



UMASS
EXTENSION



Vegetable Notes

For Vegetable Farmers in Massachusetts

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CROP CONDITIONS

Cool, dry and cloudy conditions have prevailed for the past week. Not more than a half inch of rain was recorded in the past week for most areas, and many received none. Dry conditions are welcome in some respects, since the lack of soil or leaf moisture holds off outbreaks of *Phytophthora* and some foliar diseases and helps with harvest of potatoes and fall root and fruit crops. However, most fields are in need of irrigation to keep quality and production up. Along with dry conditions, cool nights in the 40's and 50's have slowed fruit development in eggplant, pepper, tomato and summer squash. Cucurbit downy mildew has been confirmed in western Mass, in the CT River Valley. That pretty much covers the state, though none has been confirmed in the Northeastern section of the state yet. Growers report retail sales are excellent, and wholesale prices have been below cost of production in some cases.

CUCURBIT UPDATE

Cucurbit downy mildew has been confirmed in the Connecticut Valley. While cucumbers appear to be most susceptible, the disease has not been limited to cucumbers in MA. Tank mix a fungicide that will control downy mildew (Previur Flex, Gavel, Curzate, Tanos or Pristine) with a protectant fungicide such as maneb or chlorothalonil. This disease will not affect the fruit, but will devastate the foliage very rapidly.

Phytophthora capsici is showing up here and there, but fortunately has not reached outbreak proportions on a wide scale. Fungicide programs should be aiming to put away the systemic fungicides that have already been used, (to avoid building up resistance) while still providing protection against *Plectosporium* blight, powdery mildew, downy mildew, and black rot.

The fall harvest is underway. Pumpkins and winter squashes are reaching maturity relatively early under dry and (until this week) relatively sunny conditions. The next several weeks constitute a balancing act between ensuring that the crop is in the field long enough and is mature enough to be able to complete its ripening and curing versus getting the crop out of the field as soon as possible so that it won't be hit by heavy rains, fruit rots and other menaces that surely will come. See article this week on pumpkin and winter squash harvest and storage.

Watch for buildup of spider mites and aphids on later plantings of zucchini and summer squash.

PUMPKIN AND WINTER SQUASH HARVEST AND STORAGE

Although there are many fields with immature fruit, pumpkins in some fields are orange. Sugar pumpkins, especially, are ready early. Butternut in some fields is showing the dull, waxy look and tawny skin that characterizes mature fruit.

Winter squash and pumpkin fruits sitting in the field face a daunting list of diseases and insects – not to mention possible passing hurricanes -- that could threaten fruit quality. Early harvest and careful storage is often preferable to leaving fruit in the field. This is especially true if you know that your pumpkins or squash are in fields that are infected with *Phytophthora* blight.

Since the pumpkin market lasts from Labor Day to Halloween, pumpkins may need to be held for several weeks before they can be marketed. When is it best to bring them in, and when to leave them in the field? If the vines are in good condition, the foliage can protect the fruit from sunscald. If foliage is going down from powdery mildew or downy mildew, this may help with ripening and make harvesting easier, but also increases the risk of sunscald or injury to pumpkin handles. 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. If you need to hold fruit in the field for pick your own or any other reason, using a protectant fungicide (eg chlorothalonil) can help protect from black rot, powdery mildew and some of the other fruit rots.

What about pumpkin stems? In some cases, it's the handle that sells the pumpkin. Pumpkins may not be marketable if the handle is broken off or dried up. Ideally, if the timing is right, pumpkins would be cut one to two weeks prior to marketing. However, if they are harvested now they may sit much longer before being sold. The discussion of how early to cut handles is an old one with many different opinions. One view is that it is advisable to cut the handles from the vine to save them



Pumpkin handles are subject to injury from striped cucumber beetle feeding as well as disease

the vine to save them

from advancing powdery mildew and reduce shrinkage. Whether or not handles shrink and shrivel after cutting is affected by plant stress, genetics (variety), moisture and temperature conditions, and disease. There are many diseases that can affect handles, including *Plectosporium*, *Fusarium*, Black Rot, and *Alternaria*. Again, proper curing and storage conditions are key.

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 and curing in a well-ventilated barn or greenhouse. The best temperatures for ripening are 80-85 degrees Fahrenheit with a relative humidity of 80-85%. Night temperatures should not drop below the sixties. Even if pumpkins are ripe, a period of curing can improve storage life. The curing period should be about 10 days. During this process, the fruit skin hardens, wounds heal and immature fruit ripens – all of which prolongs the storage life.

Pumpkins should be stored in a cool, dry place. Ideal temperatures are between 50° and 60° F and relative humidity of 50 - 70%. Higher humidity allows condensation on the fruit with risk of disease, and lower humidity can cause dehydration. Higher temperatures increase respiration and can cause weight loss. Temperatures lower than 50° F cause chilling injury (see squash, below). 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 if damage is evident. 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.



Windrowed butternut curing in the field. Butternut stores best with stems removed; curing heals wounds before storage.

Growers often plan to store winter squash for much longer than eight weeks. Fruit that are free from disease and haven't been subject to chilling (below 50°F) should be selected for long-term storage. 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.



Pumpkin ready for harvest

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. Use gloves to protect both the fruit and the workers. 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 of squash. 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 or pumpkin 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.

--R. Hazzard; many thanks to the following sources: J. Howell, A. Carter, and Robert Wick. *University of Massachusetts*; Dale Riggs & Robert Rouse, *Pumpkin Production Guide, NRAES*; Maurice Ogutu, *University of Illinois Extension, in Vegetable Growers News, August 2004*; and Liz Maynard, *Purdue University*; Andy Wyendandt, *Rutgers Univ.*

GET READY FOR FALL COVER CROPS

As your fields finish up with crops, be prepared to turn under crop residues and sow a cover crop as soon as you can. This will help improve soil quality by adding organic matter, reducing erosion, and even avoiding compaction from the force of raindrops, which can be significant. Cover crops will also help suppress weeds. Options include crops that will winter-kill and be and to work in next spring such as annual ryegrass or oats. If you want to grow some of your own nitrogen sow 20 pounds per acre of hairy vetch around the end of August, mixed with a bushel of rye or oats. Let this grow until mid- to late-May next spring to get the most N out of it.

For ideas on a variety of cover cropping options, including permanent beds, intercroops, no-till and spaders, order the video called *Farmers and their Innovative Cover Cropping Techniques* at: www.uvm.edu/vtvegandberry/Videos/videos.html or call: (802) 656-5459 for more info on how to obtain the video.

Order cover crop seed right away if you haven't already.

Here is some information about some of the more common cover crop choices for Massachusetts:

NON-LEGUMES

Winter rye is easily the most common cover crop used by growers in Massachusetts, and for good reason. It is inexpensive, easy to get and establish, and can be seeded fairly late into the fall and still take. It consistently overwinters here and will continue to grow in the spring producing lots of organic matter. Some growers find it difficult to incorporate in the spring if it is left to grow into May. Seeding rate: 90 – 120 lbs./acre.

Oats can be seeded in the fall and will come up quickly, similar to winter rye. Unlike winter rye, oats will winterkill here in Massachusetts and will not regrow in the spring. For this reason, some growers prefer it over winter rye since it is easier to manage in the spring. It might have to be lightly incorporated into the soil in order to germinate. Enough growth is required in the fall to give adequate cover through the winter and early spring. Try to seed by September 1. Growers along the coast can plant later. Make sure the oats have not been cooked (used as an animal feed). Seeding rate: 100 lbs./acre.

Ryegrass is used by some growers because of its thick root system that is thought to mop up more nitrogen than winter rye

or oat. There are two types: annual and perennial. Despite their names, the annual ryegrass may overwinter and the perennial ryegrass may winterkill depending on when you seed them. If you have not seeded them before and would like to evaluate them, I would recommend that you seed a little of each in order to see their growth habits. I have only used these cover crops in the early spring. The seed is small and light, so specialized equipment will be needed if seeding a large area. Seeding rate: 30 – 40 lbs./acre.

LEGUMES

Clovers are used by some growers as a nitrogen source. There are several types available. Clovers can be seeded as an early spring cover crop, or in late summer. A clover will have approximately 2.5% nitrogen whereas hairy vetch (see below) averages around 3.5% (this compares to winter rye that is usually below 1%). Sweet clover and red clover (especially mammoth red clover) produce heavy growth in spring after overwintering. Red clover, sweet clover and white clover are all sufficiently hardy to withstand most winters in the Northeast. Clovers are a very small-seeded cover crop that need specialized equipment to establish. They can be seeded by hand in a small area, but if you want to do several acres, you will need specialized equipment. Seeding rate: 10 – 20 lbs./acre.

Hairy Vetch is an excellent cover crop for Massachusetts. It can be seeded up to mid September and will survive the winter. Growers near the coast or on the cape and islands can seed vetch up till October or even later. When left to grow long enough in the spring, hairy vetch has supplied over 100 lbs./acre of nitrogen.

It is very important that the appropriate rhizobia species is used for hairy vetch (the rhizobia for hairy vetch will work for all vetches and peas). Without the rhizobia the vetch will not give the desired effects.



Some cover crops will establish late into fall, but it is important to seed them as soon as possible

We have been recommending you mix the vetch with either winter rye or oat. There are several reasons for this:

1. Both oat and winter rye are very efficient in taking up nitrogen from the soil (remember, the vetch is getting most of its nitrogen from the atmosphere, so it does not need much from the soil). By taking up more nitrogen in the late summer and fall we are reducing the risk of contaminating surface or ground water and the nitrogen is recycled so that it can be used by next years cash crop.
2. The oat and rye can produce tremendous amounts of valuable organic matter if allowed to grow long enough.
3. Both of these cover crops will give better erosion control

than vetch alone since they emerge and establish themselves more quickly than vetch. This is especially important when vetch is seeded after Sept. 1.

We have been recommending 40 lbs./acre of oat or rye with 30-40 lbs./acre of hairy vetch. If you are using a grain drill then you can use seeding rates as low as 30 lbs./acre of vetch. If you are spinning the cover crop on and lightly disking it in then a rate of 35 - 40 lbs./acre is suggested.

Many growers prefer the use of oat rather than rye because of the tremendous growth of rye that occurs in the spring. This can be desirable if you are looking for increased organic matter in your soils, however some growers find the amount of biomass created by these two cover crops too much to handle. In addition, we have found that we get much more growth of the vetch in the spring when seeded with oat than when seeded with rye. The rye will compete with the vetch in the spring.

Cover crops for no till



Fields lacking ground cover are subject to irreplaceable topsoil erosion

If you plan to use a no-till system, select your fields and plant your cover crops accordingly. Rye should be seeded at higher rates for a no-till system, such as 3 bushels (168 pounds) per acre. This gives a thicker, more weed-suppressive cover and should be allowed to grow to at least 30 inches to produce enough biomass for weed control.

-Hairy vetch is another option for no till which has worked well in more southern areas but also shows promise in New England. The dense mat of vines gives a thick cover of organic matter which can last throughout the season. Vetch also provides nitrogen to the crop. It may be best for use with transplants. We have observed good success this season in on-farm trials with pumpkin transplanted into a vetch cover. It is difficult to plant direct-seeded crops through hairy vetch without specialized no-till equipment that can cut through the viney matt. In spring, hairy vetch can be killed using glyphosate or by mowing at the flowering stage.

-Adapted from articles by Vern Grubinger, University of Vermont and Frank Mangan, University of Massachusetts, and the Pumpkin Production Guide, Dale Riggs, editor, published by Natural Resource, Agriculture, and Engineering Service(NRAES) www.nraes.org (607)-255-8770

CORN REPORT

There are fewer and fewer fields in pre-silk stage. Those that are should still be checked for fall armyworm and ECB. More and more fields are tilled under and ready for cover crops. The sooner that rye or oats is planted, the more nitrogen you will re-

cover from the soil and hold over for next year. Given the rising price of fertilizer, each extra week of cover crop growth will give you a worthwhile payback. Research conducted by Stephen Herbert of UMass has shown that planting rye or oat after September 15 dramatically reduces the ability of the roots to reach the available N in the soil and to produce enough canopy to protect soil from erosion. Cover crops planted in August develop larger, deeper roots and more canopy – providing better Nitrogen uptake, less leaching, and more protection of soil from erosion.

European corn borer flights dropped much lower this week, into single digits at most locations. Corn earworm numbers are lower, but still above threshold for sprays in many areas. Counts are below 13 per night (90 per week) at all locations this week, allowing sprays to stretch out to 4 days. Days in the 70's and nights in the forties and low fifties have allowed spray schedules to be safely stretched out an additional day. However, another heat wave may be on the way, and new storms could bring a new flush of moths. Make sure to move your trap into fresh silk so that your counts reflect the most active moth location.

Pepper growers can stop ECB sprays a week after counts drop below 20 moths per week. We did find some new egg masses in fields in the CT Valley this week, but can expect new larval hatch to be over within a week as the second flight ends.

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

Sweet Corn Trap counts for August 23, 2007

Location	ZI	EII	Total ECB	CEW	FAW
South Deerfield	0	0	0	-	-
Deerfield	1	3	4	1	3
Whatley	7	5	12	1	5
Hadley (2)	1	0	1	12	0
Hadley (1)	0	0	0	0	0
Easthampton	-	-	1	4	-
Sunderland	7	10	17	0	1
Rehoboth	2	2	4	62	-
Concord	1	0	1	0	0
Leicester/Spencer	0	1	1	1	0
Northbridge	2	3	5	6	1
Tyngsboro	21	0	21	1	0
Dracut	1	0	1	1	0
Lancaster	1	1	2	3	0
Still River	1	1	2	18	-

Pepper Trap Counts for August 23, 2007

Location	ZI	EII	Total ECB
Hadley	0	1	1
Amherst	1	0	1
Hatfield	0	24	24

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