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Index:

Crop conditions
Crucifers
Cover Crops
Pumpkin and Winter Squash maturity
Cucurbits
Disease diagnostics update
Sweet Corn
Trap Captures

Crop Conditions

Ten days of sun with less than a half inch of rainfall! It's a record for the season, and very, very welcome. It's too late to overcome many of the season's ills, but it is not too late to make a significant difference in the harvest. Fruiting crops are producing better now, despite the fact that plant stature in peppers and eggplant and disease pressure in tomatoes limits the yield potential. Summer squash is in short supply, after many fields have succumbed to disease. Fall vine crops are still making fruit and some fields are beginning to ripen. Corn harvest is strong and there will be plenty of corn in September.

Phytophthora is present in many pepper, tomato and cucurbit fields. This disease has been of increasing concern over the past few years and it has infected crops in fields which previously haven't been affected. In summer squash and peppers, the plants go down rapidly when the disease is present during wet conditions. In butternut squash, the fruit become infected and begin to break down while the vines show little sign of the disease. Similarly in tomatoes, the fruit will show symptoms called "buck-eye rot" without obvious infection on the vines.

Phytophthora can be brought into a field on soil carried by equipment from infested fields. A few minutes spent hosing soil off equipment before entering a new field can pay big dividends. Also, run-off or irrigation water from contaminated sources can introduce the disease to a field. Once in a field, the disease organism can survive in the soil for several and perhaps many years. Long rotations (at least three years) to crops other than tomatoes, peppers, eggplant and cucurbits should be used if possible.

--*John Howell, R Hazzard*

Crucifers

Continue to scout for caterpillars. Pressure from **imported cabbageworm** is steady, along with the other two species. Check fields for **cabbage maggot fly eggs** or larvae, especially in late root crops. **Flea beetles** are still going strong on farms where crucifers have been grown all season long. Late seedings on these farms may need row covers or

sprays.

COVER CROPS

It's time to think about cover crops for the fall. Here is some information about some of the more common cover crop choices for Massachusetts. This is by no means a complete list. There are other cover crops out there that might fit a niche in your rotations. The best way to see if a cover crop will work for you is to try some yourself. There's nothing like seeing the cover crop growing in your own fields. Seed it next to cover crops that you normally seed so that you can make comparisons. Give me a call or send me an email if you would like some input on these or other cover crops.

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 Sept. 1. Growers along the coast can plant later. Make sure the oats have not been cooked (to be 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. If you have not used clovers before, seed different ones next to each other to compare. Like ryegrass, I have only used clovers as an early spring cover crop. 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%). 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.

Mixtures

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 year's 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 September 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.

--Frank Mangan, , 978 422-6374, fmangan@umext.umass.edu

PUMPKIN AND WINTER SQUASH MATURITY

Many growers are concerned about ripening of pumpkins and winter squash. Pumpkins in

many fields are not showing any color change as yet, or have just started to turn color. If the current warm sunny weather continues, there is a good chance that fruit will color up in the next few weeks, although many growers would like to have pumpkins to sell earlier. If the weather turns cool and/or wet again, fruit can be brought inside a building to ripen. If they are starting to turn color, they will ripen off the vine. There can be extra work involved in bringing fruit in early, especially for growers who normally have pick-your-own harvest, but it may be worth the effort.

Pumpkins can be ripened in a well ventilated barn or greenhouse. The best temperatures 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.

Winter squash is maturing late and there is a small crop in many fields. As with pumpkins, squash can be brought inside for ripening if needed. In some fields, butternut squash is developing and should be mature in several days, but there are also small fruit that may make it if we have a period of good weather. Two harvests may be ideal, though this is not practical for most growers.

Harvest and storage issues are now a major concern. This is likely to be a difficult year for storing squash. Questionable fruit should be marketed as soon as possible without flooding the market. Fruit that are free from disease and haven't been subject to much chilling (below 50 ^{o}F) should be selected for storage. Sorting fruit in this manner requires extra labor and may not be economical, but it should not be too much difficult to separate bins of squash according to good and poor fields or areas of fields. Fruit from fields where phythophthora is present are not the best choice for storage. A test harvest and holding can give some indication of the potential for at least short term storage.

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 field for pick-your-own, cut the handles from the vine to save them from advancing powdery mildew and reduce shrinkage.

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. 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 on pallets or in pallet boxes.

A period of curing can contribute to 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 ^{o}F) 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. 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. Furthermore, any clean cuts during the curing period often 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 ^{o}F in the field and 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.

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 is kept as near to the temperature of the air as possible to avoid condensation which can lead to rot. Ideally, the storage environment should be kept at 50-55 F with a relative humidity of 50-70%. Under such conditions, sound disease-free fruit should have a storage life of 8-12 weeks. Even if it is difficult to provide ideal conditions, storage in a shady, dry location is preferable to leaving fruit out in the field.

--*John Howell*

CUCURBITS

Scout fields for **powdery mildew**, which may still show up on undersides of leaves where fungicides worked well on the upper leaf surface. **Gummy stem blight** shows up as brown, soft rot of stems and petioles or as dark, water-soaked, or oozing spots on fruit. Leaf spots begin as water-soaked areas, each surrounded by a yellow halo; spots become larger, light brown, and papery. Watch for **Phytophthora fruit and crown rot**, which produces watery softening of fruit, followed by a white yeast-like growth which releases spores that can infect new fruit. We are seeing this disease expanding in infected fields. Fruit symptoms can also develop after harvest.

To protect fruit in fields where powdery mildew and/or gummy stem blight (black rot on fruit) are present, continue fungicide applications every 7-10 days. Limit repeat sprays with systemic fungicides, to reduce resistance development -- it is recommended to use no more than two applications of Quadris/Flint and no more than one of Benlate. Nova also provides systemic activity against powdery mildew and can be rotated with other systemics, but should be used with a broad-spectrum protectant fungicide. Chlorothalonil (Bravo), used alone, can provide good control of powdery mildew and black rot. Use adequate water, higher pressure and slower speed to penetrate foliage and reach the fruit. As an alternative, Armicarb 100 can be used for powdery mildew control (allowed for

organic growers).

DISEASE DIAGNOSTICS UPDATE

Greetings from the UMass Plant Disease Diagnostic Lab. The most important development this week was the appearance of **late blight**, caused by the oomycete *Phytophthora infestans*, on a tomato field in the eastern part of the state. Late blight is also being reported in tomato fileds in eastern New York State. Tomatoes are most at risk at this point in the season. It is possible that the strain of Phytophthora that affects tomatoes may not affect potatoes. Potato crops that have been vine-killed do not need further fungicide treatment for late blight. However, since late blight can be a region-wide disease, it is important to monitor both tomato and potato crops carefully. Early symptoms include purplish to black lesions on foliage and stems, a dry brownish rot on fruit or tubers, and sometimes, under humid conditions, a white downy growth over or on the underside of the lesions. If you see any signs of late blight, call us or submit a sample to the lab so we can confirm it and spread the word to other Massachusetts growers.

Fungicide options for tomato are limited: EBDC fungicides (maneb, mancozeb) or chlorothalonil (Bravo) on a weekly schedule as a preventative.

Bacterial fruit blotch has shown up on cucurbit fruits. Several different bacterial species causes this disease, including **Xanthomonas**, the same bacterium that caused leaf spots earlier in the season. Symptoms on fruit include cracks, small sunken lesions with yellow haloes, and a brown rot of the internal fruit tissue. Unfortunately, little is known about the biology of this bacterium, and there are no effective controls for this disease, although copper may check the spread of the organism if applied early during the leaf spot stage; applications once fruit is infected are of little value. However, cultural practices that reduce the spread of the bacterium are always worthwhile, such as avoiding work in wet fields, working in infected areas last, and cleaning hands between fields. Xanthomonas is seed-borne, so for future crops always start with clean, preferably hot-water treated seed (some commercial seed companies hot-water treat their seeds, or will do so upon request). Sprays of copper-based compounds (with Maneb, which enhances the copper's effectiveness) should be started early and continued throughout the season if bacterial fruit blotch is an ongoing problem on your farm.

The Diagnostic lab phone number is 413 577-1827 or 545-1045, if you have any questions or comments. Send samples to UMass Plant Disease Diagnostic Lab, Fernald Hall, University of Massachusetts, Amherst, MA 01003.

-J. Lerner, R. Wick

SWEET CORN

Corn earworm captures are moderate for this time of year, but high enough to require regular sprays (4 day intervals in the Southeast, 5 days elsewhere). Corn picked this week has been wormy if controls were inadequate. Where corn earworm control is the priority,

select insecticides which have ovicidal properties to kill eggs on the silks, short-term contact toxcity against exposed larvae, and a residue on silks that continues to act on newly hatched caterpillars that crawl on the silks to enter the silk channel. Thiodicarb (Larvin) has all of these characteristics. Synthetic pyrethroids such as lambda-cyhalothrin (Warrior), and cyfluthrin (Baythroid 2) also have a longer residual and growers are reporting good control using these materials. Methomyl (Lannate) breaks down quickly and generally provides less effective control of corn earworm. Growers are reporting poor control with this product. Larvin is the only one of this list that is not a restricted-use material. Spinosad (SpinTor) provides another non-restricted alternative, but is only recommended against corn earworm at moderate pressure (< 7 mothsper week). Growers using the oil/Bt direct silk method are seeing good control of both earworm and European corn borer. For more details on this method contact rhazzard@umext.umass.edu (413-545-3696)

European corn borer captures are on the downswing. The latest blocks of corn are now in pretassel , and infestations are variable. Best to scout -- some fields have no pressure, some are well over threshold. Often corn borer is mixed with **fall armyworm larvae**, the offspring outcome of previous flight activity. Pretassel reports in the table are the sum of both FAW and ECB. Current fall armyworm captures are spotty. Fall armyworm is best cleaned up before silking to prevent boring into the ears.

Symptoms of **maize dwarf mosaic virus** (MDMV) have been observed in some late corn plantings. Symptoms are yellow to light green stipple and mosaic on the darker background of the leaf (see photo, page 59 of *Northeast Sweet Corn Production and IPM Manual*). Infection in the whorl stage can results in excessive tillering, multiple ears, and poor kernel development. This virus is spread in a non-persistent manner by at least 12 species of aphids. The plant host range of the virus includes many grasses, and aphids vectors may be local or migrate from southern areas. Insecticidal control of aphids does not prevent virus infections.

WEEKLY SWEET CORN CAPTURES
for week ending Tuesday, August 29

Town	Date	ECB Z1	ECB E2	TOTAL ECB	CEW	FAW	% PT
N. Bennington, VT	28-Aug	5	5	10	3		
Stephentown, NY	28-Aug	3	2	5	4		
Pittsfield, MA	28-Aug	1	1	2	3		
Walpole, NH	22-Aug	8	14	22	0	4	9%
Plainfield, NH	22-Aug	3	4	7	1	5	

Westminster, VT	23-Aug	18	45	63	2	2	60%
Putney, VT	23-Aug	13	4	17	0	1	3%
Sheffield	28-Aug	4	4	8	3		
Hatfield	26-Aug	2	2	4	2	2	
Sunderland	26-Aug	3	3	6	6	0	
Hadley	26-Aug	10	5	15	5	0	
Amherst	29-Aug	6	23	29	2	3	
Feeding Hills	26-Aug	0	3	3	6	0	
Haverill	24-Aug	0	6	6	2	0	26%
Ipswich	28-Aug	0	3	3	11	0	4-%
Still River	29-Aug				7		
Concord	25-Aug	3	5	8	0	0	20%
Northbridge	23-Aug	14	5	19	12	8	24%
Framingham	28-Aug	0	1	1	11	0	0%
Needham	28-Aug	3	1	4	8	5	22%
Leicester	23-Aug	0	6	6	3	1	0%
Millis	24-Aug	9	4	13	26		10%
Hopkinton	24-Aug	0	9	9	25		
Swansea	25-Aug	9	2	11	40		
Rochester	25-Aug	7	11	18	51		
Rehobeth	25-Aug	4	5	9	35		

% PT = % of plants in pretassel blocks which are infested with ECB and/or FAW.

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.

Next Newsletter: Monday September 11.

Vegetable IPM Message, Ruth Hazzard, Editor. The Vegetable IPM Message 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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