer	8/11	0	0	0	25	0	15
Northbridge	8/11	1	11	12	24	0	36
Tyngsboro	8/9	6	12	18	18	1	8
Seekonk	8/10	3	14	17	79	0	0
Sharon	8/10	3	11	14	25	0	0

**CORN EARWORM THRESHOLDS**

Moths/Night	Moths/Week	Spray Interval
0 - 0.2	0 - 1.4	no spray
0.2 -0.5	1.4 - 3.5	6 days
0.5 - 1 days	3.5 – 7	5 days
1.0 - 13.0	7 – 91	4 days
Over 13	Over 91	3 days

*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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