



VEGETABLE IPM MESSAGE

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CROP CONDITIONS

Most crops are growing well. Crops being harvested include summer squash and zucchini, cucumbers, tomatoes, lettuce, cabbage, broccoli and other brassica greens, snap beans, and sweet corn. Bare ground corn as well as corn that was started early with plastic or row cover, has started to come in this week. Garlic harvest has begun. Potato growth is excellent. Peppers are setting and sizing fruit but main harvest is still 2-3 weeks away. Temperatures were cooler than normal last week, with heavy dew that was slow to dry off. Leaf wetness periods, while cool, extended into the morning. Hail and wind damage occurred in scattered locations. Cumulative degree-days for the season are somewhat ahead of the average at this time in eastern and central Mass, but somewhat low for the Connecticut Valley, and about average for the Berkshires.

APPLYING FERTILIZER THROUGH TRICKLE IRRIGATION

Fertigation is the injection of chemical fertilizer into irrigation water. This is typically done to apply nitrogen (N) and sometimes potassium (K) in place of conventional side-dressing. Nitrogen and potassium are available in liquid or soluble solid forms and can be applied through a drip system. Phosphorus, if

needed, should be applied at the beginning of the season.

By using a fertilizer injector, trickle irrigation can be used effectively to apply N during irrigation to crops. The need for supplemental N can be determined using the preside-dress soil nitrate test (PSNT) as it is with other application methods. If used, samples for the PSNT should be taken from under the plastic. The best way is to use a soil sampler, which will punch a small hole in the plastic and remove a core of soil. **Be sure to avoid cutting the irrigation tape when sampling under plastic.** For more information on the PSNT, see the June 14, 2001 *Vegetable IPM Message*.

With conventional topdressing or side-dressing, it is common to apply all the N in one or two applications. With trickle irrigation, it is convenient to apply small amounts of N weekly or even daily, which is desirable from a nitrogen management standpoint. For example, if you want to apply about 50 lbs N per acre, you can inject a little over 7 lbs N per acre per week for seven weeks, or about 1 lb per day if you prefer. Small weekly applications provide for more efficient crop use of N than one or two larger applications. Daily application offers little advantage over weekly application, but may be necessary if the injector cannot inject a week's worth of N during the appropriate irrigation run time. To do this, dissolve the desired amount of fertilizer for the area to be covered at one time in a bucket or barrel. In the example above, mix 7 lbs of N for each acre to be

covered at one time in water. Use enough water so that it will take about 20 to 40 minutes to complete the injection. If injection occurs more rapidly, the application may not be uniform. On the other hand, a longer injection time may result in excess water being applied. To prevent leaching, the irrigation system should not be run longer than necessary to effectively wet the root zone of the crop. This will distribute the material throughout the rooting area. Excess water will leach some of the N below the root zone. If there is not enough time to inject all the fertilizer needed for the week in one injection, then smaller, daily injections are preferable. Before injecting fertilizer, the entire system should be filled with water and at full operating pressure. When all the fertilizer has been injected, the system should be run long enough to flush all fertilizer from the lines. If fertilizer is left in the lines, clogging may occur due to chemical precipitates or growth of bacterial slimes.

Application uniformity is affected by field topography. Water gains pressure going down hill and loses it going uphill. There is a gain or loss of 1 lb per square inch for each 2.4 ft of change in elevation. There is also pressure loss due to friction. This loss is greater in small pipes than larger ones. If possible, the system should be set up so that water runs down hill to roughly offset friction loss. It is difficult to achieve even application of water and fertilizer in fields with knolls and dips.

Back flow preventors must be used so injected materials cannot flow back into the water source if the pump shuts off. Water should be filtered after fertilizer injection to remove any undissolved particles.

Calcium nitrate is the most popular source of N for injection. However, it is important to use the greenhouse grade, which dissolves readily, or buy the material already in the liquid form. Field grade

granular calcium nitrate is usually coated with wax to alleviate caking in the bag. It is difficult to dissolve in water and may clog emitters. Watch next week's issue for a discussion on water problems that may occur in fertigation.

-- John Howell

PYRETHRUM PRODUCT RECEIVES MASSACHUSETTS REGISTRATION

For two years, certified organic growers have been lacking any approved pyrethrum insecticides. Pyrethrum is a botanical insecticide produced from the flowers of a species of chrysanthemum that is grown in East Africa. While conventional growers have a wide range of synthetic pyrethroids available, the botanical equivalent has been unavailable for organic producers. A new product, Pyganic Crop Protection EC 1.4 (McLaughlin Gormley King Co.) contains pyrethrum as the active ingredient and has eliminated those inert components which caused other pyrethrum products to be prohibited. The Organic Materials Review Institute (OMRI), which reviews and approves products for organic certification and which now works closely with the National Organic Program, has approved this product. It has national registration from EPA, but must be approved in each state before it can be distributed in that state. Until this week it was not approved for use in Massachusetts. This week the Pesticide Board Subcommittee at the Department of Food and Agriculture approved Pyganic for use in Massachusetts. It also has approval in Connecticut, Maine, and Rhode Island, while registration in Vermont is (to our knowledge) still pending.

This is good news for organic growers, who are particularly concerned at this time about leafhopper control. Suppliers in Massachusetts need to arrange for shipment of product from the distributor in

California. Pyganic 1.4EC has broad registrations for virtually all vegetable crops and small fruits, and a wide range of pests. This does not necessarily mean that there is firm data on efficacy for all those situations. However, it gives growers an option for controlling difficult pests such as leafhopper. Rates are 1-2pt/acre. Sources in the Northeast include Base Organic, Inc in West Lawn PA (610-927-1942, website www.baseorganics.com; email

chris@baseorganics.com). Growers could also call Dennis Brust of Monterey Chemical Company (970-879-9370), or contact their local supplier.

PEPPER

Rains may have leached available **nitrogen**. While it is important not to over-fertilize, low fertility at this time will reduce fruit growth. Watch for signs of nitrogen deficiency such as light green color or yellowing lower leaves. The PSNT test can be used to determine if the soil has enough Nitrate-N for crop needs. A threshold of 30-35 ppm nitrate-N is appropriate for peppers. The source of N is also important. High levels of ammonium can inhibit Ca, Mg and K uptake. **Blossom end rot** of peppers can occur if calcium is limiting during fruit development. Other factors such as plant stress play a role in this, but it is prudent to avoid using ammonium fertilizers or urea, which is converted to ammonium, after fruit has set. Calcium nitrate, or if additional K is needed, potassium nitrate are good sources of N for side or top dressing because they provide all of the N as nitrate.

The second flight of **European corn borer** has not begun yet, so fruit is not currently at risk from borer infestations. Watch for build-up of **green peach aphids** by checking the undersides of leaves (see last week's issue for thresholds). Scout fields for **bacterial leaf spot**. Leaf symptoms begin as small

dark green or water-soaked spots, which turn into black or brown spots of dead tissue. Advanced symptoms are irregular brown blotches and blighting along margins or on the whole leaf. Severely affected leaves drop from the plant. Copper applications on a weekly basis are recommended if you see symptoms.

--John Howell and Ruth Hazzard

TOMATO

Early blight, Septoria leaf spot and bacterial canker have been observed in tomatoes. **Early blight** develops on older or inner leaves first; symptoms include rounded brown lesions on leaves that have a target-like ringed appearance. **Bacterial canker** very rarely produces leaf spots, but always has brown scorching or "burning" of the leaf margins. A yellow halo or margin may be present in either disease. In later stages of bacterial canker, when bacteria have invaded the vascular system, symptoms include wilting or death of one side of a compound leaf. Fruit will show small white spots with dark, raised centers. Another disease that may show up at this time (especially in unsprayed tomato) is **Septoria leaf spot**, which begins on lower leaves with small circular spots that have tan to gray centers and dark brown margins. Lesions remain small, up to ¼ inch in diameter. At their center, tiny black dots – fruiting bodies - can be seen. These are not present with early blight. It can be difficult to identify these diseases from foliar symptoms - if you want to know for sure what disease you have, contact the Disease Diagnostic Lab (413-545-1045). Where canker or other bacterial diseases are present, weekly applications of copper are recommended. Fungicide applications on a 7-10 day schedule are recommended for early blight.

Scout for **tomato hornworm**, which has been reported and occasionally causes economic damage.

TWILIGHT MEETING JULY 31: **WARD'S BERRY FARM**

Location: Sharon, MA

Time: Tuesday July 31, 5:30 – 8:00 p.m.

Questions: Contact Frank Mangan 978-422-6374

Ward's Berry Farm was established in the early 1980's by William and Ann Ward. Since then, the focus has been high value specialty crops for retail sale at the farmstand. A new year-round farmstand has been open since January 2001. The business is operated by sons Jim and Bob Ward with lots of part-time and some full-time help. Field crops include sweet corn, pumpkins, tomatoes, gourds, decorative corns, strawberries, blueberries, squashes, beans, peas, root crops. Wards have learned to live with farming in a Zone II recharge area, by using a banded delayed application of herbicides in corn and no herbicides in most other crops. Ward's Berry Farm has a production greenhouse and does school tours, parties, value-added products, and sell both pick-your-own and wholesale.

Directions: Interstate 95, Massachusetts Exit 8 (This is the segment of 95 between Boston and Providence.) Can be accessed from Rte 495 or old Rte 128. Go east, toward Sharon ½ mile (past Shaws Plaza). Farm is on the right (yellow sign).

One contact hour for PAT credit will be granted.

MASSACHUSETTS FLOWER **GROWERS SUMMER FIELD DAY 2001**

The University of Massachusetts Extension and the Massachusetts's Flower Growers Association are co-sponsoring a summer field day on **Thursday, July 26, 2001 from 1:30 to 7:15 p.m.** to be held at Elm Bank Reservation in **Dover, MA**. This event will feature talks given by Joe O'Donovan from Ecke Ranch, John Peterson & Nancy Christensen from the

Massachusetts Horticultural Society, Douglas Cox from the University of Massachusetts, and Bob Luczai from Ball Seed Co. Topics include: "The Flower Fields: Production Tips and What's New and for Spring 2002"; "Problems and Solutions for Poinsettia Growers"; "Marketing/Grower Panel: The best and worst ideas we used this past year"; and "Bedding Plant Trial Gardens". There will also be a trade show of growers and suppliers, entertainment and a "Fantastic Lobster/Clambake and Chicken Dinner".

Registration for the field day is \$15, field day plus dinner is \$35. Please call Bob Luczai from the Mass. Growers Association, by July 22 at (978) 952-0116 so that food may be provided for you. Walk-ins are welcome.

Directions: Take Route 16 or Route 9 to Route 16 into Wellesley center. Turn onto Route 16 West in Wellesley center and travel 1.7 miles. Turn left into Elm Bank Reservation across from Hunnewell Farms.

POTATO, BEAN AND EGGPLANT

Potato leafhoppers are building up in potato and need to be controlled to prevent hopperburn. Use a threshold of 1 nymph or adult per 10 compound leaves. Leafhopper damage in beans can easily be mistaken for disease. Younger plants are the most susceptible to damage. For potato, Monitor and Dimethoate have systemic activity and will also control aphids. New **Colorado potato beetle** adults are active and can do significant damage, especially to eggplant, if not controlled. Rotate classes of materials to avoid resistance development. No new occurrences of **late blight** have been reported in potatoes or tomatoes in the Northeast.

CUCURBITS

Cucumber harvest has begun. Fruit set is progressing for winter squash and pumpkin. Time to get **deer fence** in place! **Gummy stem blight** has been observed in early melons. **Powdery mildew** has been observed in zucchini and summer squash, but not in winter squash and pumpkin. Scout crops for symptoms of powdery mildew, especially searching older leaves, which show symptoms first. The initial symptoms are light green to yellow blotches on the upper surfaces of the leaves. These lesions may become necrotic (brown/dead) with time. A white to gray, powdery covering develops on the upper and lower leaf surfaces. Entire leaves may die and shrivel, but remain attached to the plant. The powdery mildew spores are carried on air currents, and do not need a film of water on the leaf surface to infect. Infection is favored by temperatures in the mid 80's F (30°C), but once infection has occurred temperatures above 85°F will hasten the development of symptoms and leaf death.

Spray programs for vine crops need to address **black rot** and powdery mildew as well as other fungal diseases such as Anthracnose. The following recommended spray program covers these bases while keeping risk of resistance development low:

1. Where black rot (or gummy stem blight) is of concern, apply chlorothalonil (e.g., Bravo) when the fruit reaches 4 inches or if symptoms are observed.
2. As soon as powdery mildew has been detected in the field, apply a systemic strobilurin fungicide (Quadris or Flint).
3. After 7-14 days (depending on weather), rotate to another systemic fungicide with activity against powdery mildew (Benlate, Topsin M, or Nova plus chlorothalonil)

4. If further fungicide applications are needed, rotate to Quadris or Flint.

Copper products should be included if bacterial diseases are present.

Fungicide resistance is a concern for black rot (gummy stem blight), **downy mildew**, and *especially for powdery mildew*. Resistance to Quadris has occurred in many locations around the globe and can develop rapidly. Do not rotate Flint with Quadris, which are both strobilurin fungicides. Benthimidazol fungicides (Benlate and Topsin-M) should not be rotated with each other and should be used only once per season.

Good coverage of leaf undersurfaces is difficult in cucurbits. One advantage of systemic products is their ability to enter tissues and compensate to some degree for poor coverage. However, it is important to maximize coverage as much as possible. For best coverage:

- Drive slowly (2 mph or less).
- Use high sprayer pressure (80 psi).
- Use high volume (75 gpa).
- Use closely-spaced nozzles (10 inches).
- Direct sprays at an angle to canopy (15°).
- Check coverage with water sensitive cards.

--Rob Wick and Ruth Hazzard

SWEET CORN

Enjoy the lull! **European corn borer** captures hit bottom this week, and **corn earworm** has not been active anywhere in the state. Pretassel corn is below threshold, but some late whorl blocks were reported above threshold. **Armyworm** infestations are winding down – after leaving barren hayfields in spotty outbreaks across the state. Watch for buildup of **corn leaf aphid** in tassels; note level of beneficials when scouting. NYS recommends aphid controls be applied if 50% of the plants have 50 or more aphids per emerging tassel.

SWEET CORN TRAP CAPTURES AND SCOUTING DATA JULY 13-19

Town	Date	ECB Z1	ECB E2	TOTAL ECB	CEW	% PT
Berkshire Region						
N. Bennington, VT	July 18	1	0	1	0	--
Stephentown, MA	July 17	6	0	6	0	--
Sheffield	July 18	1	0	1	0	--
Conn. River Valley North to South						
Plainfield, NH	July 18	0	0	0	0	6%
Westminster VT	July 18	0	0	0	0	2%
Hatfield	July 16	0	0	0	0	6%
South Deerfield	July 18	0	2	2	2	--
Hadley	July 18	2	0	2	0	--
Southwick	July 18	1	0	1	0	--
Feeding Hills	July 16	0	0	0	0	12%
East/Central MA, North to South						
Ipswich	July 17	0	0	0	0	3%
Dracut	0	0	0	0	0	--
Bolton	July 19	0	0	0	0	--
Sutton	July 19	0	2	2	0	--
Monson	July 18	0	0	0	0	11%
Still River	July 19	--	--	--	0	--
Leicester	July 18	0	0	0	0	9%
Millis	July 16	0	0	0	0	12%
Hopkinton	July 17	3	0	3	0	10%
Seekonk	July 18	0	2	2	1	--
Swansea	July 18	0	0	0	0	--
Rochester	July 16	0	2	2	1	--
Rehobeth	July 18	0	0	0	0	--
Skip Paul's Farm, CT	July 17	0	0	0	0	0%

-- Information not available.

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.

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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