UMASS EXTENSION

Vegetable Notes

For Vegetable Farmers in Massachusetts

Volume 20, Number 7 June 18, 2009

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CROP CONDITIONS

In the past week cool, cloudy conditions have prevailed and sunshine has been scarce. There's a huge contrast between the eastern part of the state which is extremely dry, and western Massachusetts which has been soaked by repeated rains. In the wet areas it's a good chance to assess whether your soils may have compacted layers that slow drainage and hold standing water. Leafy greens, Brassicas, peas, onions, beets and other cool-loving crops are doing well, but many crops could use more heat to push their growth. Peppers look like 'a stick with four little leaves', especially on bare ground. Early summer squash and zucchini grown with plastic and row cover has been harvested for a week or so for retail markets, and is expected to come in strong by next week – especially if things warm up and the sun comes out. Early broccoli and cauliflower are coming in. Corn is growing slowly, plastic corn has pushed silk in warmer areas, but where there have been heavy rains nitrogen has leached and side dressing is needed. The first ECB larvae are hatching. Leafhoppers and thrips have arrived, and flea beetles are active in eggplant and brassicas although some growers report they came early and left. Colorado potato beetle eggs are hatching out and potatoes are flowering. Damping off pathogens may cause problems in seedlings. Cucumber beetles are busy in vine crops.

INSECTIGATION: APPLYING INSECTICIDES THROUGH THE DRIP IRRIGATION SYSTEM

Many vegetable growers throughout the Northeast are already using drip, or trickle, irrigation systems as a water management tactic. 'Insectigation' allows growers to apply pest control materials through a system they already have in place (drip system), and saves significant time and money over ground-applied application. Spray drift, sunlight degradation and coverage of the foliage are not an important concern with insectigation.

With the development of many new-chemistry insecticides (imidacloprid, thiamethoxam, chlorantraniliprole, dinotefuran, etc.) that are very effective against certain insect pests at low rates, are highly soluble and systemic in action, and safe to the crop as well as to the environment, growers have new options for use in their pest management program on many vegetable crops. Some common uses of insectigation in vegetables in New England in recent years include applying imidicloprid to control striped cucumber beetle in summer squash and cucumber, Colorado potato beetle in eggplant, or aphids in lettuce. Now there are additional materials available for additional pests. Successful insectigation trials recently have been conducted at the University of Arizona using Admire or Platinum for aphid control on Romaine and head lettuce; at both the University of Florida and Virginia Tech University using Coragen for the control of worm pests on tomatoes; and at RAREC NJ using Coragen for the control of European corn borer in bell peppers. As a result of these successful trials and others, many insecticide labels for vegetables now have specific drip application instructions, including Admire and Admire PRO, Aza-Direct, Coragen, Durivo, Platinum, and Venom.

Growers that are considering drip irrigation can get information from many sources. A good summary of key components of a drip irrigation system can be found in the New England Vegetable Management Guide (www.nevegetable.org; select cultural practices/irrigation) Growers that have been using drip irrigation need very little additional equipment to begin insectigation.

Special Equipment Considerations for Insectigation

Most of the equipment necessary for insectigation is already included in a standard drip irrigation system, including back-flow prevention checkvalves, pressure regulators and a sandfilter. Additional equipment might include a quick-closing check valve to prevent the flow of fluid back toward the point of injection. Most drip labels state that the system must have a functional, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is not operating. The system must also have a control to automatically shut off the insecticide injection pump when the water pump motor stops, or when the drip line pressure suddenly decreases to the point where pesticide distribution is adversely affected (such as a hole in the drip tube, a leak or drip line break, etc).

Remember that the goal of insectigation is to deliver a consistent and uniform application of an insecticide to the crop roots for uptake and distribution of the material throughout the plant. Systems must use a positive displacement injection pump (such as an electric diaphragm pump) or similar devise to ensure a uniform and measureable application. Uniformity of application is very important. It is desirable to have the same amount of insecticide drip equally from every emitter in the drip line system. Prime the system before injecting an insecticide so dry soils have a normal moisture range before insectigation. Underwatering will prevent the insecticide from reaching the entire root zone of all plants, and over-watering will leach the insecticide from the root zone.

Don't rush injection time. Extending the length of injection will improve the uniformity of delivery. The minimum injection time is the time it takes water to move from the injection pump to the furthest emitter in the field. The minimum time for flushing the system with clean water after injection is the same. This time can be determined by injecting a soluble, non-toxic dye, or even a soap solution, through the system and recording the time it takes to reach the furthest emitter.

To determine the rate to use, start with the rate of insecticide needed per 100 or 1000 ft of row. Often this rate is provided on the label. Then calculate how much is needed to cover the number of row feet served by your trickle system. Place the total amount in the bucket with enough water for 20-30 minutes of injection. Charge the system with water first to get the soil wet. Turn on the injec¬tor, to inject slowly for even distribution (20 or 30 minutes). Then flush lines with clear water and to move product out and down.

Apply early enough to allow the plant roots and leaves to take up the material before pests arrive.

Remember, only insecticides that specify "For trickle or drip irrigation systems" on the label can be applied in this manner. The use of any material that is NOT specified for drip systems on the label is not only illegal, it can cause serious damage to the pump (corrosion), the drip lines (plugging the emitters), and the crop (phytotoxicity, illegal residues, etc).

More detailed information concerning drip injection requirements and information is available on most chemigation labels.

- Dr. Gerald M. Ghidiu, RAREC, Bridgeton, NJ. Adapted for New England by R Hazzard.

PRE-SIDEDRESS NITRATE TEST: NOW IS THE TIME FOR SAMPLING

Many crops have reached or will soon reach the stage when it's time to decide whether and how much nitrogen to apply as a side dress or top dress. The pre-sidedress nitrate test (PSNT) (also known as the June Nitrate Test) can help you to determine the current level of nitrogen in the soil. If you have a soil probe, the sampling takes about 20 minutes per field (probes are available from many ag suppliers for $40 to $75.) The amount of nitrate-N (reported as parts per million N03-N) in the soil is a good indicator of whether more N will be needed to complete crop growth.

To take a sample for nitrate testing, take 10 to 15 subsamples or cores from the field. Sample slices or cores should be taken to a depth of twelve inches if possible. Avoid sampling fertilizer bands or other areas which have high concentrations of N fertilizer. Generally the best place to sample is between the rows. If plastic mulch is used, samples should be taken from under the plastic. With a soil probe you can just sample through the plastic, leaving small holes that cause no problem. Be sure to avoid any trickle irrigation tape under the plastic. Mix all the samples together and submit about one cupful to the UMass Soil Testing Lab, West Experiment Station, University of Massachusetts, Amherst MA 01003. You may contact the soil testing lab 413- 545-2311 or consult their website at www.umass.edu/plsoils/soiltest

Cloth bags are ideal for sending PSNT samples to the Soil Testing Laboratory. These bags are more convenient to use because it is not necessary to dry the samples, as long as the laboratory receives them within four days. With plastic bags you should dry the samples unless you can deliver them within 24 hours, and ship overnight, or next-day delivery. The lab will do the PSNT within one working day of receipt and inform you of the results. The charge for this test is $6.00 (include a check made out to the University of Massachusetts). Be sure to request a Nitrate (PSNT) test.

The PSNT is a tool growers can use to optimize N application. Research conducted for several years at UMass, along with several years of on-farm experience, showed that an appropriate threshold for peppers and winter squash is about 30 ppm nitrate-N. Above this level, sidedressing or topdressing supplemental N would be of no value and will likely decrease yield of butternut squash and peppers. Research in Connecticut has shown similar results in pumpkins. There is increasing agreement that a threshold of 30 ppm is appropriate for most vegetables except for sweet corn, for which the threshold is 25 ppm. Using the PSNT can save money and time, improve crop yield, and reduce the likelihood of N leaching and water contamination. Barring unusual weather conditions, PSNT levels in a field tend to be fairly consistent from year to year. Once these values are known for a field, a grower probably does not need to test every year. As a tool, the PSNT should be used along with a grower's experience and knowledge of fields. Interpretation of PSNT results should be made with regard to weather conditions such as leaching rains or soil temperatures.

- John Howell, Frank Mangan, and Ruth Hazzard, University of Massachusetts

WATCH FOR LEAFHOPPER IN BEANS AND POTATOES

Watch fields for potato leaf hoppers – this is the time when they typically arrive. Adults are about 1/4 inch long, light yellow-green, and fly up from foliage when it is disturbed or shaken. Nymphs are found on the underside of leaves, are light green, wedge-shaped and very fast-moving. Damage can be severe on early-season varieties of potato, as well as in green beans. Beans are more susceptible when they are young than at later stages.

Adults and nymphs feed by inserting a needle-like beak into the plant and sucking out sap. They also inject a toxin into the plant, which causes yellowing, browning, and curling of leaves. In potato, leaf margins turn brown and brittle first, followed by death of entire leaves. In beans the leaf turns mottled brown as if infected with a disease before dying completely. Both adults and nymphs cause damage. Plant injury and yield loss can be significant.

Hopper Burn on Beans

It is important to protect plants when leafhoppers first arrive, before nymphs build up. In potato, the threshold is based on insects per leaf: Nymphs can be monitored by visually inspecting lower leaf surfaces on lower leaves. Treat if more than 15 nymphs are found per 50 leaves. University of Connecticut has established a threshold of 1.5 leafhopper per leaf in eggplant. In potato, some materials registered for Colorado potato beetle adults will also control leafhopper, including neonicotinoids. Other carbamate, synthetic pyretrhoid and organophosphate products are also registered. Refer to the New England Vegetable Management Guide for recommended materials. An update list can be found at www.nevegetable.org (under crops/potato)

For organic potato growers, pyrethrin (PyGanic EC5.0) has been shown to be the most effective product for reducing leafhopper numbers and damage. Good coverage is important. The residual period is short. Spraying late in the day or in the evening may provide better control than spraying early in the morning. Don't wait for numbers to build up.

NEW INSECTICIDES: CORAGEN

This is one of a series of articles that will provide information about recently registered insecticides. Federal registration for Coragen was obtained by Dupont last year, but this is the first season that New England growers will really have an opportunity to try this new material. The common name is Rynaxypyr, or chlorantraniliprole. This introduces a brand new mode of action (Mode of Action Group #28, an 'anthranilic diamide') that disrupts the calcium balance of muscles. That's an advantage where rotation of chemistries is needed to avoid development of resistance, such as with Colorado potato beetle or diamondback moth. Another feature is that it can be applied as foliar (translaminar) or systemic (soil uptake) at planting or transplanting or through drip irrigation where it is taken up by the root system and transported throughout the plant. It is very effective against most of the caterpillar pests in vegetables and also against the Colorado potato beetle and leafminers. It supports an integrated pest management program because it is safe to beneficials, other insects and wildlife, mammals, etc, and has low toxicity to people. While we don't have quite as many caterpillar pests in New England as more southerly locations (fortunately, and we hope that continues!) this product can be helpful in Brassicas, fruiting crops, and potato. Coragen has been extensively tested over the past 5 years in trials located at Texas, Arizona, Florida, Virginia, New Jersey and other states, and has been highly effective against worm pests and Colorado potato beetle when applied either as a foliar spray or through the trickle/drip irrigation system.

Labeled Vegetable Crops for Coragen 1.67 Suspension Concentrate

Brassicas (broccoli, Brussels sprouts, cabbage, cauliflower, kohlrabi, mustard greens, kale, and others).As a foliar spray for beet armyworm, cabbage loopers, diamondback moth larvae, imported cabbageworm, cross-striped cabbageworm, and others.

Cucurbits (cucumber, melons, pumpkins, squash, Chinese okra, chayote, others) – through trickle irrigation or as a foliar spray for beet armyworm, melonworm, ickleworm, loopers, and other worm pests.

Fruiting vegetables (pepper, eggplant, tomato, others)– through trickle irrigation or as a foliar spray for Colorado potato beetle, European corn borer, hornworms, corn earworm, cabbage loopers, fall armyworm, leafminers, and others.

Leafy vegetables (celery, head and leaf lettuce, arugula, cardoon, spinach, others) – through trickle irrigation and as a foliar spray for beet armyworm, diamondback

moth larvae, corn earworm, cabbage loopers, webworms, and others.

Potato – there is a supplemental label for foliar use on potatoes for control of Colorado potato beetle, European corn borer, and beet armyworm.

You can download a copy of this label at http://www.cdms.net/LabelsMsds/LMDefault.aspx. Search by trade name or common name. In fruit crops, this active ingredient is registered under the product name Altacor 35 WG.

FUNGICIDES FOR PHYTOPHTHORA CAPSICI IN SQUASH & PEPPERS

It's turning into another wet June in many parts of the state, and we're already seeing the first outbreaks of *Phytophthora capsici*. This disease is especially pernicious because of a lack of effective fungicides. While fungicides cannot be the sole method for preventing the disease, in some cases they may provide some degree of disease control, especially when used in combination with other management practices. However, even the most effective products typically only reduce disease levels by 40-60%, which may not be commercially acceptable. In all cases, the focus should be on water management, to minimize conditions conducive to the initiation and spread of this destructive disease.

Older chemistries that are recommended for control of Phytophthora blight include mefenoxam (Ridomil Gold, Ultra Flourish), mixes of mefenoxam and copper hydroxide (Ridomil Gold/copper), famoxadone plus cymoxanil (Tanos), zoxamide plus mancozeb (Gavel), or copper plus maneb. Many of these chemicals are also labeled for suppression of the fruit phase of Phytophthora blight. There are several new chemistries available that have been shown to be effective at reducing plant mortality caused by Phytophthora blight. Relatively new labeled products containing cyazofamid (Ranman), fluopicolide (Presidio), and mandipropamid (Revus) have shown to be very effective at reducing Phytophthora blight severity, although Ranman is not currently labeled for use on pepper.

One consideration is that different products have different preharvest intervals (PHI). A product with a PHI of 5 days (i.e. maneb) cannot be used when harvests are done more than once per week. Another important consideration is fungicide resistance management, as pathogens may develop insensitivity (resistance) to certain chemistries if these products are used too frequently.

Ridomil Gold is registered for pre-plant and early post-plant application to control Phytophthora blight in peppers. Ridomil Gold is labeled for use on cucurbits to control Pythium damping-off, but not Phytophthora blight. Thus, the manufacturer makes no claim of efficacy against this disease in cucurbits. Specific recommendations of rates and timing for Ridomil Gold can be obtained from the label or by consulting the updated recommendations in the New England Vegetable and Berry Management Guide (online at www.nevegetable.org). In the case of peppers, placement of Ridomil Gold in the root zone is extremely important. Ridomil Gold applications should be incorporated or moved into the zone by using sufficient water at application.

Following the pre- and early post- planting applications, Ridomil Gold/Copper or maneb plus copper can be used as foliar sprays to limit the foliar phase of the disease, alternated with one of the products listed above plus a fixed copper. The maneb plus copper combination is a protectant spray and must be applied before conditions conducive to Phytophthora prevail. Growers may want to consider up to three maneb/copper applications on 7-10 day intervals starting 2 to 3 weeks after the last Ridomil Gold application.

No fungicide has been shown to be sufficiently effective to be the sole management strategy for Phytophthora diseases, but when used in conjunction with cultural practices they can be a valuable tool.

- based on work by F.J. Louws, G.J. Holmes, and K.L. Ivors, Extension Plant Pathology, NCSU; adapted for New England by A. Cavanagh

Location	Z1	EII	Total ECB	Total CEW
CT Valley				
South Deerfield	1	5	6	-
Deerfield	1	5	6	-
Sunderland (1)	4	9	13	-
Sunderland (2)	5	8	13	0
Hadley (1)	5	11	16	-
Hadley (2)	4	9	13	-
Hatfield	2	13	15	-
Easthampton	3	14	17	-
Central & Eastern MA				
Rehobeth	2	25	27	-
Concord	3	5	8	1
Tyngsboro	2	10	12	-
Dracut	12	1	13	3
Lancaster	5	8	13	0
Northbridge	10	0	10	0
Spencer	5	0	5	0
Sharon	7	22	29	-
NH				
Litchfield, NH	0	2	2	
Hollis, NH	0	9	9	
Mason, NH	0	0	0	

CORN REPORT

Many early fields are in pre-tassel and tassel stage, while a few are even silking. For fields that have received much rainfall this week, growers are hoping for a few days of warm temperatures and sunshine for their later plantings. European corn borer (ECB) trap counts seem to be staying steady in most locations; flight remains in the double digits in the Connecticut valley, while Rehobeth still has much higher flight at 27. Degree day accumulations indicate that we should be at peak flight for many locations, while in cooler locations flight remains in single digits. ECB eggs require 100 degree days from egg laying to hatch. Degree day accumulations for New England may be found here: http://www.nrcc.cornell.edu/grass/grassWeb_dd2.html.

The first field scouts were made this week in tasseling sweet corn fields. Infestation levels were ranged from low, around 4%, to above the 15% threshold at 18%, 22% and 30%, warranting sprays. European corn borers that were found were small, 1st and 2nd instars indicating that hatch most likely occurred within the past few days. The time to scout for ECB feeding damage is when the pre-tassel begins to form, and the borers are the most exposed. Scout your pretassel corn and if >15% have borers, spray as tassels emerge, when

borers are most exposed. To scout, pull out the emerging tassels to look for tiny black-headed white larvae or frass (white to brown, the size of fine sand). Or, pull back the leaves to search tassels. Before insecticides have been applied, scouting is fast and easy because any sign of feeding is an almost sure sign of live larvae. After the first spray, feeding damage may be from the previous week so finding live larva is more important for an accurate estimate of the number of infested plants. Scout again 3-4 days after spraying to see if infestation has decreased or if another spray is warranted. At high levels of infestation or where new eggs are still hatching, it often takes two sprays, 5-7 days apart to bring the population under control.

Something you may want to keep in mind when/if you are deciding to spray for borers is the impact the material you use will have on beneficials in your field. Choosing an insecticide that is less toxic to non-targets such as Spintor or Avaunt, will conserve the population of natural enemies and reduce if not eliminate the need for aphid and other secondary pest control later in the season.

For information on scouting procedures and implementing a sweet corn IPM program on your farm, visit www.umassvegetable.org to download a copy of the UMass Extension publication Using IPM in the Field Sweet Corn Insect Management Field Scouting Guide or email umassvegetable@umext.umass.edu to request a free copy.

- C. Huffman, UMass Extension

UNDERSTANDING AND CONTROLLING DAMPING-OFF.

Damping-off can kill seedlings before they break the soil line (pre-emergent damping-off) or kill seedlings soon after they emerge (post-emergent damping-off). Common pathogens that cause damping-off include Pythium, Phytophthora, Rhizoctonia and Fusarium spp. Although all four pathogens are associated with damping-off, the conditions which favor their development are very different. In general, Phytophthora and Pythium are more likely to cause damping-off in cool, wet soils, while Rhizoctonia and Fusarium are more likely to cause damping-off under warmer, drier conditions.

In general, Pythium tends to kill seedlings before they emerge where Rhizoctonia and Fusarium tend to kill seedlings after they emerge. There are exceptions to the rules in some cases, but none the less, all damping-off pathogens can cause serious losses if not controlled properly. Control of damping-off depends on a number of factors. First is recognizing the conditions which may be leading to the problem (i.e. weather, greenhouse growing conditions) and secondly, identifying the pathogen causing the problem. Why is this so important? The fungicides applied to prevent or control damping-off are specific in the pathogens they control. Fungicides used to control Pythium or Phytophthora won't control the other damping-off pathogens. Why is this? The biology of the fungus and the mode of action of the fungicide dictates fungicide efficacy. For example, Ridomil Gold and Ultra Flourish (mefenoxam, FRAC code 4) and

Previcur Flex (propamocarb, 28) helps control the 'water molds' (Pythium's and Phytophthora) where Terraclor (PCNB, 14) and Rovral (iprodione, 2) help control damping-off caused by Rhizoctonia. Therefore, it is extremely important to know which pathogen is causing the damping-off problem and which fungicide to properly apply. Always refer to the fungicide label for crop use, pathogens controlled and application rates.

- Andy Wyenandt, Ph.D., Specialist in Vegetable Pathology, Rutgers University

UPCOMING MEETINGS

Pleasant Valley Farm Twilight Meeting

255 Merrimack St. Methuen, MA

Tuesday June 23, 5pm-8pm

**2 Pesticide Applicator Training Credits are available

Topics: Phytophthora capsici management, cucurbit disease management, growing and marketing new crops for expanding ethnic markets in New England, focus on okra, chipilin ('edible alfalfa') and mixixe (spiny cucumber); mums on drip

irrigation; drip irrigation systems with double sand filter pulling water out of Merrimac river; lettuce production harvested June to mid October with baby lettuce, full sized heads and bagged Romaine hearts; Beehives to pollinate summer squash and zucchini; biocontrols for European corn borer in peppers: GAP: getting the pack shed ready for Good Agricultural Practices audit; Starting a CSA on the farm

Light supper will be provided. Funding provided by MDAR, EPA Region I, and USDA sources.

Driving Directions: I-495 from N or S take exit 46 for Pleasant Valley, make a left off the ramp, drive 0.7 mile, look for farm sign on right. Park next to greenhouse.

For advance information, call UMass Extension Vegetable program, 413-545-3696; for last minute info call Rich Bonanno 978-361-5650

Aquaculture Workshop: Water Quality and Re-circulating Aquaculture Systems

Location: 302 Agric. Engineering Bldg., UMass Amherst

Saturday, June 27, 9 am - 3 pm

UMass Extension Western Mass. Center for Sustainable Aquaculture 413-545-1055; chollingsworth@umext.umass.edu; www.umass.edu/aquaculture

Vegetables, Energy Crops, Wheat, and Zone Tillage Field Day at the UMass Crops Research and Education Farm, South Deerfield.

89-91 River Rd, South Deerfield, MA

Thursday July 16, 2009

2:00 Understanding and Using Combines.

3:00 Heritage Wheats – Varieties from gene banks and farmers of the Old and New Worlds

4:00 Zone tillage demonstration

5:00 Supper – will include specialty breads and ethnic crops

6:00 Choose your tour:

1: Energy Crops: sunflower, crambe, oilseed rape, soybean, grain corn, and switch grass experiments.

2: Vegetables:

- ethnic crops including okra, mixixe (spny cucumber), chipilin (legume herb) and taioba. Production and marketing, field and high tunnel. Frank Mangan
- ecology of cucumber yield: cucumber beetles above and below ground, pollinators, and mycorhyzal fungi
- organic beetle controls in eggplant and cucurbits
- Brussels Sprouts variety trial for yield and disease resistance
- UMass Student Farming Enterprise
- roller-crimper timing to kill cover crops
- edamame variety trials

Pesticide applicator credits have been requested.

This field day is funded through grants from Northeast SARE, Mass Dept of Food and Agriculture, EPA, and other sources.

For more information contact Ruth Hazzard 413-545-3696, umassvegetable@umext.umass.edu

New Hampshire Meetings

NH Vegetable & Berry Twilight Meeting

Piccadilly Farm, Winchester NH

Thursday July 2, 5:30-7:30pm

Integrated pest management (IPM) plans for organic diversified vegetable producers, CSA marketing, and more. For info, contact Carl Majewski at carl.majewski@unh.edu or 603-352-4550.

Grape Twilight Meeting

Haunting Whisper Vineyard, Danbury NH

Monday July 6

For info, contact Amy Ouellette at 603-225-5505 or amy.ouellette@unh.edu.

Farm to Restaurant Twilight Meeting

Monadnock Berries, West Hill Rd., Troy NH

Tuesday July 7, 6:30-8:30pm

Marketing to local businesses, and on giving area businesses and restaurants a view of farm production in NH. For info, contact Carl Majewski at carl.majewski@unh.edu or 603-352-4550.

New Hampshire Tree Fruit Twilight Meeting

Brookdale Fruit Farm, Rte 130, Hollis NH

Wednesday July 8, 5:30-8:00pm

Features Tracy Leskey and Starker Wright from USDA-ARS Appalachian Fruit Research Station in Kearneysville, WV. For info, contact George Hamilton at george.hamilton@unh.edu or 603-641-6060.

If you would like to become a Vegetable notes sponsor, please contact Jessica Dizek at jdizek@outreach.umass.edu or 413 545 1445

Vegetable Notes. Ruth Hazzard, editor and Amanda Brown and Andrew Cavanagh, assistant editors. Vegetable Notes is published weekly from May to September and at intervals during the off-season, and includes contributions from the faculty and staff of the UMass Extension Vegetable Program, other universities and USDA agencies, growers, and private IPM consultants. Authors of articles are noted; author and photographer is R. Hazzard if none is cited.