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In this Issue:

Crop Conditions
Peppers
Tomato Hornworm Alert
Cucurbits
Crucifers
Disease Diagnostic Update
Twilight Meeting August 21
Grape Twilight Meeting
Sweet Corn
Trap Captures

Crop Conditions

It finally feels like summer, and the heat-loving crops are pickup up the pace of ripening and fruit production. Peppers, tomatoes, and eggplants are finally up to speed, and corn is ripening more quickly. Fruit set in vine crops has improved, and some fields have nearly full sized fruit. Unfortunately, many diseases are also doing well in the hot, moist weather. Phytophthora blight, early blight of tomato, black rot of cucurbits, Verticilium and Fusarium wilt, bacterial leaf spot of pepper, borwn spot of tobacco -- the list of diseases that have been blooming in the past week is long. Eastern Massachusetts soils are actually approaching dryness, and sandier fields occasionally need irrigation. This is not the case in central and western Mass, which has still been hit regularly with too much rain.

Peppers

European corn borer captures have been above the threshold of 7 moths/week in most areas for one to two weeks. Insecticides for ECB should be applied at regular intervals during the second-generation flight period, especially in the next 2-3 weeks during peak flight. The recommended interval depends on the material used. Orthene (7dh) can be applied at 10-14 day intervals; SpinTor (1 dh) or Pounce (3 dh), at weekly intervals, and Bt products (0 dh) twice weekly. Confirm has a 7 dh restriction. Pounce has been shown to cause aphid outbreaks. Note that the application limit for Spintor for the season is 29 oz of product (4-8 ounces per application).

Bacterial leaf spot is showing up in peppers, including cultivars which normally are resistant to all three strains. We do not know whether these infections are the result of the extremely favorable weather conditions or other factors.

TOMATO HORNWORM ALERT in Pepper and Tomato

"Alert" is not a word commonly applied to hornworms! These large caterpillars typically appear in small numbers and cause their impressive feeding damage to just a few leaves

or plants. However, this season hornworms are making an appearance in high numbers -- in both tomato and pepper. 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.

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 quninquemaculata*) is known as the five-spotted hawk moth while the adult **tobacco hornworm** (*Manduca sexta*) is called the **Carolina sphinx**. The wingspread of these impressive insects may reach five inches. They emerge from overwintered 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 hairy, robust abdomen of the tomato hornworm has five yellow spots on each side of the abdomen while tobacco hornworm moths have six. The tomato hornworm moth has two distinct, narrow, dark, zigzag, diagonal lines running across the center of the hindwings. These fine lines are obscured and fused into a single, dark, indistinct stripe in the tobacco hornworm.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" laying on it's 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. There is one generation per year in northern areas. Larvae consume large amounts of foliage on peppers, tomatoes, eggplant, potatoes, and related solanaceous weeds. Loss of foliage decreases production and increases the amount of sunburned fruit.

Controls: If only a few plants are involved, larvae can be removed by hand. One grower reported picking 4 gallons of caterpillars off a 350 foot row and decided it was time to spray! To conserve existing beneficials that may be keeping aphids in check, use insecticides which are specific for caterpillars, such as *Bacillus thuringiensis* (Bt) *kurstaki* or *aizawi* strain (Dipel DF, Mattch, Agree, or Xentari), tebufenozide (Confirm), or spinosad (SpinTor). If possible, target younger larvae. Use higher rates if populations may have reached older larval stages. In peppers, any controls used for European corn borer should control hornworms.

--*Reference: Utah Sate University Extension fact sheet # 74*

Cucurbits

Fruit set on pumpkin and winter squash is improving with hot, sunny weather, although

some growers are concerned about whether late fields will reach full maturity before frost. See below for reports on outbreaks of **Phytophthora** and **black rot**. The stem and immature fruit infections with black rot and gummy stem blight are unusual. Fungicide and bactericide applications at weekly intervals are recommended to hold down the array of fungal and bacterial fruit and leaf diseases present in many fields. Copper hydroxide (Kocide 2000, Champ, Nu Cop 50DL, 3L) can be mixed with one of the EBDC fungicides, which include maneb (Maneb 75DF, 80WP or Manex) and mancozeb products (Manzate 75DF, Penncozeb, Dithane DF or F-45). It is well documented that adding an ECBD fungicide increases the efficacy of copper in suppressing bacterial diseases, although the mechanism of this effect is not completely understood. When mixing copper with fungicide such as one of the EBDC's, Bravo Ultrex or Quadris, it is suggested that the copper be added first to the spray tank to achieve a good suspension in pure water, followed by the fungicide. Since Bravo is latex-based, no additional adjuvant is needed when it is used. With Quadris use only non-ionic surfactants. Adjuvants may be used with copper or EBDC product, but in general, it is wise to avoid excessively high rates of surfactants in order to prevent phytoxicity. Note for Tomato: no surfactants should be used with Quadris in tomato; use lower rates of 5-6 oz/acre.

Crucifers

Cabbage looper numbers are building. We've been seeing both full-grown and small larvae in scouting. Controls should target younger loopers where possible, since they cause most of their feeding damage in the late instars. (Instars are the stages of larval growth between molts). The cabbage looper caterpillar is light green, with wavy white or light yellow lines down the back and sides. Full-grown larvae reach 1 ½ to 2 inches. At rest or when disturbed, cabbage loopers of any size will raise the middle of their body in a characteristic "loop" shape. Eggs are round, light green or yellow, and laid underneath the foliage. Monitor caterpillar activity by field scouting, checking undersides of leaves -- both wrapper and frame leaves-- for feeding holes and caterpillars. Looper feeding tends to create ragged, large holes in foliage, but the small caterpillars.

Cabbage aphids are also being observed. These are gray-green aphids with a waxy coating that makes them appear whitish gray. Colonies tend to form in younger, upper leaves, in cabbage heads, between cauliflower curds, or in long-season cole crops such as Brussels sprouts. Numbers tend to build in the fall. Large colonies can stunt plants or cause curled leaves, and will contaminate harvested parts. Biocontrols (predators and parasites, and a fungal pathogen) often keep colonies under control; however, if numbers are building, insecticides may be needed. University of Connecticut recommends a threshold of 10% infested plants in cabbage, broccoli, cauliflower and Brussels sprouts after heads or sprouts begin to form. Insecticidal soaps are capable of reducing cabbage aphid. Soaps must contact the pest to be effective and have no residual activity once they have dried. Several applications may be needed. For chemical controls, a single application of a systemic insecticide may provide better control than multiple applications of a contact insecticide because the insects tend to be hard to reach. Consult the *2000-2001New England Vegetable Management Guide* for recommendations (for both organic and conventional growers) (To order a copy call Extension Bookstore, 413-

545-2717).

--*Reference:* IPM Guide for Connecticut Cole Crops*, T. .J. Boucher and R. Adams*

Disease Diagnostic Update

We are beginning to get the feeling here at the Plant Disease Diagnostic Lab that this may be a record-setting year, not only in terms of the number of samples submitted to the lab, but also in the range of diseases that are affecting crops throughout Massachusetts. We've seen just about every disease that affects cucurbit crops in Massachusetts. The **black rot** fungus, *Didymella*, manifests itself in different ways depending on when and what part of the cucurbit plant it is infecting. Earlier in the season, it causes irregular looking leaf spots, which coalesce to form a leaf blight. In mid-season, the fungus infects stems, where it causes a gummy light-brown exudate (the disease is called **gummy stem blight** at this point). Now, it is beginning to show up on fruit, and can show several different symptoms:

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- small encrusted tan spots
- large brown dry necrotic lesions
- soft rot with fuzzy white and black growth.

We've seen black rot on butternut and summer squash, pumpkin, and melon. Another fungus that infects fruit during wet weather is *Alternaria*, and like *Didymella*, this starts out as a leaf spot disease. For both of these diseases, the fungicide regimen mentioned in the previous issue of this newsletter (Bravo alternating with Quadris or Benlate) should be effective.

Wet soils have also set the stage for **crown and fruit rot** caused by ***Phytophthora capsici***, and several samples have been diagnosed with this disease**. Scout low-lying, wet sections of cucurbit fields for symptoms of Phytophthora.** The initial symptoms are a water-soaked spot on fruit, especially where fruit is in contact with the ground. Symptoms can also begin around the stem due to systemic infection from the vine. Infection can quickly overtake the fruit, resulting in soft rot and collapse. Fruit symptoms also can develop rapidly after harvest. The fungus produces a white yeast-like growth on the fruit that is mostly sporangia, a type of spore, especially under moist conditions. Sporangia cause new infections when they are dispersed to healthy fruit. Although *Phytophthora* can spread rapidly throughout a field, there is currently no effective fungicidal treatment for this disease. Ridomil was found to be ineffective against *P. capsici* in cucurbit crops, resulting in the removal of cucurbits from the label.

Tilling under infected sections is one of the only control measures that can reduce spread of Phytophthora within an infected field. This reduces the release and spread of

spores from infected sections into the rest of the field. If *P. capsici* is found early enough, infected plants can be rogued, placed in plastic bags on-site, and removed from the field. If a larger area is infected (and it is feasible to do so), the plants can be tilled under to prevent the aerial spread of spores. Disk the infected crop deeply, to bury fruit and infected plants. Start in an uninfected border area and move into the infected area. One must be careful, after tillage, to exit the field in such a way as to not drop infected soil in other parts of the field. Afterwards, thoroughly remove any soil from cultivation machinery with a strong spray of water. Covering the infected plants with a tarp may be another option in small patches of infection. If you have Phytophthora in a field, it is recommended that you rotate out of cucurbits, peppers and tomatoes for at least one year.

Several vascular wilt diseases have made an appearance as well. These generally involve a wilting and yellowing of foliage, and sometimes misshapen fruit, followed by decline and death of the plant. **Fusarium wilt of melon**, certainly an unusual disease in this region, but one that can affect a large portion of susceptible cultivars, was found in a sample from the eastern part of the state. Resistant varieties are the best defense against this disease, since there are no effective fungicidal treatments. Several eggplant samples recently submitted to the lab appear to have **Verticillium wilt**, but we won't have confirmation for a few days. If you see any diseased plants in your fields, call us here at the lab (414 545-1045 or 577-1827), and send samples to the Plant Disease Diagnostic Lab, Fernald Hall, UMass, Amherst, MA 01003.

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

Twilight Meeting Reminder: August 21 in Amherst

Brookfield Community Farm and farmer Dan Kaplan will host a twilight meeting Monday, August 21, at 5:00 - 8:00 p.m. Brookfield Farm is 120 acre mixed farm with 20 acres in vegetable/small fruit production, mixed livestock production, pasture, hay, and woodland. All of the produce of the farm is grown for the Community Supported Agriculture (C.S.A.) project, which sells 400 shares on a yearly basis and is one of the oldest CSA farms in the country. CSA shares are picked up weekly at the farm or delivered to four pickup sites in the Boston area. The farm is managed along organic lines and is economically self-sustaining.

The farm tour will include the whole CSA operation including distribution, packing, and production techniques for vegetables, and how livestock are being integrated into vegetable production. We will also review crop planning software that has been developed for managing this complex vegetable operation for CSA. Brookfield is part of an 8-farm research project with UMass on organic pest management in sweet corn and the tour will discuss this trial and demonstrate the use of the methods involved including the Zealator oil applicator.

Directions to Brookfield Community Farm:

From Points South and West: Take I-91 North to Exit 19, "Northampton/Amherst -

Route 9". Turn right to Rt. 9 East and go over Connecticut River. Take the 2nd right after crossing the bridge, just before GettyMart, sign says "To Route 47". Take a right at stop sign. Go 1.5 miles, over bridge, left on Bay Rd., sign says "Hampshire College" and "South Amherst". Follow 2.5 miles to stop sign at Rt. 116 (Atkins Farm Market on right) Take a left onto Rt. 116 and an immediate right to continue on Bay Road. Follow 2.5 miles. Take a left onto Hulst Road at sign for Brookfield Farm. Farm is 600 yards down Hulst Rd. on the left.

From Points North: Take I-91 south to exit for Northampton, Route 9. Take a left the light. Take a left at the next light. Follow directions above from "go over Connecticut River".

From Points East: Take I-90, Mass Turnpike West. Exit at Palmer. Follow signs to UMass - through Palmer. Go through Bondsville - Route 181. In Belchertown, go straight at light at town common. Take a left at next light - Route 9 West. Take a left onto Bay Rd - opposite Roadhouse Restaurant. (There's a sign for Atkins Farms.) Go 4 miles on Bay Rd. Take a right at Hulst Rd - (You'll see a sign for Brookfield Farm), 1/2 mile past Amherst town line. Farm is 600 yards down on left.

From Route 2 West: Take Exit for Route 202 South - sign says "Belchertown/Amherst" Take right on Amherst Road (15 miles). Left at stoplight onto South east St. (7 miles). Straight at next light. Go under two railroad bridges. Bear left at fork in S. Amherst common. 1.5 miles until road ends. Go left onto Bay Road. Take 1st left onto Hulst Rd. Farm is 600 yards down on left.

Grape Twilight Meeting

This meeting will take place at Sakonnet Vineyards, Little Compton, RI, on Tuesday August 15, 2-5 pm. For more information contact Sonia Schloemann, 413-545-4347.

SWEET CORN

Corn earworm numbers rose to higher levels throughout eastern and central Massachusetts and the Connecticut RiverValley. Berkshire regions and southern Vermont captures are the same or lower than last week's. A four-day schedule is called for in much of the state. Some sites have now exceeded the 90 moth/week threshold for tightening up to a three- day schedule. Note local variations such as the difference between captures at Leicester (5), Millis (55) and Hopkinton (95). This is a great reason to have your own trap! You might save some sprays or be alerted to a heavy flight! Moving the trap into freshly silking corn is also important in order to accurately gauge flight activity, since moths are attracted to blocks of fresh silk. It is recommended that corn earworm lures be changed every two weeks, although many IPM consultants have taken reliable data with a three-week lure interval.

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	3.5 - 7	5 days
1.0 - 13.0	7 - 91	4 days
over 13	Over 91	3 days

Note: spray intervals can be lengthened by one day if daily maximum temperatures were below 80 ^{o}F for the previous 2-3 days.

European corn borer flight rose at many locations. Note that ECB captures depend on habitat and trap placement: open weedy or grassy areas, with the trap base touching the plant canopy, are best. Infestations of pretassel corn are variable -- many fields are still low, but infestations are rising as new second-generation borers hatch. **Fall armyworm** is active at many locations. Scout whorl-stage corn for caterpillars and treat if 15% of plants have larvae. Search damaged plants inside whorls or pretassels for live larvae. FAW larvae drop to the soil to pupate after feeding is completed. Scouted whorl-stage corn was found to range from 8-10% infested this week.

New website: Check out pest flights in the Mid-Atlantic states on a new website which maps weekly trap captures! The address is http://www.ento.psu.edu/vegetable/sweetcorn/default.html. Perhaps in future years you will be able to check New England data at this Pennsylvania-based website.

SWEET CORN TRAP CAPTURES FOR WEEK ENDING AUGUST 10, 2000

Town	Date	ECB Z1	ECB E2	TOTAL ECB	CEW	FAW	% ECB PT*
Berkshire Region							
N. Bennington,VT	9-Aug	11	0	11	2		
Stephentown,MA	9-Aug	20	0	20	11		
Conn. River Valley North to South							

Walpole, NH	8-Aug	7	2	9	1	0	14%
Plainfield, NH	8-Aug	1	1	2	1	1	
Westminster,VT	9-Aug	2	74	76	0	3	6%
Putney,VT	9-Aug	1	12	13	2	1	>34%
Whately	7-Aug	11	126	137	2	0	
South Deerfield	10-Aug	3	11	14	33		
Sunderland**	5-Aug	4	7	11	**3	1	0%
Hadley**	5-Aug	11	35	46	**16	0	2%
Amherst	8-Aug	2	5	7	13	2	6%
Feeding Hills**	5-Aug	4	3	7	**6	1	14%
East/Central MA North to South							
Ipswich	7-Aug	2	0	2	41	1	0%
Dracut	8-Aug	2	74	76	24	0	
Concord**	4-Aug	2	17	19	**6	0	4%
Stow	8-Aug	10	31	41	34	4	2%
Northbridge	9-Aug	4	0	4	31	0	4%
Munson	9-Aug	1	0	1	16	0	3%
Still River	10-Aug			0	24		
Leicester	9-Aug	0	0	0	5	0	0%
Millis	9-Aug	0	11	11	55	3	8%
Hopkinton	9-Aug	6	30	36	95	3	10%

Seekonk	10-Aug	3	33	36	177		
Swansea	10-Aug	3	19	22	59	3	24%
Rehobeth	10-Aug	5	122	127	155	4	30%

****NOTE**: captures reported from August 4 and 5 do not reflect increases in CEW flight during August 6-10!! Growers should rely on more recent local capture data for current spray decisions.

*% infestation with European corn borer in unsprayed, pretassel corn. (Blanks indicate no data is available)

-- *Thanks to J. Mussoni, M. Yates, R. Pestle, D. Riggs, P. Willard, R. Cook, P. Westgate, & R. Parker for sweet corn data.*

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Disregard any information in this newsletter if it is in conflict with the label.