UMASS EXTENSION

VEGETABLE IPM MESSAGE

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CROP CONDITIONS

Most of the state received at least an inch of rain within the past week. The northern part of the Connecticut Valley, continuing up into Vermont and New Hampshire, remains very dry. The heat wave has abated and conditions have been excellent for the major potato, cucumber and tobacco harvests, as well as for all the main-season vegetable crops.

PEPPERS

Harvest of bell peppers is in full swing, and fruit quality is reported to be excellent. **European corn borer** moth captures climbed further this week and numbers indicate that this second generation could be serious if weather conditions are right. We are probably at the peak egg-laying period this week, with steady hatching of new larvae that will be moving into fruit, so it is critical at this time to maintain a regular insecticide program. See last week's issue for products and recommended intervals; don't stretch these intervals now!

TOMATO

Tomato harvest is reaching peak levels. Local supplies hit the wholesale market in the last week. In warmer areas of the state, the earliest plantings are finishing, but in cooler areas they are just peaking now. **Spider mite** is active in some fields and scouting should continue. Treatment is warranted if mites are on new growth or throughout the planting, especially in later plantings that need to stay healthy for several more weeks. Till under residues as soon as harvest is completed, if possible. Control options for spider mite include Agri-Mek 0.15 EC (note 7 DH interval) and Kelthane (2DH, also labeled for pepper). Organic growers could use Cinnamite, which is a contact toxin; however, phytotoxicity can occur -- make a test application and do not use on water-stressed or wilted plants. Insecticidal soap (MPede) and neem (Ezozin 3%, Neemix) are other options for suppression, if not complete control. Release of predatory mites may suppress spider mites if initiated when infestations are low.

Bacterial canker and **bacterial speck** are reported to be serious in some fields, especially in the Sun series varieties. This includes some fields where seed was hot-water treated, which is extremely frustrating. The *Clavibacter* bacteria can survive for at least one winter in crop residue on the surface or underground, and will infect successive crops in non-rotated fields (this includes 'rotated fields' that are adjacent to last year's tomato fields). Greenhouse equipment and field stakes can also be sources of the bacteria. A single tomato variety with very low levels of infected seed can infect all the rest, either in the greenhouse or in the field. Non-symptomatic transplants can carry the bacteria on external leaf surfaces, and these bacteria can enter the vascular system through wounds and natural openings. They can also be spread through the field by rain or moist wind, workers, and airblast sprayers. Wherever possible, use drop nozzles on a boom sprayer in staked tomatoes, and a boom over ground tomatoes. Weekly copper applications (Kocide, Champ) suppress the development, but should start when symptoms first appear. Scouting and early identification is key. Use of Streptomycin or copper in the greenhouse is recommended wherever bacterial diseases have been a chronic problem on a farm.

Early blight and TOM-CAST: Through last week's hot spell and the period of wet weather on Monday, conditions have been

favorable for early blight. The 15 DSV threshold was reached in 9 days, counting back from Wednesday, August 15 (see chart below). Foliar fungicides on at least a 9-10 day schedule are recommended.

When to **stop** spraying? As a planting reaches the end of its harvest period, further investment in fungicides may not be cost-effective. Anticipate the time you expect to stop picking and if early blight is the only concern, stop 2-3 weeks earlier. However, if diseases that directly affect the fruit are a concern (such as anthracnose or botrytis), continue spraying through the last harvest (taking into consideration any preharvest-intervals on the label).

DSV VALUES, Aug 9-15, 2001:
South Deerfield Research Farm

Date	DSV's/Day	Date	DSV's/Day
Aug 4	3	Aug. 11	2
Aug 5	2	Aug. 12	0
Aug. 6	2	Aug. 13	4
Aug. 7	3	Aug. 14	2
Aug. 8	2	Aug. 15	1
Aug. 9	2	**Total DSV's since Aug. 1**	**25**
Aug. 10	0	**Days to reach 15 DSV**	**9**

FALL COVER CROPS

Now is the time to think about cover crops for the fall especially if you need to order the seed. 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 Sept. 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. 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 very small-seeded cover crops 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 Cape Cod, Martha's Vineyard, Nantucket and southern New England 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.

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 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.

Feel free to contact Frank Mangan (978-422-6374) if you have questions about these or other cover crops.

--Frank Mangan

ONION THRIPS IN CRUCIFERS AND ONIONS

Thrips has been observed in late crucifers, including cabbage and Brussels sprouts. On one particular farm these crops were planted next to onions and both are suffering damage. Given the hot weather last week, we recommend checking both these crops for a late-season infestations.

Onion thrips attack onions and other crops in the onion family and cruciferous (cabbage family) crops. They are tiny insects, which feed primarily at night and hide during the day. They have rasping mouthparts. They feed by abrading the leaf epidermis and them drinking the liquid from the leaf tissues. On onions, feeding injury appears as silvery blotches on the leaves. If injury is extensive, the leaves produce less food and this reduces the size of the bulbs. Feeding injury makes scallions and green onions unmarketable. In crucifer foliage, feeding damage shows up as white or bronze mottling on the upper surface, and a mottled bronzing on the lower surface. On cabbage heads, feeding results in small wounds, which heal over forming raised corky areas, which resemble edema. This is unsightly and can make heads unsalable. Thrips must be controlled before heads form.

These insects multiply rapidly in hot weather and populations can get out of control rapidly. Scout onions by spreading the leaves and looking for thrips, which have been hiding between the leaf sheaths. To the naked eye they look like a small speck of dirt, but they crawl around as soon as they are exposed to light. The young nymphs are light in color and the adults are nearly black. Cornell University recommends that an insecticide program be initiated when there are three thrips per green leaf on dry bulb onions and one per green leaf for Spanish and green bunching onions. For best results a wetting agent should be used. High gallonage (100 gpa) and high pressure (100 psi) are important for good thrips results. Since many insecticides are degraded by sunlight, applications should be made in the evening when the insects are crawling up on the foliage to feed.

Thrips populations are often greatly reduced by heavy rainstorms. Overhead irrigation can also reduce populations. Populations will reestablish themselves at some time after the rain event. The

interval will be affected by temperature. Some of the older onion varieties with more spreading leaves are somewhat resistant to thrips.

Refer to the *New England Vegetable Management Guide* for recommended materials, which include the traditional pyrethroids, carbamates, and organophosphates. Biorationals ("softer" materials) for thrips include spinosad (Spintor 2EC, labeled for crucifers, not onions), which has a reputation for working very well against thrips in greenhouse situations. Azadiractin (Neemix, Ecozin 3%) is labeled for control of thrips in both onions and crucifers.

CRUCIFERS

Downy mildew is being observed in kale and collards. Nearly all crucifer crops and weeds can be affected by downy mildew. Symptoms start with white mildew on the undersides of leaves (more visible when leaves are wet), followed by a slight yellowing on the upper side. Irregular yellow to brown spots develop on both leaf surfaces and affected areas turn tan and papery. Cabbage heads may show sunken black spots that range is size from minute dots to an inch or more in diameter. Cauliflower and broccoli may show dark, purplish spots or darkening on florets or curds. Long leaf wetness periods from rain or dew, with night temperatures under 75 oF favor this disease. Fungicides for downy mildew include chlorothalonil, maneb, copper and fosetyl aluminum (Aliette). However, these products are not labeled for all crucifers. Check label carefully for specific crucifers as well as days to harvest intervals. Aim for good coverage of lower leaf surface. **Alternaria** has also been observed in Chinese cabbage and bok choi. Leaf lesions show the characteristic concentric rings but no fruiting bodies. Chlorothalonil and maneb provide control. Again, check labels for specific crops.

–John Howel, Ruth Hazzard and Dale Riggs

CUCURBITS

The earliest winter squash and pumpkins are approaching maturity. Pumpkins continue to develop symptoms of **bacterial wilt**. Some fields are showing the first symptoms of **powdery mildew** this week. Where powdery mildew has been present for a while, sprays at two week intervals are giving adequate control.

As fall vine crops begin to mature, growers face the question of when to stop spraying. Come to the UMass Field day to see experiments that are testing different spray schedules for powdery mildew and black rot in butternut – including variations in final spray dates! Even though powdery mildew pressure is low this year, and vine quality matters less as harvest approaches, crops still need to be protected from black rot. The greatest protection for mature crops is to remove them from the field and provide good storage conditions. More on this next week!

Note: DuPont is canceling the registration of benomyl (Benlate SP). If you have existing stocks of benomyl, use them this season (though not more than once per season).

Spider mites have been observed – a relatively rare pest in this crop, but the hot weather has favored this pest. Sprays are needed only if crop decline is sufficient to reduce yield. Options for mites include Agri-Mek 0.15 EC, Kelthane, Metasystsox R, Neemix, and Thiodan.

UPCOMING EVENTS

UMass Vegetable Field Day: Tuesday, August 21

On Tuesday, August 21 from 5:30-7:30 P.M. at the UMass South Deerfield Research Farm. Join the members of the Vegetable Team for a tour of current research projects on the following topics:

- Cucumber & Bacterial Wilt Management in Pumpkin
- Asian & Latino Crops
- Trickle Irrigation
- Butternut Fungicide Schedules For Disease Management In The Field & In Storage
- Late Season Nitrogen Test In Corn
- Organic Corn Earworm Management With The Zea-Later

Directions: *From the North.* Take any route to Interstate 91S. Take exit 25. Follow signs to Route 116 South. Take a left onto

River Road just before crossing the Connecticut River. The entrance to the farm is ¼ mile on the left. *From the South*. Take any route to Interstate 91N. Take exit 24 to route 5/10 North to 116 South. Take a left onto River Road just before crossing the Connecticut River. The entrance to the farm is ¼ mile on the left.

Massachusetts Marketplace Festival: Aug 24-25

On Friday and Saturday, August 24 & 25 the Mass Department of Food and Agriculture and the Mass. Horticultural Society are co-sponsoring this event at Elm Bank Reservation in Dover, MA. Friday is for wholesale growers and Saturday is for the public. This is a great opportunity to make contacts with wholesale or retail buyers! For more information contact Mary Jordan of the MDFA at (617) 626-1750 or Mary.Jordan@state.ma.us

Beyond Buckwheat & Winter Rye: August 30th

On Thursday, August 30, Dr. Stephan Seiter, an agro-ecologist from University of New Hampshire, will lead an on-farm workshop at Pooh and Ann Sprague's diversified Edgewater Farm in Plainfield, NH from 4 to 7 pm. Dr. Seiter will give an overview of different cover crops and then we will walk the fields and have a round table discussion of other cover crop strategies for organic matter improvement, nitrogen management, etc.

Directions: From VT, take exit 20 off I-89 just across the river in NH, go south 4 miles on Route 12A. Turn right on River Rd. at the River Bend veterinary clinic; the farm is 1/8 mile on left. For more information contact Vern Grubinger, UVM, (802) 257-7967 ext. 13 or vernon.grubinger@uvm.edu

SWEET CORN

Corn harvests are bunching up after last week's heat. There have been customer complaints about poor quality in sh2 varieties, but otherwise quality is excellent. **European corn borer** numbers on are still on the rise and pressure in silking corn will be significant. Egg masses may be laid on leaves near the ears, and hatching larvae may move into the ear without much sign of feeding on leaves or husks. In the absence of corn earworm, silking corn should be sprayed at least weekly to prevent damage from ECB. Pretassel corn is showing higher infestations in some fields. Scout these blocks to determine the need for sprays. **Corn earworm** trickled into the region this past week, with some heavy flights in southeastern coastal areas. Central and western Mass. captures are quite variable, ranging from 0 to 6 per week. See table below for appropriate spray intervals.

CEW egg hatch and temperature. Corn earworm moths lay eggs on all parts of the plant, but fresh silk is preferred. Creamy, globe-shaped eggs are laid singly, attached to the silks. When the egg hatches, the first-instar caterpillar moves down the silk into the ear to feed. The egg will require 2-6 days to hatch, depending on temperature. Lab studies in which eggs are held at a constant temperature have determined the following hatch times:

Avg Daily Temp (°F)	Days to hatch
65	6.8
70	4.6
75	3.6
80	2.9
85	2.5
90	2.2

In last week's heat wave (August 7-9), the average daily temperatures were 81 to 83 degrees at SDF (with daily highs of 95-98 oF). From August 11-14, average temperatures have been 67-71 oF. These temperature differences mean the difference between egg hatch in 2-3 days vs. 5-6 days. This is why spray schedules can be extended in cooler weather.

These numbers can be converted into degree days or degree hours to hatch. A "degree day" is the number of degrees accumulated during a day, above the minimum temperature at which insects develop. Corn earworm eggs do not develop below 54°F, so this is considered the base temperature. Usually minimum and maximum temperatures are averaged to determine the temperature for a twenty-four hour period. The formula for degree days, then, is: [(Max.Temp + Min.Temp) /2] – Base Temp. = Degree Days. To convert this to "degree hours", multiply by 24. Lab research has shown that corn earworm eggs hatch in about 1800 *degree hours*.

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 °F for the previous 2-3 days.

SWEET CORN TRAP CAPTURES AND SCOUTING DATA AUGUST 10-16

Town	Date	ECB Z1	ECB E2	TOTAL ECB	CEW	% PT
Berkshire Region						
Sheffield	August 14	5	7	12	0	--
Conn. River Valley North to South						
Westminster, VT	August 16	14	234	248	1	0%
Hatfield	August 13	10	33	43	0	18%
Whately *	August 14	18	49	67	--	--
Sunderland	August 13	7	38	45	0	--
Hadley	August 14	18	21	39	4	--
Amherst	August 13	15	30	45	0	3%
Southwick	August 14	15	45	60	5	--
Feeding Hills	August 13	9	26	35	0	17%
Cromwell, CT	August 14	38	19	57	6	40%
East/Central MA, North to South						
Ipswich	August 14	16	9	25	5	18%
Dracut	August 15	23	108	131	3	0%
Stow	August 15	33	58	91	12	0%
Bolton	August 15	10	37	47	0	--
Sutton	August 15	2	2	4	11	--
Monson	August 15	6	5	11	0	4%
Still River	August 16	--	--	--	0	--
Leicester	August 15	6	5	11	0	0%
Millis	August 14	95	69	164	25	--
Hopkinton	August 14	18	76	94	4	--
Seekonk	August 14	15	26	41	28	--
Swansea	August 14	18	59	77	38	--
Rochester	August 14	12	43	55	77	--
Rehobeth	August 14	8	35	43	48	--
Little Compton, RI	August 13	31	52	83	18	6%

* Next to pepper field.

*--Data provided by D Riggs, J Mussoni, M Yates, **R Pestle**, A Rodgers, **R Cook**, P Westgate & R. Hazzard. Many thanks!*

Visit the UMass Vegetable Program website at www.umassvegetable.org.

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