



VEGETABLE IPM MESSAGE

Vegetable Notes

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CROP CONDITIONS

Farmers are still recovering from some crop losses that took place during the long wet period – especially greens and lettuce—but field conditions are much drier now after a week with little or no rain. Fall has been ‘in the air’ this week. Cool nights reduce the activity of insects and some diseases such as bacterial leaf spot of pepper. They also slow crop growth rates and the pace at crops such as summer squash and zucchini produce fruit. Watch for **spider mites** which are showing up in some eggplant fields. **Corn earworm** may have drifted into tomatoes from corn after the heavy flights of two-three weeks ago, so scout your fruit for direct feeding damage. Tomato fruitworms (same insect with a new name, when they cross the border into a tomato field) dig into the fruit, unlike hornworms which feed primarily on foliage.

PUMPKIN AND WINTER SQUASH HARVEST AND STORAGE

Although there are many late fields with immature fruit, **pumpkins in some fields are turning orange.** If the current warm sunny days continue, more and more fruit will color up in the next several weeks. Pumpkins may need to be held for several weeks before they can be marketed. There can be extra work involved in bringing fruit in early, especially for growers who normally have pick-your-own harvest, but we recommend that growers harvest as soon as crops are mature and store under proper conditions, if it is feasible.

Attention to curing and handling will go a long way toward improving the life of winter squash and pumpkin fruit. In fields where pumpkins are turning orange, it is worthwhile to cut and windrow the pumpkins and bring them in out of the field. This will allow the handles to cure and will protect fruit from insects, vertebrate pests, and diseases. Pumpkins are not marketable if the handle is broken off or dried up. If you need to leave pumpkins in the field for pick-your-own, cut the handles from the vine to save them from advancing powdery mildew and reduce shrinkage. On some varieties, however, handles shrink after cutting. Ideally, if the timing is right, pumpkins would be cut one to two weeks prior to marketing.

Ideally, pumpkins should be harvested when fully mature, with a deep orange color and hardened rind. However, as long as pumpkins have started to turn color, they will ripen off the vine if held under the proper conditions. While not ideal, this may be preferable to leaving them in the field if conditions are not favorable. If necessary, pumpkins can be ripened in a well-ventilated barn or greenhouse. The best temperatures for ripening are in the seventies or even low eighties during the day. Night temperatures should not drop below the sixties. In a greenhouse, temperature can be managed with ventilation on sunny days. Unless it is quite cool, heat is not likely to be needed if the house is closed up at night.

Often it is not feasible to harvest pumpkins early and store them until they can be marketed, and so they must be ‘stored’ in the field. If vines and fruit are healthy, storage in the field

can be successful for a few weeks. If the vines die back, damage to the fruit from sun, disease and insects is more likely. In any case, it is important to scout for insects feeding on the fruit and handles, which may include **squash bug nymphs or adults**, or **striped cucumber beetle**. Control them with insecticides if damage is evident – look at fruit throughout the field to assess feeding damage on handles and fruits. Squash bug nymphs are gray with black legs and usually group together on the undersides of leaves. Adults are a dull brown and are more likely to feed singly. Cucumber beetles at this time of year are most likely found in flowers, but may also group together on fruit. Both cause unsightly scarring and pitting which can also allow entry of diseases. There is no set threshold, but judge the level of damage and the proportion of fruit with damage. In fields that have a history of **Phytophthora blight**, **Fusarium fruit rot**, or **black rot**, field storage may increase the incidence of these problems, particularly if we have a period of wet weather or a major storm while fruit is sitting in the field. This has been one of the causes of significant losses in recent years, and one reason that we recommend bringing fruit in as soon as it is mature.

Winter squash is also maturing in some fields. Fruit that are free from disease and haven't been subject to much chilling (below 50°F) should be selected for long-term storage. Sorting fruit in this manner requires extra labor and may not be economical, but it should not be too difficult to separate bins of squash according to good and poor fields or areas of fields. Fruit from fields where Phytophthora is present are not the best choice for storage.

Storage life depends on the condition of the crop when it comes in and your ability to provide careful handling and a proper storage environment. All fruit placed in storage should be free of disease, decay, insects, and unhealed wounds. When harvesting squash and pumpkins, it is important to handle the fruit with care to avoid bruising or cutting the skin. Despite its tough appearance, squash and pumpkin fruit are easily damaged. The rind is the fruit's only

source of protection. Once that rind is bruised or punctured, decay organisms will invade and quickly break it down. Place fruit gently in containers and move bins on pallets. Removal of the stem from squash (butternut, Hubbard, etc.) will also decrease the amount of fruit spoilage because the stems frequently puncture adjacent fruit, facilitating infection.

A period of curing after harvest can help extend storage life. This may be done in windrows in the field -- especially with a series of warm, dry days -- or by placing squash in a warm dry atmosphere (70-80°F) with good air circulation, such as a greenhouse, for up to two weeks. This pre-storage treatment permits rapid drying of the outer cell layers, and when combined with a dry atmosphere for storage inhibits infections that can take place at this time. Any clean cuts during harvest are likely to heal over and are no longer a source for injury or infection.

Take care to avoid subjecting squash to chilling injury. Chilling hours accumulate when squash is exposed to temperatures below 50°F in the field or in storage. Injury increases as temperature decreases and/or length of chilling time increases. Chilling injury is of particular concern with squash intended for storage because it increases the likelihood of breakdown. If squash has been exposed to chilling injury it should be marketed first and not selected for long-term storage. Remove squash from the field if temperatures likely to drop below fifty degrees for any length of time.

After curing, move squash or pumpkins to a dry, well-ventilated storage area. Pressure bruises can also reduce storage life, so avoid rough handling, tight packing, or piling fruit too high. Fruit temperature should be kept as close to the temperature of the air as possible to avoid condensation, which can lead to rot. Ideally, the storage environment should be kept at 55-60°F with a relative humidity of 50-70%. Lower relative humidity increases water loss, resulting in reduced weight, and if excessive, shriveling of fruit. High relative humidity provides a favorable environment for fungal and bacterial decay organisms. Under ideal conditions, disease-

free pumpkins should have a storage life of 8-12 weeks and butternut squash up to three or four months. Even if it is difficult to provide the ideal conditions, storage in a shady, dry location, with fruit off the ground or the floor, is preferable to leaving fruit out in the field.

As you plan for storage and marketing, keep in mind that the market for pumpkins seems to get earlier every year. Fall decorative displays include pumpkins, and those displays begin showing up as Labor Day approaches. One of the best solutions to early-maturing pumpkins may be finding an early market. With so many late-planted field this year, early pumpkins are likely to be in demand.

--J. Howell, R. Hazzard, A. Carter, University of Massachusetts. Additional resource: Liz Maynard (Purdue)

TRY SOMETHING NEW WITH FARMER/GROWER GRANTS FROM NORTHEAST-SARE

Have an idea you've been wanting to try but haven't had the time or resources? Wish you could compare some new way of doing things with your old way, or experiment with something new? A SARE farmer/grower grant may be just what you need. Many farmers have found these grants helpful, and we encourage farmers who are interested in conducting innovative production and marketing projects are encouraged to apply to the **Sustainable Agriculture Research and Education (SARE)** program for grant funds for projects starting next spring. For some reason, Massachusetts farmers have participated in this program to a more limited extent than farmers in some of the other Northeastern states.

Applications can address a broad range of agricultural issues such as pest management, soil and water conservation, aquaculture, marketing, grazing, bee health, no-till, pasture management, agroforestry, new crops, and other sustainable farming techniques. Northeast SARE defines sustainable agriculture as agriculture that is profitable, environmentally sound, and good for the community. In 2003, the average

grant was about \$5,200; grants are capped at \$10,000.

Any full- or part-time farmer in the Northeast SARE region can apply. The region is made up of Connecticut, Delaware, Massachusetts, Maryland, Maine, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, West Virginia, and Washington, D.C. Applications and more information about the requirements of the Farmer/Grower Grant program are available at 802-656-0471 or on the Northeast SARE web site at www.uvm.edu/~nesare/. Feel free to contact Helen Husher, NE SARE, University of Vermont. 802/656-0554, or 802/223/7923; email helen.husher@uvm.edu to find out more information. The proposal deadline is December 8, 2003.

Wondering what growers have done in the past and whether they found it useful? A pamphlet that reports on the innovations that were possible for eleven farmers in Massachusetts who received farmer/grower grants is available free from Steven Herbert, 413-545-2250, sherbert@pssci.umass.edu. Steve can assist you in finding advice on successful grant-writing strategies.

UPCOMING TWILIGHT MEETING: RANDALL'S FARM

Wednesday, September 10, 2003, 6:00-8:00pm

The flower, vegetable and ice cream stand is a new building that is 10,000 square feet and open year-round. Karen Randall is on the Flower Growers' Board. It is family owned with a diversified, friendly atmosphere selling locally grown quality products. Tina Smith from the UMass Floriculture Team will be speaking about Pest Management in Retail Greenhouses for an hour including discussion. 1 contact hour has been requested for pesticide re-certification for private category 26. Contact

Tina Smith (413) 545-5306 or Karen Randall (413) 589-7071 if there are any questions.

Directions: Travel Route 90 (Mass. Pike) to Exit 7 (Ludlow Exit). Turn right off ramp onto Route 21 North. Travel approximately 2 miles, Randall's Farm and Garden Center are on the left.

PEPPERS

Where **European corn borer** pressure is high, infestations are increasing in unprotected fruit. Feeding damage can be seen first from the sawdust-like frass near the calyx (cap) at the stem end. When the fruit is opened, you will find tunneling and frass and the corn borer caterpillar. In areas where **pepper maggot** pressure is high, such as Southeastern Mass, the white legless maggots feed internally in the wall or placenta and will emerge from exit holes in the blossom end to pupate. Either of these insects may be noticed first by the appearance of soggy and smelly fruit with **soft rot**. Feeding entry holes allow soft rot bacteria to enter the fruit. By the time the fruit has gone soft, it may be difficult to find the insect damage that was the original cause. Feeding damage may also be noticed because injured fruit are more likely to ripen early. The most recent **ECB flight is dropping**, but is still high enough in some areas to expect more new eggs. Growers in high ECB-pressure areas should continue sprays for another week or two. When captures have fallen below 20 per week, sprays are generally no longer needed. We have used this “end of the season” threshold for many years with good success.

Bacterial spot is shut down by cold night temperatures, below 50°F. If cool nights continue, copper applications for this disease are no longer needed.

POTATO AND TOMATO: LATE BLIGHT OUTBREAKS IN NEW YORK STATE

New occurrences of late blight have been reported this week at several farms in western New York State (Steuben and Wyoming County) in commercial potato fields. Late blight had been found earlier in potato and tomato in Pennsylvania and in other locations in western NYS. While this is still quite a distance from anywhere in New England, growers should be on the alert for this disease. Given that late blight has occurred in western New York and Pennsylvania, which have

experienced similar weather patterns as New England this season, it is possible that we will see it in Massachusetts. Since we are likely to see continued cooler temperatures and dews, which are ideal for further sporulation and spread, and there is the possibility of showers this weekend, growers need to maintain regular spray schedules with protectant fungicides. Weekly intervals are suggested. This will also be adequate to control early blight. In tomato, recommended materials include Cabrio (0dh 12 REI), Quadris 0 dh 4REI, or Bravo (0 dh,12 REI). Cabrio is a new product (not listed in the 2002-2003 New England Vegetable Management Guide) that is labeled for late blight. It is a new type of strobilurin, with similar chemistry to Quadris so it should not be rotated with Quadris or other Strobilurins. Like Quadris it is also effective for early blight and septoria. Organic growers can use copper, which does have activity against late blight.

Scout low areas of the field for symptoms of blight. These include dark green water-soaked lesions on leaves or stems, which become dark brown and brittle within a few days. Also look for fluffy white fungal growth on the underside of leaves, which is visible on dewy mornings. If you suspect late blight, it is wise to get the diagnosis confirmed (Diagnostic Lab, 413-545-1045). If it occurs, consider plowing in the field to avoid spreading spores to the surrounding region. Airborne spores of late blight can move many miles and increase the risk to other growers in your region. In recent years, this disease has been found in the late season in unsprayed tomatoes.

In potato, continue a protectant fungicide program until vine kill. Late blight only grows on living plant tissue. If your potato plants are already fully down, they are less likely to become infected unless the vines are already infected. The choice of fungicides is broader in potato and includes some materials which may be helpful in holding down existing infections. Switch to one of the following if late blight occurs: Acrobat, Curzate, or Previcur Flex. For organic growers, if late blight occurs, an alternative to spraying copper would be to mow and flame the tops to kill them fully.

--R Hazzard & R. Wick, with information from T. Zitter, Cornell University and B. Caldwell, NOFA-NY

BRASSICAS

Flea beetle feeding in brassicas is dropping off after intense pressure in early and mid August. **Diamondback moths** and **imported cabbageworms** are still active. Also, successive generations of **cabbage root maggot fly** generally result in a period of fly activity in late August. Cooler soils allow for better survival of eggs and maggots than during the heat of midsummer. Growers of fall turnips, radishes, and daikon, as well as sensitive crops like Chinese cabbage, should scout these crops for root maggot eggs. Root crops may survive maggot feeding damage and grow well, but a small amount of feeding damage on the roots renders them unmarketable. A single soil drench directed at the root zone should be adequate if eggs are found. Pay attention to “days to harvest” intervals. Watch for buildup of cabbage aphids at this time of year. Thrips may also move from onions after harvest if fields are close by.

--R Hazzard, with contribution from E. Droesher.



Cabbage root maggot feeding injury to daikon
Photo by R Hazzard

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

Month	Day	DSV/Day	Accumulated DSV	Avg. Wet Temp F	Wet hrs/day
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
New Data Set					
August	21	3	128	73	13
	22	3	131	68	17
	23	0	131	51	11
	24	1	132	56	8
	25	2	134	64	14
	26	1	135	67	6

SWEET CORN

Corn earworm (CEW) captures declined further this week and spray schedules can relax further. Given cooler nights and lower captures, a 5-6 day schedule should be adequate in most locations. **European corn borer (ECB)** captures are still in the 15-50 moths/week range at many locations, with some sites even higher (over 100 moths per week). This means that new caterpillar hatch can be expected a while longer. In silking corn, small larvae will be entering through the tip throughout the silking period. However, the spray schedule for corn earworm should control these ECB as well. **Fall armyworm** captures increased in some areas. Watch for these in any late blocks that are in pretassel, or in silking corn that might not have been sprayed prior to silk.

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	8/27/03				0		
North Bennington, VT	8/28/03	129	14	143	1		
Walpole, NH	8/28/03	10	36	46	3	1	
Plainfield, NH	8/26/03	36	2	38	1	0	
Westminster, VT	8/27/03	10	60	70	0	1	
South Deerfield	8/28/03	17	23	40			
Whately, MA (Peppers)	8/26/03	14	18	32			
Sunderland	8/28/03	8	6	14	5	6	
Hatfield	8/28/03	61	3	64	3		
Hadley	8/28/03	41	83	124	0		
Feeding Hills	8/26/03	2	2	4	16	0	0%
Salisbury	8/28/03				12	10	
Tyngsboro	8/25/03	18	31	49	1	0	0%
Lancaster	8/28/03	1	3	4	7	0	2%
Still River	8/28/03	7	4	11	7	12	
Concord	8/25/03	1	11	12	0	1	14%
Leicester/Spencer	8/27/03	1	4	5	0	1	4%
Northbridge	8/27/03	9	12	21	4	3	4%
Sharon	8/27/03	23	14	37	16.5		
Rehoboth	8/26/03	55	31	86	12	2	

*Note: Counts in **bold** represent an average count from two traps.*

--R Hazzard with contributions from A. Duphily, J. Golonka, J. Mussoni, D. Riggs, R. Pestle, P. Westgate, and P. Willard

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

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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