

Vegetable IPM Message

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Crop Conditions

Rain kept pouring down last weekend, but a few days of sun and heat since are helping crops and growers catch up. More fields are becoming workable for cultivation and late plantings. Late pumpkins, squash, crucifers and corn are going in. Some fields are still too wet to work.

Briefs: **Potato leafhopper** has arrived. Watch tomato transplants for **two-spotted mite** that may have come out of the greenhouse. **PSNT tests** are indicating low nitrate levels in many soils. **Striped cucumber beetle** is still active and is moving into newly sprouting and already treated fields. **Spotted cucumber beetle** is showing up in low numbers.

GREENHOUSE TOMATOES

Grey mold, caused by the fungus *Botrytis*, is causing serious losses in at least two greenhouses. The problem has become evident during the last week to ten days. The disease gets its name from the fact that it causes a grey moldy growth on plant parts including fruit, leaves, blossoms and stems. Leaves become necrotic. At first glance, the fruit symptoms may be confused with blossom end rot, but the color is tan to grey and the affected area is not sunken as with blossom end rot. Botrytis is favored by moist, humid conditions. Recently, we have had a good deal of wet and cloudy weather which is conducive to this disease. Although the houses are fairly well ventilated, the dense plant canopy keeps the relative humidity high around the leaves.

Moisture management is a key part of managing this disease. Use ventilation and air flow to reduce humidity. Relative humidity should be below 90% within the plant canopy. This is difficult to achieve, especially with heavy leaf growth. Air movement can be increased by removing older leaves below the lowest fruit cluster. Food is translocated downward from leaves to the fruit, so leaves above a cluster should not be removed. Other factors such as nutrient management may weaken a plant and increase its susceptibility to the disease. In one severely affected crop grey mold appeared shortly after the onset of boron deficiency symptoms.

Chlorothalonil can be used to help manage grey mold, but it is not a substitute for proper environmental management. This fungicide can be applied as a spray such as Bravo, but this is time consuming and it is difficult to achieve thorough coverage. Appropriate clothing and equipment is required to protect the applicator in an enclosed greenhouse environment. Chlorothalonil can be applied in the form of Exotherm Termil which is lit to form a smoke. After lighting the cans, the operators leaves the greenhouse. This method improves coverage and operator safety and is much less time consuming than applying a spray. Follow all directions on the label.

-- *JohnHowell*

Postemergence Weed Control in Sweet Corn

Recently, Permit (halosulfuron) herbicide has been registered in sweet corn for postemergence control of weeds. Here are a few thoughts on this new herbicide. Permit is excellent for control of nutsedge and should be used primarily for this use until growers gain experience with this herbicide. The reason for experience is that Permit has the potential to injure corn and this injury is variety dependent. At this point, there is not a lot of information on which varieties are sensitive. Regular sugary varieties do not appear to be more tolerant than se (sugar enhanced) types or sh2 (supersweet) types. Other postemergence options continue to exist. These include AAtrex (atrazine), Basagran (bentazon), Formula 40 (2,4-D), Lorox (linuron), and Evik (ametryn). Atrazine, Basagran, and 2,4-D are the most commonly used. Also note that a new formulated prepak of Atrazine and Bladex (cyanazine) named CyPro is on the market. This cannot be used postemergence in sweet corn because of the Bladex which can seriously injure or kill emerged sweet corn.

--*Rich Bonanno*

TOMATO

Leaf wetness periods have been long and frequent this month, creating favorable conditions for **early blight, late blight and bacterial diseases**. Even though it is early in the season, we recommend starting a fungicide/bactericide program. Include a copper product along with a protectant fungicide for activity against bacterial diseases as well. See late blight article regarding materials for late blight.

Since 1993, this newsletter has provided weekly, regional recommendations on fungicide application intervals. These were based on TOM-CAST disease forecasting and weather data from two or three sites in Massachusetts. Ideally, growers should base their spray decisions on weather conditions on or within a few miles of their own farm. There are several ways to get weather data and forecasting for your farm. I encourage growers for whom tomatoes are an important crop to consider these options:

1. **On-site dataloggers** that record temperature and leaf wetness in your fields provide the best information. Over the years, the convenience of these is improving while the cost

is, in some cases, going down. It is now possible to get field monitors that are programmed to provide TOM-CAST output, which can be read off the datalogger in the field, or sent to a computer. Push a button and get the daily DSV! Sources include Sensor Instruments Co, Inc, Concord NH (800-633-1033). A low-cost field monitor is being developed specifically for TOM-CAST.

2. **Estimated site-specific data** provided by a private weather service. Once such service is SkyBit, Inc., Boalsburg, PA (1-800-454-2266). This service uses a wide range of existing measured weather data, which is fed into complex computer models to calculate weather data and forecasts for your site. These are delivered daily to subscribers by fax or email. The output can include TOM-CAST DSV's in addition to other weather data and weather forecasts. The service has a monthly cost of \$50 for weather data and \$10 for TOM-CAST. Sites within 10 miles of another site can piggyback on another account for \$10. Studies conducted in several states comparing directly measured, onsite weather data and the SkyBit modeled data found that SkyBit was most accurate with temperature, and tended to somewhat over-estimate leaf wetness. So it's TOM-CAST output was the same or somewhat more conservative (recommends more sprays) than measure data.

Crucifers

Diamondback moth numbers were higher this week. **Cabbage butterflies** were active and the numbers of new eggs and tiny newly hatched larvae were up. You won't see them from the tractor seat. Check under leaves for small nibble holes in the surface, and look for a caterpillar nearby. Both caterpillars are well--camouflaged light green. These are easy to clean up if caught young before damage is significant. As cabbage reaches heading stage, treat if 20% of plants are infested. Spray greens at 15%, pre-cupping and seedling cabbage at 35%.

UMass Plant Disease Diagnostic Laboratory

Current weather conditions (wet soils, humidity, and warm temperatures) have created an ideal environment for many types of fungal and bacterial pathogens. Preventative sprays may be warranted under these circumstances. For example, it may be prudent to spray **pepper fields** that have a history of **bacterial leaf spot** with copper-based compounds such as Kocide. Growers should keep a close watch on their crops to detect early symptoms of disease and submit plant samples to the UMass Plant Disease Diagnostic Laboratory, Fernald Hall, Amherst, MA 01003 (413-545-1045).

Conducive conditions have created the potential for late blight in potato and tomato fields and a fungicide program should be started for early and late blight. The following information is adapted from an article by Dr. Tom Zitter (Dept. of Plant Pathology, Cornell University):

Late Blight Control: What Are the Options?

Destroy cull piles and volunteers, both of which may be sources of late blight

inoculum Tubers in stone piles at the edge of fields can also be a problem. The goal is to prevent the development of green leaf tissue and subsequent infection and sporulation of the late blight fungus.

Seed tubers. Given that late blight occurred in some seed production regions of the US in 1999, we should expect that inoculum will be present in some seed lots. If you planted a suspect lot, scout those fields early and often.

Scout cull piles, volunteers, and crop fields. Scout aggressively for signs of late blight. Late blight can occur on stems as well as on leaves. When a canopy develops, look for blight in the lower portions of the plant where the foliage stays wet. Take care not to spread late blight from field to field when scouting. Rubber (or disposable) pants and boots, which can be washed after leaving a field, should be used if disease is present. Inoculum can be carried from field to field on equipment, but is easily removed by washing with water.

Fungicide options. It is likely that any late blight that occurs will be the new Ridomil-resistant type. Therefore, blight control should depend on other materials, used in a preventative manner. Some are better than others. The protectant fungicides most commonly used are chlorothalonil (Bravo, Echo, and others), mancozeb (Manzate 75DF, Dithane DF, Penncozeb75DF, and Manex II), maneb (Maneb 75DF or Manex), and metiram (Polyram 80DF) in combination with triphenyltin hydroxide (Super Tin 80WP). Bravo Weatherstik has long been an industry standard, and if used at the very early stage of disease development can be quite effective. The newer formulations of Dithane DF Rainshield and Manzate 75DF will provide growers with good control under times of less intense disease pressure. Metiram (Polyram) plus triphenyltin hydroxide (Super Tin) have a place in mid-season sprays when disease pressure from late blight and early blight are less intense, and this combination can be alternated with other fungicides.

When conditions are highly favorable for late blight, or if *Phytophthora* has been reported in the area, products that have preventative, curative and locally systemic activity should be considered. These are most effective if used preventatively. Follow label directions to prevent fungicide resistance from developing and to adjust rates according to disease conditions.

Quadris (azoxystrobin) is registered for use on both potato and tomato. It will provide control of late blight if used preventatively, and excellent control of early blight. Rates differ for tomato and potato.

Curzate 60DF is registered for use only on potato at the rate of 3.3 oz/A and must be tank mixed with a protectant fungicide such as Bravo or Manzate. It should be used on a 5- to 7-day schedule. Even when tank mixed with a protectant fungicide, rotate to a fungicide with another mode of action after several applications. Curzate should be mixed with Bravo or Mancozeb to reduce the risk of resistance development and to provide adequate control of early blight. Curzate can not be used more than 7 times/year

Acrobat MZ (dimethomorph + mancozeb) is registered in Massachusetts for use on potato. Acrobat already has Mancozeb in it so there is no need to mix with another protectant. Acrobat can only be used 5 times per season.

There is no Section 18 registration in Mass. for Tattoo

For organic growers, several fixed copper fungicides are available (Basicop, Champ, Kocide, etc.) and provide fair control of late blight and early blight, again if used preventatively. These and other copper products are registered for use on both potato and tomato.

Application methods. The key word here is coverage. Thick canopies, stem infections, and lower canopy infections, all translate into the need to deliver fungicides in the most effective manner. Slowing the tractor speed, adjusting boom height to the appropriate level over the plant canopy, and entering the field from a different direction each time you spray may provide better coverage.

High relative humidity and long periods of leaf wetness (from rainfall, dew, fog, or irrigation) are favorable for late blight. The favorable temperature range is very wide, but the disease proceeds most quickly when average (day and night) temperatures are 59-80 degrees F.

SWEET CORN

The earliest corn (grown with row cover or plastic) is silking. Bare ground corn is mostly still in whorl. There are likely to be some gaps in harvest because growers could not plant for long periods, and because of slow germination and growth.

European corn borer (ECB) flight continues to be high which means corn in silk should be sprayed weekly. Also, its time to get **corn earworm** traps up, since it looks like there is an early flight!

Any blocks reaching pretassel should be scouted for ECB. Look for signs of feeding damage -- leaf holes, frass -- or for the small larvae (white or gray with black heads) in the florets of the emerging tassel. Spray if 15% are infested with one or more larvae. Early corn varieties move very rapidly from pretassel to silk. It is critical to get sprays on before tassels fully emerge and silking starts, to clean up early ECB infestations effectively. Reports from southeastern Mass. indicate pretassel corn is over threshold in many fields.

SWEET CORN TRAPPING DATA FOR WEEK ENDING JUNE 22, 2000						
<i>* % of plants infested with caterpillars in pretassel stage corn.</i>						
Town	Date	ECB Z1	ECB E2	TOTAL ECB	CEW	*PT % ECB
Walpole, NH	6/21	5	2	7	-	1 st larvae
Plainfield, NH	6/21	1	6	7	-	Whorl
S. Deerfield	6/22	5	23	28	-	--
Dracut	6/20	26	56	82	0	--
Millis	6/21	12	90	102	1	
Hopkinton	6/21	12	7	19	2	12
Seekonk	6/21	9	27	36	9	30
Rochester	6/21	31	175	206	29	64
Swansea	6/21	170	7	177	3	45

--Ruth Hazzard, Roz Cook, Mike Yates, Ray Pestle, Jim Mussoni

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