



## VEGETABLE IPM MESSAGE

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### CROP CONDITIONS

After nearly three weeks of baking heat and sun, irrigation was added to the long list of daily tasks this week. Region-wide, temperatures averaged 5 °F above normal for the week ending July 7, and rainfall virtually nil. Some areas received light rain yesterday and more is coming soon. Daylight is long and work days even longer. Crop growth is good and harvest began this week for cabbage, beans, carrots and -- finally -- sweet corn. Weeds take no holidays, especially when provided with freshly cultivated soil, good moisture, long days and lots of heat. Watch for galinsoga which is busy flowering and setting seed while your back is turned. Transplanting of late-season cabbage and broccoli and tomatoes is underway.

### CUCURBITS: WATCH FOR POWDERY MILDEW

Scout for **powdery mildew** in all vine crops, especially searching lower, older leaves for symptoms. Powdery mildew has been observed in summer squash and zucchini. Search at least 50 leaves, both upper and lower surfaces, in groups of 5 leaves in 10 locations throughout the field. Look for light green to yellow blotches on the upper surface, or a white to gray, powdery covering on the upper or lower leaf surfaces. These powdery areas most often start on the underside of the leaf, often as small as a quarter. The last week of July and first two weeks of August are typically the time when powdery mildew shows up in pumpkin and winter squash.

**Begin fungicide applications** as soon as powdery mildew is observed, and continue at approximately 10-day intervals. Rotate among classes of materials (rotate Quadris or Flint, both strobilurins, with Nova, also a systemic but with a

different mode of action) and use a broad-spectrum fungicide (eg chlorothalonil) as well. Resistance to the systemic fungicides has been observed in other regions and when it happens, it tends to be a high level of resistance. Avoid overuse (not more than twice per season per class of fungicide), rotate to other classes, and use a non-systemic fungicide at the same time to reduce the chance of resistance.

**Striped cucumber beetle** numbers are down. Watch for **squash bug** adults, eggs and nymphs.

### POTATO LEAFHOPPER IS HERE

**Potato leafhoppers** are building up in **potato** and **beans**, and need to be controlled to prevent hopperburn. Scout for the adults, which are about 1/4 inch long, light yellow-green, and fly up from foliage when it is disturbed or shaken. Also look for nymphs, which are found on the underside of leaves and are light green, wedge-shaped and very fast-moving. Leafhoppers can also be monitored with sweep nets. If they are really thick, they flood the air around the tractor when you cultivate or hill. It's definitely preferable to scout and control them before they reach that level, because damage occurs at very low numbers. 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. Both adults and nymphs cause damage. In **potato**, leaf margins turn brown and brittle first, followed by death of entire leaves. Damage and yield loss can be severe on early-season varieties of potato, as well as in green beans. Some late-season varieties of potatoes such as Katahdin seem to have more tolerance. In **beans**, the leaf turns mottled brown as if infected with a disease before dying completely. Leafhopper damage in beans can easily be

mistaken for disease. Younger plants are the most susceptible to damage. Plant injury and yield loss can be significant.

Since most growers in New England scout by looking at leaves rather than using a sweep net, we recommend a threshold based on insects per leaf: In potatoes it is one nymph or adult per 10 leaves. Check 25 compound leaves throughout the field to determine numbers per leaf. Cornell recommends a threshold of 2 nymphs per tri-foliolate leaf in beans prior to blossoming. Eggplant can also be affected: University of Connecticut has established a threshold of 1.5 leafhopper per leaf in eggplant.

In potato, many materials registered for Colorado potato beetle adults will control leafhopper. Admire treatments may provide leafhopper control. See the *New England Vegetable Management Guide* for recommended insecticides. In beans, in addition to those listed in the *Guide*, Sevin XLR Plus, Capture, Warrior, Pyganic 5.0 EC and Provado are now labeled for leafhopper control. If the material is effective, one application generally is sufficient to bring leafhoppers under control; however, fields should be re-scouted to be sure the numbers are low.

TOM-CAST DSV's for Summer 2003					
Month	Day	DSV/Day	Accumulated DSV	Avg. Wet Temp F	Wet hrs/day
June	28	1	40	63	11
	29	1	41	65	4
	30	1	42	58	8
July	1	1	43	59	11
	2	0	43	0	0
New Data Set					
	3	2	45	68	12
	4	2	47	72	9
	5	2	49	72	11
	6	2	51	66	11
	7	2	53	72	8
	8	2	55	70	11

Leafhopper is one of the most difficult pests for organic potato growers. Pyrethrin products provide some control and Pyganic 50.EC is approved and labeled in both beans and potato. Diatect, a mixture of pyrethrum and diatomaceous earth is another option which has NOP approval. This product showed significant reductions in leafhoppers in a potato study

in Maryland. This product may not be available locally; the website reference is [www.diatect.com](http://www.diatect.com).

## TOMATO

Make sure plants have adequate, consistent water and adequate nitrogen, because a healthy plant can fight off disease better than a stressed plant. Use the PSNT test to determine whether more N is needed. Watch for first symptoms of **early blight** or **Septoria leaf spot** on lower leaves and maintain a regular fungicide program where possible. Since July 3, nights have had dew periods of 8-12 hours with average temperatures of 67-72 degrees F (see table), generating daily DSV's of 2. This means that conditions have been favorable for early blight. For the period ending July 8, 15 DSV's were accumulated in of period 10 days. Thus spray intervals should not be extended beyond 10 days at this time; and should be tighter if bacterial disease is a problem. Also be on the lookout for bacterial diseases including bacterial canker. Marginal necrosis of the leaves is one key external symptom

## BRASSICAS: CATERPILLAR ALERT

**Diamondback moths (DBM) and imported cabbage worms (ICW)** are hatching out and are likely to be above thresholds in many fields. **Cabbage loopers (CL)** have also been observed. When scouting for worms, be sure to look beneath the leaves and on the inner most portions of the plants. Look for feeding damage as well as for caterpillars. Tiny feeding holes are often easier to spot than the small worms. Apply controls when caterpillars are small, and direct materials at the undersides of leaves as much as possible. Use at least 50 gal/A of water to achieve better spray coverage, and use a spreader-sticker.

A **threshold of 15%-infested plants** (an 'infested' plant has at least one caterpillar of any species) is recommended for any heading cabbage, broccoli, and all leafy greens. Before the cupping stage, in cabbage and broccoli, use a threshold of 35% plants infested. These thresholds provide a clean crop at harvest.

A good comparison of “worm” insects at various life stages can be found at the following website (click on images to enlarge)

<http://www.ces.ncsu.edu/depts/ent/notes/Vegetables/veg012e/cwcompho.htm>.

**Imported Cabbageworm:** The larva is a slow-moving, velvety-green caterpillar, which grows through a series of five stages, or instars, to a length of 1 1/4 inches. Larger caterpillars have a delicate yellow line that runs lengthwise down the center of their bodies. Small larvae feed on the undersides of outer leaves after hatching. Larger larvae are more mobile and are often found in the florets of broccoli or feeding on the heads of cabbage. Larvae may also move to neighboring plants.

**Diamondback Moth** larvae grow through four instars to a length of 1/3-inch. They are light green; tapering to points on both ends and appearing scalloped or segmented along the edges of their bodies. During the first two instars, the larvae have black heads, which later lighten to match their green bodies. They can be distinguished from other caterpillar pests by their habit of wiggling frantically when touched or disturbed. They may also drop from the plant and suspend themselves on a silken thread until the disturbance passes. The larval stage lasts from two to four weeks, depending upon temperatures. Pupae are found attached to the undersides of crop foliage and appear to be thinly veiled under a fine, net-like silken cocoon.

The **cabbage looper** caterpillar is light green, with wavy white or light yellow lines down the back and sides. Full-grown larvae reach 1 1/2 to 2 inches. At rest or when disturbed, cabbage loopers of any size will raise the middle of their body in a characteristic “loop” shape. Eggs are round, light green or yellow, and laid underneath the foliage. Feeding tends to create ragged, large holes in foliage, on both frame leaves and heads.

**Insecticides for Caterpillars:** In the area of caterpillar control there are several new products available in addition to

those which have been labeled for a long time. These include spinosad (SpinTor 2SC, Entrust), Avaunt (indoxycarb), Confirm 2F (Tebufenozide) and Proclaim (Emamectin benzoate). It is possible to get excellent control of the three major caterpillar pests using low-risk products that are safe to handle and conserve beneficial insects (which do have an impact in suppressing aphids and caterpillars). It is also easier now to rotate among different types of products, to prevent selecting for resistance to any single product. The cost of the new products listed below ranges from \$7 to \$20 per acre, depending on whether high or low rates are used, compared to \$5 to \$12 per acre for synthetic pyrethroids, \$5 to 21 for carbamates, and \$3 to \$17 for Bt products.

*-R. Hazzard*

## **O**XIDATE UPDATE FOR ORGANIC FARMERS

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Certified organic growers who have been using Oxidate by BioSafe Systems for disease control in field crops are reminded that this product no longer meets the requirements of the National List of allowable products for certification under the National Organic Program. However, BioSafe Systems has reformulated Oxidate to meet the requirements of the National List. The reformulated product is called StorOx and is listed for use on field crops by the Organic Materials Review Institute (OMRI). Growers certified by NOFA/Mass Organic Certification may use StorOx immediately on their certified crops. Growers certified by other certifying agents must check with their agent to verify that StorOx is approved for use. Growers may not use leftover quantities of Oxidate on their certified crops. Any certified grower that has used Oxidate on their certified crops in 2003 must contact their certifying agent immediately.

*-Don Franczyk, Certification Administrator,  
NOFA/Mass Organic Certification*

## BUCKWHEAT AS A SUMMER COVER CROP

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Buckwheat is an excellent summer cover crop to follow peas, lettuce, and early harvested Cole crops for weed control and soil building at this time. After harvesting these crops, Buckwheat can be drilled at 48-70 lb./A (1-1.4 bushels/A) or broadcast at 60-96 lb./A (1.2-1.5 bushels/A). Buckwheat will cover a soil quickly and keep weeds out of the field. It will also attract beneficial insects to the field, loosen topsoil and rejuvenate low fertility soils. To keep it from becoming a weed problem in subsequent years, mow it down before it goes to seed. After mowing, it can be disked and planted to a fall cover crop like rye, wheat or barley.

-LPVP Pest Minder, Vol. 10, Letter 9

## PEPPERS

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Plants are gaining stature, putting out new blossoms, and beginning to develop fruit. Scout fields now for **aphids** and **bacterial leaf spot**. Aphids fly into peppers in June and July. The most common species is green peach aphid, which is light green, yellow green, or pink, with no distinctive marks. Wingless females feed on the underside of leaves, and give birth to tiny nymphs which look just like them. Most of the time, predators such as ladybeetles, lacewings, and aphid parasites keep aphid numbers under control in peppers. Avoiding unnecessary insecticide sprays will help reduce aphid problems later in the season. Aphids may build up after broad-spectrum insecticides are used, especially synthetic pyrethroids. In field studies comparing aphid numbers in permethrin-treated peppers vs. untreated or Bt-treated, we have found that the permethrin-treated plots developed high numbers of aphids and sooty mold on leaves and fruit.

**Monitoring aphids:** Examine the underside of four leaves per plant on 25 plants. Count aphids found. Calculate the average aphids per leaf (divide total by 100). **Threshold:** 10 aphids per leaf. At lower numbers, recheck to determine if populations are increasing. This threshold has been used successfully in IPM fields in MA and CT for many years. See *New England Vegetable Management Guide* for recommended materials.

**Pepper maggot fly** activity begins in mid July. Pepper maggot is an occasional pest at scattered locations in Massachusetts, especially in the southeast and in spots in central Mass. It tends to hit certain farms or fields fairly consistently from year to year. If pepper maggot is historically a problem on your farm, watch for activity – the best indicator is oviposition ‘stings’ on cherry peppers. Flies lay their eggs under the cuticle of the fruit, and the stings where flies deposited eggs show up as small dimples. Cherry peppers are a favorite host and it works very well to scout cherry peppers as an indicator of activity in other varieties. Research in Connecticut has shown that border sprays of pepper fields can give adequate control (pepper maggot flies come into the field daily from trees outside the field), and perimeter plantings of cherry peppers can retain nearly all maggot fly activity to the border. Check CT phone hotline (860-870-6954) for updates on this and other pests in Connecticut. The *Northeast Pepper IPM Manual* has great photos of this and many other pests and diseases – an excellent reference for any pepper grower!. This book can be purchased online from the UMass Extension Bookstore (<http://www.umassextension.org/Merchant2/merchant.mv?Screen=SFNT>) or by calling 413-545-2717. One or two sprays of Dimethoate or Orthene for control of adults will prevent infestation of fruit.

# POTATO DISEASE REPORT

*The following update is from plant pathologist Tom Zitter of Cornell University:*

To date there have been no reports of late blight anywhere in New York or in the Northeast. The same holds true for all Midwestern states. This is good news, given that we have exceeded 18 severity values in most locations in the state. Growers and scouts need to remain vigilant for the symptoms of late blight in the coming weeks. Early blight should begin to appear on the lower leaves where they touch the ground, are becoming senescent, and where the most favorable moist environment occurs. Remember, earlier heavy rains may have leached applied nitrogen, and this can lead to increasing plant susceptibility to the early blight fungus. Fungicides effective for early blight control include the strobilurin chemistries like Quadris or Gem (Headline is not yet registered) and should be tank mixed with a protectant fungicide such as chlorothalonil, mancozeb or metiram. The use of a tank mix will reduce the chance for the development of fungicide resistance of strobilurins to *Alternaria solani* (early blight).

Researchers like Walt Stevenson in Wisconsin, and results from our own plots at Freeville (Cornell Experiment Station), have shown that up to three sprays with this mixture alternated with chlorothalonil, mancozeb or metiram and then continuing at least weekly for the rest of the season with these latter materials will easily control early blight. Triphenyltin hydroxide mixed with chlorothalonil, mancozeb or metiram would also provide good control of early blight.

*-T. A. Zitter, Cornell Cooperative Extension, published in LPVP Pest Minder, Vol. 10, Letter 9*

## SWEET CORN

First corn was harvested this week – not for the holiday weekend, but soon after.

European corn borer flight is down, essentially over at most sites. We are finding very few egg masses in the field now – very little new hatch is likely to happen from this generation. However, we are still finding larval infestations over threshold in fields in pretassel – ranging around 20% infestation. The best time to spray is as those green tassels poke out of the whorl and open up. Follow with a second spray 5-7 days later if live larvae are still present 3-4 days after the spray and infestation with live larvae is >15%. The second scout takes a little longer because

Weekly Trap Captures of European Corn Borers and Corn Earworms in Sweet Corn						
Town	Date	ECB Z1	ECB E2	TOTAL ECB	CEW	% PT
Walpole, NH	7/10/03	0	0	0	0	11%
Plainfield, NH	7/9/03	10	0	10	0	25%
Westminster, VT	7/10/03	12	5	17	0	12%
South Deerfield	7/8/03	5	6	11	0	
Sunderland	7/7/03	0	0	0	0	
Hatfield	7/9/03	5	2	7		25%
Hadley	7/8/03	19	13	32	0	
Feeding Hills	7/8/03	1	0	1	0	19%
Lancaster	7/10/03	0	3	3	0	22%
Still River	7/9/03	1	3	4		
Concord	7/7/03	1	0	1	0	28%
Leicester/Spencer	7/9/03	0	1	1	0	22%
Northbridge	7/9/03	0	1	1	0	19%
Dighton	7/7/03	1	0	1		
Rehoboth	7/7/03	18	0	18	3	21%
Sharon	7/7/03	6	0	6	5	
Stephentown, NY	7/9/03	14	5	19		
Tyngsboro	7/7/03	0	0	0	0	21%

some damage may be from larvae that were killed by the spray and should not be counted in your decision. Larvae that are feeding in the tassel or in the stalk close to the tassel will exit their feeding holes and move down the stalk – so you have a chance to reach them with insecticide before they enter the ear. Infestation of new blocks is likely to decline after this. New flight usually begins the last week of July.

We picked up the first corn earworm moths in Southeastern Mass this week (Rehobeth and Sharon). It's no surprise that they first showed up in the southeast, which juts out into the Atlantic and picks up moths as they move up the coast on storm fronts. Captures were 3-5 moths per week. Central, northeastern, and western Mass had captures of zero CEW. Growers in the southeast with silking corn should be on a 6-7 day spray schedule. Elsewhere in the state, if you have cleaned up ECB in the tassel, silking corn should be fine without further sprays at this time. CEW watch is on!

A great resource for an 'early warning system' on migratory flights, and a regular update on trap counts is the Pest Watch site (<http://www.pestwatch.psu.edu/sweetcorn/tool/tool.html>).

You can see the counts reported every week for European corn borer, corn earworm, and fall armyworm, from PA, NYS, ME, DE and MA. For each location, you can view a graph of the captures for the season. Each site is color coded to indicate the level of trap captures for that week. You can also 'play' the map, seeing the changes over time. This map reports captures of zero from Long Island, but one per night from eastern Pennsylvania. This site is still in the development phase, but take some time to look around – it gives a great picture of what's happening with moth counts throughout the Northeast. More states and sites may be added soon.

-R. Hazzard

We would like to thank the following businesses for their sponsorship of Vegetable Notes:

**Family Farm Life and Casualty Insurance Co.**, 88C Main St., Northboro, MA 01532. Phone 508-393-9327. Contact: Dick Simonian. **“Call for the agent nearest you.”**

**Harris Seeds**, 355 Paul Rd., P.O. Box 24966, Rochester, NY 14624-0966 Phone 585-295-3600. Contact: Karen McGuire. **“A grower-friendly company.”**

**Superior Scale Company**, 154 Grove St., Chicopee, MA 01020. Phone 800-719-9040. Contact: Jerry Gamache. **“The farmer's friend.”**

*Vegetable Notes*, Ruth Hazzard, Editor. Nicholas Connor, Assistant Editor. *Vegetable Notes* 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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