



## VEGETABLE IPM MESSAGE

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### CROP CONDITIONS

Daily downpours, high humidity, long leaf wetness periods and saturated soils have made field work a challenge this week. Cumulative rainfall over the past 10 days has exceeded four inches in many places, six in others. Many fields are too wet for machine operations. Spray schedules needed to fight disease and insect pressure have been difficult to maintain. We are seeing *Phytophthora* in vine crops and pepper. Some succession plantings of zucchini, summer squash or lettuce have been abandoned early because of disease or mud or poor quality and summer squash is actually in short supply this week at the wholesale level. Nonetheless, harvest continues. Demand for local produce is high. Pepper quality and size is excellent and weekly yields are picking up. Tomato quality is also good. Late plantings of brassicas, lettuce, summer squash and zucchini, turnips, beans are growing well. Watermelon and muskmelon are ripening. Potato harvest has been delayed by wet ground. Sweet corn is under tremendous insect pressure from corn earworm and European corn borer and growers are struggling to keep it clean, but quality has generally remained excellent.

We'd like to offer thanks to the farms who hosted three excellent and informative twilight meetings this year: Caretaker Farm in Williamstown, Ward's Berry Farm in Sharon, and Four Town Farm in Seekonk. It takes a tremendous effort from the whole farm family and staff to prepare a farm for a twilight meeting and we appreciate the effort these families made during the busy farming season. All three meetings were very informative and drew farmers from all over the state. Food was terrific and clearly many farmers

appreciated the chance socialize as well as get new ideas. We would also like to thank CISA, our partner who co-sponsored the UMass Field Day at the South Deerfield Research Farm. CISA (Communities Involved in Sustaining Agriculture) coordinated a delicious local foods dinner. Look for the Field Day Program, a summary of the many projects currently taking place at the Research Farm, online at [umassvegetable.org](http://umassvegetable.org).

### PLECTOSPORIUM BLIGHT ON CUCURBITS IN MASSACHUSETTS

**Plectosporium blight** is a new, destructive disease of cucurbits, especially squash and pumpkin. This fungus disease is well known in Europe but was first reported in the United States (Tennessee) in 1988. Since then it has been reported in several mid-Atlantic, southern and mid-western states. In 1999 we had one case in Massachusetts and this summer we found an additional outbreak.



Plectosporium on Zucchini  
(Photo by R. Wick)

The fungus causes a silver to white russeting all over the fruit of zucchini and pumpkin. The entire surface can become scabby (see photo above) The vines and petioles develop many small elongate, lens-shaped lesions, also white. The disease can develop throughout a field in a few weeks. Plectosporium blight is controlled by Bravo and Flint. Make applications as directed by the label. It is very likely that the fungus will survive over the winter in plant debris so rotation for two years is recommended. Please notify Rob Wick and the **Plant Disease Diagnostic Clinic** 413.545.1045 if you need to confirm the presence of this disease.

--R. Wick, UMass Extension

## DISEASE IDENTIFICATION IS KEY

This time of year as diseases proliferate it can be very difficult to know what is causing the awful symptoms appearing in your crops. However, you can only manage diseases effectively if you know what you have. Is it caused by bacteria, a fungus or a virus? Which one? Will fungicides make any difference, or are they only a waste of money? We encourage growers to get on the phone to contact the Disease Diagnostic Clinic (413-545-1045), and overnight mail to send in samples from anywhere in the state. Another excellent resource is the Vegetable MD Online. This is a website produced by the Plant Pathology Department at Cornell. It has great pictures. You can go through a selected crop and learn about any disease that might affect that crop. The web location is <http://VegetableMDOnline.ppath.cornell.edu/Home.htm>

## HORNWORMS FOUND IN PEPPERS AND TOMATOES

Hornworms are making an appearance in relatively high numbers, and can be found 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 quinquemaculata*) 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 over wintered 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



Tobacco Hornworm in Pepper  
(Photo by R. Hazzard)

have six.

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. **Caterpillars** 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 its 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.

A **parasitic wasp** is an important natural enemy of the hornworms. The wasps lay their eggs inside the body of the caterpillars. After feeding within the caterpillar body, the larvae of the wasps eat out through the skin and spin the cocoons on the caterpillar surface. The adult wasps later cut out circular lids and escape from the cocoons to attack other hornworms.

**Controls:** While broad-spectrum pyrethroids will work, there are also numerous selective insecticides that will conserve beneficial insects. In tomato and pepper this is important because those predators and parasites are very likely keeping your aphid populations under control. Insecticides which are specific for caterpillars include *Bacillus thuringiensis* (Bt) kurstaki or aizawi strain (Dipel DF, Xentari, etc.), indoxycarb (Avaunt), tebufenozide (Confirm), or spinosad (SpinTor or Entrust). Although Bt usually works best on small caterpillars, in this case it will work very well even against large hornworms. In peppers, any controls used for European corn borer should control hornworms.

--R Hazzard.

Sources: Utah Sate Univ. Extension Fact Sheet # 74,  
Purdue Vegetable Crops Hotline # 409 (Frankie  
Lam)

## VINE CROPS

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Late zucchini and summer squash plantings are coming in. Many pumpkin and winter squash crops are late, but fruit is setting and developing size. Cloudy conditions over the past two weeks may have inhibited bee activity and hence pollination. Canopies are thick and soils are wet. It is a good

idea to walk and scout vine crop fields to look for powdery mildew, *Phytophthora*, or other diseases. Not surprisingly, **Phytophthora** is being reported. Once you discover *Phytophthora* in a field, growers face difficult decisions. It may be that the best course of action is to abandon it. Equipment that goes into that field will become contaminated with spores and then you risk spreading the problem to other fields. Pickers can spread the disease with their boots to other fields. **Powdery mildew (PM)** is present in many fields. Fungicide programs should be based on the presence of PM as well as risk of black rot or other fruit diseases, which is higher in non-rotated fields. It is very important to get good coverage on both sides of the leaf with your protective fungicide program. Lower pressure with a higher volume of water is recommended. The systemic fungicides like Flint, Quadris and Nova will slowly move throughout the plant. Benomyl / Benlate may still be used if you have that product on hand. Follow this with Nova + Bravo or some other protectant. To avoid resistance, it is recommended Quadris/Flint or Nova are used only twice each season. Don't rotate between Quadris and Flint. Nova is a different type of fungicide and it is what you should rotate with Quadris or Flint. Applications of these products should be two weeks apart with Bravo and/or copper applied in the between week. Sulfur is also effective against powdery mildew.

The second generation of **cucumber beetles** is active. They are very attracted to flowers, and most will be found in flowers rather than on foliage at this time of the year. **Squash bugs** may also be present. As the fruit gets mature, both cucumber beetle and squash bugs will feed on the ripe fruit and cause scarring on rinds and stems. In pumpkins, management of these insects depends on the numbers present (which is very difficult to estimate at this stage) and also how pumpkins will be marketed. If you are doing u-pick and leaving the ripe pumpkins in the field, insects have more time to cause damage. If you are harvesting the pumpkins and moving them out of the field, then the pumpkins will be less likely to suffer damage from these pests. However, they can

cause injury prior to harvest. Check fruits to note if damage is present.

--J. Mishanec, NYS IPM Vegetable Program

## TOMATO UPDATE

Tomato harvest has accelerated this past week, and in general quality is good. Maintaining a regular fungicide program has been a challenge given the rain. Drying periods have been few, leaf wetness periods long, temperatures high both night (in the low 70's) and day (mid 80's), rainfall heavy.

Fungicide applications should be continued on a weekly basis to help plants hold up against early blight, Septoria leaf spot, late blight and fruit diseases such as anthracnose. Alternate systemic and broad-spectrum fungicides. Many growers are also concerned about bacterial disease. Symptoms of bacterial and fungal diseases in tomato can be difficult to distinguish, and bacterial diseases can be more difficult to diagnose and control than early blight.

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

Month	Day	DSV/Day	Accumulated DSV	Avg. Wet Temp F	Wet hrs/day
	30	1	81	62	9
	31	3	84	64	24
August	1	1	85	62	8
	2	0	85	76	1
	3	3	88	75	19
	4	3	91	74	13
	5	3	94	72	16
New Data Set					
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

**Bacterial canker:** Typical symptoms on foliage are "scorching" of leaf margins -- brown, crisp edges of the leaves, with a thin, yellow chlorotic band inside the burned tissue. This "secondary infection" is what we see most often. Fruit may have "bird's eye" spots, small raised scars with a tiny brown center surrounded by a white halo. Symptoms of systemic infections include stunting, wilting (especially one half of a compound leaf), and development of open stem

cankers and fruit lesions. The bacterium can be seed-borne. It will be carried over in non-rotated fields for at least one year.

**Bacterial speck:** Symptoms of speck are tiny black spots on leaves, which soon develop a yellow halo. Small black specks can also be seen on fruit. Leaves with a lot of spots usually turn yellow and fall off. This disease is seed-borne and under the wet, humid conditions that we have experienced recently we would expect to see some damage to the foliage and some loss of fruit. Splashing water from heavy rains will spread the disease easily. When the leaves are wet, bacterial speck is easily spread by tractors or people as well. Bacterial spot is similar to a bacterial disease caused by *Xanthomonas* that causes larger, scabby lesions on the fruit. The foliar lesions are identical. Unlike bacterial canker, the speck and spot bacteria cause small circular to angular lesions on the leaves. Bacterial canker does not cause a leaf spot, just a marginal scorch and wilt. If any of these bacterial diseases is present, applications of copper on a weekly schedule are recommended to reduce the spread of the disease. Speck and spot can be controlled with copper fungicides on a weekly basis. Addition of maneb in the copper spray mix increases the availability of the copper; however, maneb has a 5 days to harvest interval thus is difficult to include in a spray program once harvest has begun. Copper is not rain fast. If possible, applications should be made with a boom sprayer, as an air blast sprayer can spread the bacteria to new locations in the field. If possible, harvest infected fields only when they are dry to avoid spreading the disease. Unfortunately, this has been virtually impossible under recent conditions.

**Late blight** has been reported in NY, NJ, and PA (see potato). Watch for symptoms. In recent years, when this disease occurred in MA, it was generally found in tomato.

# FARM SAFETY FOR CHILDREN - PART I : WHAT PARENTS AND GRANDPARENTS SHOULD KNOW

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Fact: Injuries are the leading cause of childhood death in the United States.

Fact: Farm machinery causes 85 percent of all machinery-related deaths to children.

Fact: The main sources of childhood farm-related injuries and deaths can be prevented.

Fact: Nearly all childhood farm-related injuries and deaths can be prevented.

The farm is a dangerous place for children because they live where work is performed. It is difficult for children to separate their play from farm hazards. Children on their own cannot recognize farm hazards. They must be taught how to recognize farm dangers and how to avoid them. The following are dangers that should be discussed with children:

1. Animal behavior
2. The harmful gases released by manure and silage
3. Electricity
4. Chemicals and pesticides
5. Riding and playing on equipment

Young children learn primarily by touch and sight. Many times these two senses put a child into a dangerous situation. For example, fascination with a quickly moving PTO can result in disaster. However, these senses can also be used to teach children about farm hazards. For example, bright safety emblems can be used as flash cards to teach children farm hazards. Models of farm equipment can also be used to demonstrate and prevent possible accidents.

Parents and grandparents should use precautionary safety measures to prevent accidents. They can set and enforce safe limits and be good role models for children by promoting farm safety.

The following are key steps to farm safety:

1. Children should not be extra riders on equipment.
2. Children should not play with idle machinery.
3. Equipment that might fall, such as front-end loaders, should be left in the down position.
4. When parked, self-propelled machinery should be locked and keys removed from the ignition.
5. A tractor PTO should be in neutral when not in use.
6. Know where children are whenever starting machinery, and especially when backing up equipment.

7. Machinery should be kept in good repair, particularly protective shields, ROPS, and seat belts.
8. Children should not operate machinery until they complete safety training.
9. All ATV riders should wear helmets.
10. Farm ponds and manure pits should be fenced.
11. Fixed ladders should be out of reach, or fit with a special barrier.
12. Portable ladders should be kept away from danger areas such as wagons and silos.
13. Dangerous machinery components should be kept out of reach of small children.
14. Electrical boxes should be kept locked.
15. Warning decals recognizable to children should be on all grain bins, wagons, silos, barns, and trucks.
16. Chemicals and pesticides should be stored in a locked area.
17. All equipment used on roads should have working lights, reflectors and a slow-moving vehicle emblem.
18. Set regular times for family safety instructions (for example, monthly family safety days).

Farm-related injuries occur while children are both at play and at work. The majority of children over the age of seven are participating in farm labor when injured. Children perform a lot of duties on farms and are a valuable resource, but children working on farms have a high rate of injury. Proper safety training can minimize the risk of injury to your child.

*--Craig Hollingsworth; adapted from Ohio State University Extension Fact Sheet AEX-991  
[http://ohioline.osu.edu/aex-fact/0991\\_1.html](http://ohioline.osu.edu/aex-fact/0991_1.html)*

## POTATO

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Potato harvest in Massachusetts is later than usual. By August 10 only about 5% was reported to be harvested, compared to the five-year average of 15%. It is advisable to wait for drier conditions for harvest, to avoid problems with bacterial soft rot. Keep looking for late blight. There are confirmed reports of **late blight** in central New York, northwestern Pennsylvania and New Jersey. Given that all our storms are coming up from the south, late blight spores could move into the New England region along with the rain. Certainly conditions have been favorable for late blight. Check in low spots, along tree lines and anywhere the field stays wet for long periods of time. Spots will be about the size of a half dollar and black with a white ring of spores on the edge of the spot. If you think you have found late blight, call the UMass Disease

Diagnostic Lab at 413-545-1045.

**Potato leafhopper** damage is evident in fields where this pest was not controlled. Hopperburn and vine decline will reduce yields. The results from a recent experiment conducted by Brian Schultz and Nancy Hanson at the Hampshire College Farm have some promising news for organic growers who have struggled with a lack of effective controls for this pest. Pyganic 4EC (at the highest labeled rate) was highly effective, reducing leafhopper numbers by 94% compared to the control. No intermediate rates were tested. More details will be available after harvest data have been taken.

*--R. Hazzard, adapted from B. Schultz (Hampshire College), J. Mishanec (CCE), NASS Crop Weather*

## BRASSICAS

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Fall greens, turnips, cabbage, and broccoli are growing well. Succession plantings of fall greens are being planted. **Flea beetles** are very active and feeding heavily. Sprays may need to be applied more than once because of heavy rains and new emergence of summer adult beetles. Row covers need to be very well sealed around the edges to provide control, because beetles find their way through small hollows and spaces between soil and cover. Given a good seal, row covers produce excellent control of flea beetles (and other pests) and good quality greens. **Caterpillar pests** are active – keep scouting. Watch for downy mildew and Alternaria leaf spot.

## ORGANIC FARMING WEBSITE LAUNCHED

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The **Organic Farming Research Foundation** has announced an exciting new resource on organic agriculture:

**<http://www.organicaginfo.org>**. OrganicAgInfo.org is an on-line database of research reports, farmer-to-farmer information, outreach publications, and more. The database can be searched by keywords, region, crop or livestock type. All information on this website can be accessed free of charge. Best of all, if you have information on organic agriculture that you think would be useful to others, you can upload it to the site yourself. To add your (or your organization's) work to the web site, please click where it says "We encourage submissions to the site" on the home page.

You will need to create a user name and password during your initial visit. Any information submitted on-line will be reviewed by their reviewers before being posted. This unique feature will allow the information in the database to grow through participation of the community it serves.

Those using the site also can rate and comment on information already posted on the site.

OrganicAgInfo.org, which is being hosted by North Carolina State University, was funded by a grant to the Scientific Congress on Organic Agricultural Research (SCOAR) and the Organic Agricultural Consortium (OAC) from the Initiative for Future Agriculture and Food Systems (IFAFS) through the USDA CSREES. If you have any questions or concerns, please contact Kathy Bielek of the Organic Agriculture Consortium at [oac@osu.edu](mailto:oac@osu.edu), or Brise Tencer of the Organic Farming Research Foundation at [Brise@ofrf.org](mailto:Brise@ofrf.org), (831) 426-6606.

We urge you to help expand the public knowledge base for organic farming systems by submitting your materials to OrganicAgInfo.org. We look forward to receiving your valuable contributions...

*--The OrganicAgInfo Working Group, Organic Farm Research Foundation, June 2003*

# SWEET CORN: CORN EARWORM GETS WORSE

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

Town	Date	Iowa	NY	TOTAL ECB	CEW	FAW	% PT
		ECB Z1	ECB E2				
Brandon, VT	8/13/03				3		
North Bennington, VT	8/12/03	10		10	14		
Walpole, NH	8/14/03	4	65	69	27	2	
Plainfield, NH	8/14/03	25	3	28	31	0	
Westminster, VT	8/13/03	40	2	42	2	3	
South Deerfield	8/14/03	22	34	56			
Whately, MA (Peppers)	8/12/03	20	32	52			
Sunderland	8/13/03	56	183	239	68	14	
Hatfield	8/14/03	43	220	263	104		35%
Hadley	8/13/03	178	330	508			
Feeding Hills	8/12/03	4	11	15	35	2	32%
Ipswich	8/7/03	3	17		105	0	19%
Tyngsboro	8/4/03	2	7	9	33	0	14%
Sheffield, MA	8/14/03	5	7	12	40		
Lancaster	8/14/03	2	14	16	41	1	11%
Still River	8/14/03	5	17	22	249	2	
Concord	8/11/03	3	6	9	44	1	18%
Leicester/Spencer	8/6/03	2	4	6	26	2	2%
Northbridge	8/6/03	5	17	22	45	4	30%
Sharon	8/13/03	12	80	92	272	14	
Dighton	8/13/03	0	0	0	272	6	
Rehoboth	8/14/03	51	35	86	436	37	

Corn earworm captures climbed still higher this week throughout the region. In the Southeast (all sites), Northeast (Ipswich) and some locations in central (Still River) and Western Mass (Hatfield), captures were over **90 moths per week** – calling for a **three day schedule** in silking corn. In **most other locations in the state and southern Vermont, a four day schedule** is needed. This is when it's helpful to have your own trap to know what the pressure is at your own farm, since moth captures do vary within regions. Try to time your applications so there will be a 5-6 hour drying period afterward. This has not been easy in the past week, since downpours have arrived at unpredictable

intervals. If rain comes shortly after a spray, come back at a shorter interval. Focus on coverage, choice of materials, regular sprays.

**European corn borer** counts also rose this week. In the Connecticut Valley we are finding extremely high borer moth counts, exceeding 200 per week. This can be expected to produce heavy pressure in both corn and peppers. Counts in other areas are moderate to high. Infestations in the remaining pretassel corn indicate that the combination of ECB and FAW larvae are above threshold in most blocks. A note on methomyl (Lannate): Lannate needs acidic water. If the water is alkaline, the half-life of the insecticide is about 20 minutes. Use a buffering compound if you use Lannate.

**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

For organic farmers: If you are using the Zea-later for oil/Bt direct silk applications, the rainfall is not a problem. Applications can be made under wet conditions (including during the rain) and the oil/Bt will not be washed off by rainfall after application, since they remain within the silk channel. Sprays of spinosad or Bt during pretassel and at first silking are likely to improve ear quality under the very high CEW and ECB pressure that is present at this time.

--R Hazzard

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."

*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.*

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