UMASS EXTENSION

VEGETABLE IPM MESSAGE

AUGUST 21, 2003 VOLUME 14, NUMBER 14

CROP CONDITIONS

Lower humidity, cooler nights and fewer rainstorms have been a welcome change this week. The continued hot sunny days are good for ripening and growth in fruiting and vine crops. Some crops such as cabbage are coming in full of water, which sometimes causes splitting – even after harvest. Pumpkins and winter squash are beginning to ripen in some fields, while late plantings are still setting and growing fruit. Everyone hopes for a warm, sunny September and a late frost. Late summer squash and zucchini plantings are ready to produce a fresh harvest. Potato vine kill and harvest is underway. Late plantings (seed and transplant) of fall greens are going in (and might even need irrigation), and fall crops are growing well. Growers are catching up on weeding and cultivating. Some growers are preparing for the loss of student workers who will leave after Labor Day.

Growers are finding some wormy corn despite intensive spray schedules, but corn earworm pressure is easing off a bit. European corn borer feeding damage in peppers and corn is likely to increase in the next week or two, as eggs from the second flight hatch. *Phytophthora capsicii* is showing up widely in vine crops, peppers, and tomato, as are other diseases. Sales are strong in retail markets. Several cases of Plectosporium in zucchini have been confirmed (in both eastern and western MA) since last week's alert. If you think you might have this disease in zucchini or pumpkin contact R. Wick.

---R Hazzard, contributions from J. Golonka, D. Rose, K Foppema, W. Czajkowski, NASS Crop Weather 8/18/03

PHYTOPHTHORA BLIGHT

Phytophthora capsici symptoms on butternut squash.
Photo by R. Wick

Not surprisingly, *Phytophthora capsici (*crown and fruit rot of tomato, cucurbit and pepper) is showing up in many fields. Sometimes, it appears in fields where host crops have not been grown for years, and it is difficult to explain how it got there. Fields can also become infected by irrigation water, when water is pumped out of a pond that received runoff from other infected fields. Once Phytophthora is present, that field will be infected for years to come. As more fields become infected, we are going to have to figure out how to 'live with' this disease. If you think you have Phytophthora, it should be confirmed by the Diagnostic Lab because the consequences for your rotation plans are serious. If you don't have Phytophthora you will have more options for crop rotation. Other soil borne pathogens can cause crown rot and fruit rot with similar symptoms. For example, Sclerotinia white mold causes a crown rot on peppers and tomato with white mycelia on the stem; the small black nuggets that form (sclerotia)

indicate that it is Sclerotinia -- but the *lack* of them does not necessarily mean that it is *not* Sclerotinia. It's an expensive mistake to guess wrong on these diseases! Use the Diagnostic Lab – that's what its there for. Pond water can be tested to determine if Phytophthora is present. Call 413-545-1045 to speak with Rob Wick.

--R. Wick and R. Hazzard, University of Massachusetts

PREVENTING DEER DAMAGE

As pumpkins and winter squash fruit ripen, its time (or **past** time) to get deer controls in place. Deer populations in Massachusetts are increasing every per year, in the most urbanized as well as the most rural parts of the state. Normal adult deer will eat anywhere between 6 and 10 pounds of food per day during the growing season, typically selecting weeds and broad-leaved plants, not grass. This places most planted crops at risk to damage from deer. Some of the crops most susceptible to damage are pumpkins, squash, beans, peas, lettuce, strawberries, and most other fruits and the plants that bear them, including grapevines.

Damage caused by deer is usually easy to identify. Deer tracks are the familiar cloven-hoof type. Because deer do not have upper incisors, they tear plants when they browse them, rather than making a clean cut like a woodchuck or rabbit. Deer will also gnaw pumpkins and squash, leaving tooth marks in the fruits that can eventually rot.

Fencing: Fencing, the construction of a barrier between the crop and the deer, is the most effective solution to deer damage. The basics of fencing apply to both electric and non-electric fencing. It is important to understand that deer can easily jump a fence 10 feet high, but much prefer not to. Deer prefer to go under or through a fence rather than to jump it if at all possible. Thus, the bottom wire of an electric fence should be no more than 10 or 20 inches off the ground and non-electric fences should either have an even lower bottom wire (about 6 inches) or be of mesh construction. No gaps should exist in the fence. Build gates for your own access to the field. If a tree falls on the fence or a hole is cut in the fence, repair it immediately. Get it in place BEFORE deer get used to feeding in the field. Once deer have gotten inside and discovered the crop, it will be harder to keep them out, even with an electric fence.

Electric fencing. Electric fencing is the most cost-effective short term remedy to deer damage. Portable units that can be put up and taken down in half a day can protect many small and moderate sized fields. Hot tape and ropes are becoming more widely used in place of bare wire, but any of these will work. Hot tapes are wide, colored tape with several wires embedded inside and enhance protection by being very visible to deer, even at night, while providing an electric shock on contact.

The effect that being shocked by an electric fence has on deer behavior and their subsequent avoidance of the fence allows a landowner to use a lower fence than in the non-electric case. Deer will try to go under or through the fence, thus keep the bottom wire about 15 to 20 inches above the ground. In a two-wire fence, the second wire can be at a height of 30 to 40 inches above the ground. A three-wire fence can have strands at 20, 40 and 60 inches. Keep in mind that adult deer are about 36 inches at the shoulder. Your goal is to entice the deer to touch the fence with their nose (see baiting, below). Fence posts do not need to be as stout as with the non-electric fence. Fiberglass posts driven into the ground at 30 to 40 foot intervals, close enough to keep the fence from sagging are adequate. It is the electric shock that provides the deterrent here, not the strength of the fence.

As few as one or two strands of electric wire or tape can be used to protect crops if it is put up before feeding starts, it is baited consistently, it is always "hot", and is maintained properly (e.g., do not let weeds or grass grow up into the fence). If deer pressure is severe in your area you will probably need three strands.

Voltage and grounding Be sure the fence is grounded properly and energized with adequate voltage. Suppliers can provide you with the details on how to set up a system

properly.

Bait the fence. Baiting is quite simple and is critical to the success of an electric fence. Deer are extremely well insulated over most of their body with fur. Couple that with their tendency to go under or through a fence, where they are most likely to contact the fence with their back or neck and it is easy to see how deer can penetrate an electric fence and not be shocked too badly. Baiting the fence will make the deer contact the fence with it's nose and tongue, wet parts that will conduct the electricity quite well. A metal tab such as aluminum foil smeared with peanut butter is cheap and works well. Commercial baits are also available. This first contact and the resulting shock on sensitive parts will educate a deer to respect the fence for quite some time. Obviously, the fence must be off to apply the tabs and bait, but turn it on immediately upon finishing. Space the tabs about 30 feet apart and keep the fence baited. The first several weeks of 'training' are the most crucial for baiting, but for best results keep it baited. Deer will occasionally test a fence that has shocked them and new deer may enter the area.

Keep it hot: Most important is to keep the fence hot at all times. At the end of the season, take the fence down rather than leave it in place without electricity.

Make it visible. Fences should have a clear perimeter, at least 5 or 6 feet on the outside of the fence, so deer have to cross an opening before encountering the fence. Deer should be able to see the fence before they reach it. Deer will blunder into a fence that is placed tight to a wooded edge and can actually damage or take down sections of a fence simply because they do not see it very well. Having a clear border will increase the effectiveness of the fence and aid in maintenance. For electric fencing, it is best to maintain some kind of vegetation growing near the outside of the fence so that animals will be standing on a moist surface (grass with roots in the soil) when they touch the fence. If the animal is standing on dry bare ground it will get less of a shock. Mow the grass or weeds outside the fence to keep the fence visible.

Lower wires for raccons: Replace the lower tape with wires at 5 and 10 inches for raccoons and woodchucks. Tapes will not work for low strands, but wire will carry the current even when it touches grass.

Other fencing types. Growers need to weigh their longterm needs. If you are in rented fields, moving your crops every year, inexpensive electric fencing is the best option. If you will be using the same field for many years, a more expensive initial investment may be the most cost-effective in the long run. There are many types of more permanent fencing, both electric and non-electric. Electric anti-deer netting, vertical high tensile fence, or three dimensional tape fence are electic fence options. Eight foot fixed knot woven wire fence is highly cost-effective in the long term as a permanent exclusion barrier.

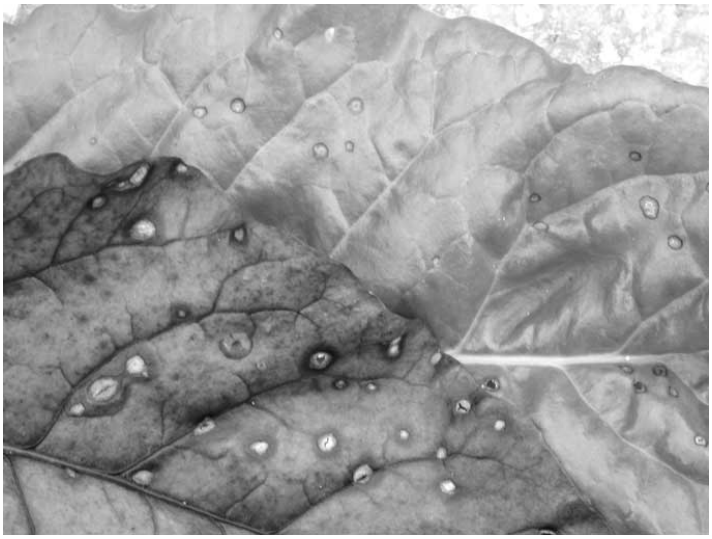
Suppliers: Electric fence supplies can be found at farm supply centers or through fencing specialty companies. Three fencing specialists in the Northeast are: Wellscroft Farm, 167 Sunset Hill-Chesham, Harrisville, NH 03450, (603) 827-3464; Kiwi Fence Systems, 1145 E. Roy Furman Hwy, Waynesburg, PA 15370, (724) 627-5640; Walnut Grove Farm, 50 Cartland Rd., Lee, NH 03824, (603) 659-2044.

Repellents: Repellents are advertised to reduce deer damage by making the target crop taste or smell unpalatable to deer. All repellents are billed to reduce, not eliminate, deer damage. To achieve this reduction, they must be consistently applied and reapplied as directed. If applied after deer damage has occurred, repellents are less likely to work. For a recurring deer problem, fencing is likely to be more reliable.

One grower in MA reports promising results in repelling deer on strawberries, vine crops and sweet corn (where they eat the silks) with foliar applications of fish emulsion fertilizer. He cautions that burning can result if the material is not agitated or is used at rates higher than recommended.

*-- R Hazzard, adapted from fact sheet **Preventing Deer Damage** by J. McDonald, Jr. and C. Hollingsworth, with additional information from D. Kennard, Wellscroft Fence Systems*

Cercospora leaf spot on beet, swiss chard, and spinach



Cercospora leaf spot symptoms on Swiss chard and beet greens.
Photo by R. Hazzard

Cercospora Leaf Spot fungus (*Cercospora beticola*) causes widespread disease on table, sugar, and fodder beet, Swiss chard, and spinach wherever these crops are cultivated in the US. Symptoms are circular 2-5mm lesions, tan to light brown in color with darker, sometimes purplish borders. Lesions coalesce on heavily infected leaves. Outer leaves eventually collapse leaving the less heavily infected inner leaves.

Extended periods of nighttime temperatures between 70-80 °F and relative humidity of 90-100% favor disease development. Occurrence of the disease is negligible when temperatures are below 61 °F.

Because the fungus survives on crop residue infected fields should be deep-plowed and planted on a 2-3 year rotation with non-host crops. New fields should be separated from recently planted fields by a minimum of 300 feet. Resistant cultivars of sugar beet only are currently available. The following fungicides are labeled for use on beets: Cabrio (carbamic acid), Quadris (azoxystrobin), Topsin M (benzimidazole). These fungicides can result in resistance development. Do not apply more than once. They can be rotated with each other.

--C. Bergweiler, Extension Vegetable Program and R. Wick, Plant Disease Diagnostic Lab

Belly rot of cucumber

Belly Rot, caused by the soil-inhabiting fungus *Rhizoctonia solani*, can be a serious disease of cucumber that primarily affects the area of the fruit in contact with the ground. This fungus has a wide host range and may infect other cucurbits as well, although cucumber is most susceptible. Symptoms include water-soaked yellowish-brown lesions that become irregular and sunken as they dry. Infection can occur between 46 ºF and 95 ºF - a temperature of 81ºF is considered optimum and periods of high relative humidity can further promote infection.

Management of this disease is impossible during the current growing season. Avoid fields where this disease has been a persistent problem. Plowing to a depth of 8 to 10 inches has been reported to be helpful. Artificial barriers between the fruits and soil such as plastic or other mulch is also effective.

--C. Bergweiler and R. Wick

Downy mildew of crucifers

Downy mildew is a common problem of more than 80 different Brassica host plants. It is caused by the fungus *Peronospora parasitica*. Among susceptible cruciferous crop plants are broccoli, Brussels sprouts, cabbage, cauliflower, Chinese cabbage, kale, radish, rutabaga, and turnip. Infection of host plants can occur at any growth stage – on cotyledons of seedlings, generally on lower leaves of mature plants, and on the florets of broccoli and cauliflower and heads of cabbage. Lesions appear as circular or angular yellow spots on the upper leaf surface, sometimes accompanied by delicate white mycelial growth on the leaf underside. Infection on cabbage can extend to the head leaves forming sunken black spots. Extensive bacterial soft rot may occur as a secondary infection.

Disease development is favored by cool, moist conditions. Optimal temperatures promoting disease are 75 °F or less during the daytime and 45-60 °F nighttime, and leaf wetness lasting until midmorning for 4 days in a row. Spring and fall

crops are more susceptible due to lower average temperatures, with the tendency for summer crops to outgrow the disease.

Two-year field rotation to non-crucifers is advisable. Avoid overhead irrigation to reduce leaf wetness periods. Cultivars of broccoli found to be resistant or tolerant are Arcadia, Cindy, Citation, Esquire, Eureka, Green Belt, Hi-Caliber, Marathon, Mariner, Pinnacle, Samurai, Sprinter, and Zeus. Effective fungicides include phosethyl al (Aliette), pyraclostrobin Cabrio, trifloxystrobin (Flint) azoxystrobin (Heritage), chlorothalonil (Bravo®720), or metalaxyl plus chlorothalonil (Ridomil/Bravo®81W).

-- R. Wick and C. Bergweiler

PEPPERS

We are hearing reports from many areas of the MA as well as southern Vermont that European corn borer pressure has been unusually heavy in sweet corn this year. We are seeing high trap captures for the second moth flight in some areas of the state, especially the Connecticut River Valley and Southeastern Mass (see Table 2 in the Corn section). This should serve as an alert for pepper growers. While many farms report that they do not have much of a problem with borer in peppers, it would be advisable to take precautions to protect pepper fruit unless captures have remained below 7-10 ECB moths per week at your farm. It has been three to four weeks since the second flight began, which means that there has been time for eggs to be laid and hatch. In pepper, the small flat white egg masses are laid on the undersides of leaves. When the tiny borers hatch, they do a small amount of feeding on leaves, but move quite quickly into the fruit. Larvae enter fruit by boring through the pepper under the calyx. A small amount of dried frass that looks like a bit of sawdust near the calyx is the only sign of entry. Opening the fruit will show feeding damage in the placenta area. Worms in corn are bad, but worms in peppers are even worse. The entry hole may also provide entry for soft rot pathogens, and this may be the most visible damage that you see. If fruit sinks in the wash tank, it is probably infested with borer.

Maintain a regular spray schedule on peppers while the flight remains high. The recommended interval depends on the material used. Acephate (Orthene , 7dh), methoxyfenozide (Intrepid 2F, 1 dh). or tebufenozid (Confirm 2F,7dh) can be applied at 10-14 day intervals; spinosad (SpinTor,1 dh) or pyrethroids (Pounce, Ambush, 3 dh; or Asana XL, Capture, Baythroid, Warrior, Mustang, 5-7 dh) at weekly intervals and Bt products (0 dh) should be sprayed twice weekly. Indoxycarb (Avaunt) is also labeled for use against ECB in pepper and will not cause secondary outbreaks of aphids.

If you find that one pick is infested and you have younger fruit in the field, it is probably worthwhile to start a spray program to protect the younger fruit as it matures. ECB enter fruit that is one inch in diameter or larger.

Table 1: TOM-CAST DSV's for Summer 2003

Month	Day	DSV/ Day	Accumulated DSV	Avg. Wet Temp F	Wet hrs/day
August	6	2	96	71	12
	7	3	99	71	17
	8	1	100	74	4
	9	3	103	74	14
	10	0	103	76	2
	11	3	106	71	18
	12	2	108	72	11
New Data Set					
August	13	2	110	72	11
	14	3	113	69	13
	15	2	115	69	12
	16	2	117	70	12
	17	2	119	68	13
	18	2	121	64	15
	19	2	123	64	11
	20	2	125	64	14

Conditions remain favorable for early blight. Based on DSV accumulations, we recommend that growers continue weekly fungicide applications.

SWEET CORN

Corn earworm captures declined this week throughout the region – but numbers are still high. Some parts of the Southeast are sill capturing over 90 moths per week, but in other regions captures dropped enough to shift to a four-day schedule. Maintain a regular spray schedule from first silk through 3-5 days before harvest. Rotate materials if possible. Despite high daytime temperatures this week, nighttime temperatures have dipped into the mid to low 60's and daily average temperatures have declined from mid-70's last week to about 70 degrees F this week. Low night temperatures mean slower rates of egg laying at night and slower hatch rate for egg masses. Drier conditions mean it is easier to maintain a regular schedule with good coverage. **European corn borer** counts remain high, especially in the Connecticut Valley. Watch for high infestations at the pretassel stage. With high flights we will also see plenty of ECB larvae entering ears through the tip during the silking period. They may move in as small larvae at any time during the silking period. These borers can take you by surprise if you are expecting that ECB will always show up in the tassel frits. However, the spray schedule for corn earworm should control these ECB as well.

Table 2: Trap Counts for European Corn Borer, Corn Earworm and Fall Army Worm in Sweet Corn

		Iowa	NY				
Town	**Date**	**ECB Z1**	**ECB E2**	**TOTAL ECB**	**CEW**	**FAW**	**% PT**
Brandon, VT	8/20/03				0		
Walpole, NH	8/21/03	15	51	66	6	2	38%
Plainfield, NH	8/19/03	35	5	40	12	1	18%
Westminster, VT	8/21/03	24	110	134	12	1	
South Deerfield	8/19/03	34	57	91			
Sunderland	8/21/03	49	95	144	**11**		
Hatfield	8/20/03	83	14	97	37		37%
Hadley	8/19/03	132	101	233			
Feeding Hills	8/19/03	3	4	7	12	2	2%
Tyngsboro	8/18/03	1	2	3	14	0	0%
Sheffield	8/20/03	27	6	33	6		
Lancaster	8/21/03	2	5	7	23	0	4%
Still River	8/21/03	12	15	27	**44**	0	
Concord	8/18/03	1	6	7	12	0	8%
Leicester/Spencer	8/20/03	1	3	4	5	2	0%
Northbridge	8/20/03	9	19	28	17	1	12%
Sharon	8/20/03	32	40	72	**123**	2	
Dighton	8/18/03	42	0	42	**73.5**	1	
Rehoboth	8/20/03	22	83	105	**86**	2	

Table 3: 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

--R Hazzard with contributiosn from A. Duphily, J. Golonka, B. Howden, J Mussoni, D. Rose, R. Pestle,P. Westgate, and P. Willard

Vegetable Notes, Ruth Hazzard, Editor. Nicholas Connor, Assistant Editor. Vegetable Notes 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.

We would like to thank the following businesses for their sponsorship of *Vegetable Notes*:

Crop Production Services, 25 Elm St., South Deerfield, MA 01373. Phone 413-665-8775. Contact: Mike Barlow. "Profit from our experience."

Empire Packaging Co., 311 North Plank Rd., Newburgh, NY 12550. Phone 800-562-5520. Contact: Dave Enos. "Retail & Wholesale Packaging for the Farm & Orchard."

Family Farm Life and Casualty Insurance Co., 88C Main St., Northboro, MA 01532. Phone 508-393-9327. Contact: Dick Simonian. "Call for the agent nearest you."

Harris Seeds, 355 Paul Rd., P.O. Box 24966, Rochester, NY 14624-0966 Phone 585-295-3600. Contact: Karen McGuire. "A grower-friendly company."

Superior Scale Company, 154 Grove St., Chicopee, MA 01020. Phone 800-719-9040. Contact: Jerry Gamache. "The farmer's friend."

Where trade names or commercial products are used, no company or product endorsement is implied or intended. Always read the label before using any pesticide. The label is the legal document for product use. Disregard any information in this newsletter if it is in conflict with the label.