



UMASS
EXTENSION



Vegetable Notes

For Vegetable Farmers in Massachusetts

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CROP CONDITIONS

It has been a good spring for field preparation and crop establishment, with the exception of some dry periods that required irrigation. The past week has demanded that growers and crops adjust to extremes of high and low temperatures. Hopefully the combination of high temperatures from last weekend and this long steady period of rain will prove beneficial for recent transplants. Fruiting crops are in the ground for the most part, including peppers, tomatoes, eggplants and cucurbits. Some that were held in the greenhouse during the hot days last week are showing signs of stress while they adjust to the cool, wet field conditions they are now under. Asparagus and rhubarb harvest is going strong and selling well along with other early season crops such as chard, arugula, salad mix, baby bok choy, and spinach. Lettuce and radish harvest is beginning. Vegetable bedding plants are selling well but perhaps not as well as many growers would like.

Expect to see the beginning of insect activity in the next few days as average daily temperatures are forecasted to stay at or above 60 degrees for most regions in the state. We have seen the start of the European corn borer flight. The first pest alerts are, as usual, flea beetles and cabbage root maggot fly on brassica crops. Striped cucumber beetles and Colorado potato beetle are waiting in the wings. Keep an eye on susceptible plants.

-A. Brown & C. Huffman

SPINACH LEAF MINER ON CHARD, BEETS OR SPINACH

It's disappointing to discover that your high-value early spinach and chard leaves are showing ugly feeding mines just as they are ready for harvest. Spinach leaf miner, typically an early-season pest, is active now, and may cause damage to early greens. It attacks crops and weeds in the plant family Chenopodiaceae which includes the crops chard, beets, and spinach as well as weeds like lamb's quarters and pigweed. Leafminer is a fly larva that burrows between the layers of a leaf eating everything but the epidermis. Early damage is a slender, winding 'mine,' or tunnel, but later these expand and become blotches on the leaves. Inside the mine is a pale, white maggot.



Leaf Miner Exposed

The fly overwinters as pupae in the soil and hatches in late April and May. The adult fly then lays eggs on the leaves and the resulting larvae begin their damage. The oblong white eggs, less than 1 mm long, are laid in neat clusters on the underside of the leaves. They are easy to spot if you scout by looking under the leaves. The maggots may migrate from leaf to leaf down a row. They become fully grown in just a few weeks and drop into the soil to pupate. The entire life cycle is 30-40 days. There are three to four generations per season. Typically mid-late May, late June and mid August are peak activity periods.



Leaf Miner Fly

In most seasons the damage is minimal and the plants will out grow it leaving only early leaves with cosmetic damage. In other years, or other fields in the same year, the damage may be great and if the plants are hit early and growth is slow because of weather conditions, the loss may be great. Treat

when eggs or first tiny mines are noticed. See the New England Vegetable Management Guide for products (<http://www.nevegetable.org/index.php/crops>). There are both conventional and organic products available. An adjuvant is recommended to improve efficacy. Some soil-applied systemic neonicotinoids are registered, but be sure to observe the long days to harvest restrictions. Most of the products labeled are for foliar applications.



Leaf Miner Tunnels

Weed control and crop rotation are the first line of defense. Row covers can also be used to exclude flies if placed over the crop before flies are active or immediately after planting. “Spinach” and “beet” leaf miners are very similar species in behavior, appearance, and damage and can’t be distinguished in the field.

-Adapted by R Hazzard from Eric Sidemann, Maine Organic Farmers and Gardeners Association

USDA EXTENDS SIGN-UP FOR NEW ORGANIC INITIATIVE

\$308,000 in funding available to Massachusetts farmers

The USDA Natural Resources Conservation Service (NRCS) has extended the sign-up period for Massachusetts organic farmers and those in transition to organic production to apply for technical and financial assistance under a new federal initiative. Massachusetts farmers may now apply through June 12th.

More than \$308,000 in funding is available in Massachusetts for the Organic Initiative through NRCS’s Environmental Quality Incentives Program (EQIP). Participants will receive help implementing conservation practices; six core practices are being emphasized with higher payment rates, including: conservation crop rotation, cover crop, nutrient management, pest management, prescribed grazing, and forage harvest management.

NRCS will also assist with other conservation practices that address site-specific natural resource concerns. Initiative rules limit the amount of funding a participant may receive to \$20,000 per year or \$80,000 over six years.

Farmers should contact their local USDA Service Center to determine eligibility. USDA service center locations are listed on-line at <http://offices.usda.gov> or in the phone book under Federal Government, U.S. Department of Agriculture. General program information is available on the NRCS Massachusetts website at www.ma.nrcs.usda.gov. The 2009 Organic Initiative is a nationwide special initiative to provide financial assistance to National Organic Program (NOP) certified organic producers as well as producers in the process of transitioning to organic production. Those applying for this special funding will be competing only among other organic/transitioning farmers. The objective of this initiative is to make EQIP assistance more available, appropriate and accessible to organic food producers. Organic producers may also apply and compete for funding under the general EQIP program where the payment limitation is \$350,000 over six years.

EQIP is a voluntary program that helps farmers and forest landowners address water quality, water conservation, invasive species control, soil quality, erosion control, nutrient and pest management, residue management, irrigation efficiency, energy conservation, air quality and other natural resource concerns. NRCS offices in Greenfield, Hadley, Holden, Hyanis, Pittsfield, Westford, and West Wareham work with local conservation districts and other partners to serve farmers and landowners throughout the commonwealth.

UMass Extension is offering assistance with the Integrated Pest Management practice to growers (organic or conventional) who currently have or are applying for an EQIP contract that includes this practice. Growers who would like help or consultation regarding the Integrated Pest Management portion of their EQIP contract or application should contact us at 413-577-3976 or by email at umassvegetable@umext.umass.edu.

MANAGING COLORADO POTATO BEETLE

Colorado potato beetles (CPB) adults will soon show up in potato and eggplant crops. The bright yellow eggs are laid in clumps with about 30-35 eggs each, generally on the undersides of leaves. As with most other insects and plants, there is a direct relationship between higher temperatures (in the range between about 55 and 90 degrees F) and faster rate of development. That includes egg-laying, egg hatch, larval growth, and feeding rates. A period of cold, rainy weather slows everything down, but we can expect a surge of adults and shiny yellow eggs to appear with the next hot spell.

New chemistry is available this year for CPB, which is good news when trying to control a pest that has a stunning reputation for rapidly becoming resistant to insecticides. See below for description of Coragen, which has been shown to be very effective against both adults and larvae. Radiant is a 'second generation' spinosyn, similar to Spintor and Entrust.

Scouting and Thresholds

Walk your fields and look for CPB adults and eggs. A treatment should be considered for adults when you find 25 beetles per 50 plants and defoliation has reached the 10% level. The spray threshold for small larvae is 4 per plant; for large larvae, 1.5 per plant (or per stalk in midseason), based on a count of 50 plants or stalks.

Controls are needed on eggplants when there are 2 small or 1 large larvae per plant (if plants are less than six inches) and 4 small larvae or 2 large per plant (if plants are more than six inches).

Potatoes can tolerate 20% defoliation without reduction in yield (or even more, depending on time of the season and cultivar). Damage to eggplant seedlings from adult feeding is often severe enough to warrant control of the adults. In potato, adult damage in rotated fields may not be significant, so you may be able to wait until after egg hatch to kill both adults and larvae.

Look on the undersides of leaves for the orange-yellow egg masses. The fresher the eggs, the brighter orange the eggs will appear. Eggs hatch in 7-10 days, depending on temperature. If you want to know when the earliest eggs are hatching, you can flag a few of the earliest egg masses you find with bright tape or flags, and then keep an eye on the hatch. Hatched larvae go through four stages before they become adults. In the first stage, the larvae are about the same size as the eggs and in the second stage they are about an eighth of an inch long. As the larvae get bigger, they do more feeding. The fourth, or largest, stage does 85% of the feeding damage. It's a good idea to prevent beetles from ever reaching the fourth instar!

After larvae complete their growth, they drop to the ground and burrow into the ground to pupate. About ten days later the next generation of adults emerges – ready to feed. If they emerge before August 1, they will lay more eggs. After August 1, they feed and head to overwintering sites. Good control in June prevents problems with CPB in August.

Cultural Controls

Crop Rotation. The single most important tactic for CPB management is to rotate potatoes or eggplant to a field that is at least 200 yards from the previous year's fields. Barriers such as roads, rivers, woodlands, and fields with other crops are helpful. Rotated fields tend to be colonized 1-4 weeks later in the season. Also, the total population of adult beetles is lower, producing fewer larvae to control.

Perimeter treatments or perimeter trap cropping can be applied to potato. One approach is to plant a barrier crop between overwintering sites and this year's crop and get it in earlier than the main crop; then control early-arriving beetles with a systemic or foliar insecticide. Another approach is to plant three to five rows of potatoes treated with a systemic insecticide (for example, Admire or Platinum – assuming resistance is not a problem) in a perimeter around the field, this treated crop will kill up to 80% of the colonizing beetles. A perimeter spray could also be used. In eggplant or tomato, the perimeter border can be an Italian eggplant type, which is more attractive to both CPB and flea beetles. Treat only the border, as soon as beetles arrive.

Early planting. Green sprouting, also known as chitting, prepares whole seed potatoes to emerge rapidly, gaining about 7-10 days to harvest. This early start makes it easier for the crop to put on growth and size before CPB adults and larvae arrive. It can be combined with raised beds and plasticulture. While it won't avoid damage altogether, it may reduce the need for insecticides. Refer to the New England Vegetable Management Guide (online at www.nevegetable.org) for more details.

Late planting. Another strategy for beating the beetle is to plant late. CPB adults that do not find food leave the field in search of greener pastures. Planting after mid-June, using a short season variety, often avoids CPB damage and eliminates the need for controls.

Straw mulch. It has been well documented that when potato or eggplants are mulched with straw, fewer Colorado potato beetle adults will settle on the plants and fewer eggs will be laid. This can be accomplished on larger plantings by strip planting in a rye mulch, followed by mowing and pushing the rye straw over the plants after they emerge. For smaller

plots, straw may be carried in.

Organic controls. Spinosad and azadiractin are two options. There is no longer a registered product for agricultural use in organic crops in the US that contains *Bt tenebrionis* as the active ingredient. *Beauveria bassiana* (Mycotrol O) has been shown to suppress CPB populations though does not provide immediate control. Cultural controls are key to reducing dependence on a limited number of products.

Biological Control. There are numerous predators and parasitoids that attack CPB adults (a tachinid fly), larvae (12-spotted ladybeetle, spined soldier bug, ground beetles), and eggs. Conserve these beneficials by using softer chemistries.

Resistance management must be part of every potato grower's plan.

Colorado potato beetle has a remarkable capacity to develop resistance to insecticides. Based on a fifty-year track record, we can expect that any insecticide that is used repeatedly on the same population of Colorado potato beetles (that is, those in the same field or a farm with nearby fields) will lose its efficacy within 2-4 years. Wherever possible, growers should rotate classes of insecticides and avoid using the same chemistry more than once per year or even better, once every other year. Do not use the same chemical class on successive generations in the same year. There are enough different classes to allow this! Note that in the New England Vegetable Management Guide, as well as on all pesticide labels, each insecticide has a Group Number, which identify chemistries with the same mode of action. Avoid using insecticides from the same group.

Groups and products registered for Colorado potato beetle include:

Group 1A: (organophosphate) oxamyl (Vydate* L) (note- CPB is resistant in many areas of Massachusetts)

Group 1B: (organophosphate) phorate (Thimet* 20G)

Group 2A: (carbamate) endosulfan (Thionex* 50W)

Group 3A: (synthetic pyrethroids and pyrethrin) (note- CPB is resistant in Massachusetts) cyfluthrin (Baythroid* 2), deltamethrin (Decis* 1.5EC), esfenvalerate (Asana* XL), permethrin (Pounce*) and pyrethrin (PyGanic EC5.0)

Group 4: (Nicotinoids) thiomethoxam (Platinum, Actara, Cruiser), imidacloprid (Leverage, Admire 2F or Admire Pro, Provado 1.6F, Gaucho), dinotefuran (Venom 70SG), acetamiprid (Assail 30SG), imidacloprid + mancozeb (Gaucho MZ)

Group 5: (nerve poison) spinosad (SpinTor 2SC, Entrust); spinetoram (Radiant)

Group 6: (nerve poison) abamectin, (AgriMek * 0.15EC, Abba* 0.15EC)

Group 9B: (gut disruptor) cyololite (Kryocide)

Group 11: (gut disruptor) *Bacillus thuringiensis tenebrionis* (Novodor FC)

Group 16B: (Insect growth regulator) novaluron (Rimon 0.83EC)

Group 17: (Insect growth regulator) cyromazine (Trigard)

Group 18B: (molting disrupter) azadiractin (Neemix, Aza-Direct)

Group 26: (nerve poison) indoxacarb (Avaunt)

Group 28: (calcium balance disruptor) chlorantraniliprole (Coragen)

Labels to these products can be found at <http://www.cdms.net/LabelsMsds/LMDefault.aspx?t=>

Be sure to read all labels to select the correct rate, maximum number of applications and observe resistance management statements on the labels.

To prevent resistance, alternate among classes of insecticides in each generation, and throughout the season. The following insecticides each have a different mode of action and provide good options for alternate insecticides that provide

effective control:

NEW Chlorantraniliprole (Coragen) received a federal label in 2008. It is a new class of chemistry (group 28) that disrupts the calcium balance in insects and is low risk for people and beneficial insects. It can be applied as foliar (translaminar) or systemic (soil uptake) at planting or transplanting or through drip irrigation. Effective against caterpillars, including difficult ones like beet armyworm, CPB (all stages), and leafminer; labeled in potato, brassicas, leafy greens, cucurbits, fruiting crops, and sweet corn. Active ingredient also known as Rynaxypyr.

Spinosad (Spintor 2SC or Entrust, an organic formulation) gives control of all stages of CPB at a 3.5 to 4.5 fl oz rate. Will also control European corn borer.

NEW Spinetoram (Radiant 2SC) has the same type of active ingredient and mode of action as spinosad. New liquid formulation. Target small larvae. May be applied with chemigation.

Abamectin (AgriMek 0.15EC, Abba) is mainly a contact material, which controls larvae. It may be best used early in the season, when good coverage is easier to obtain. Rates of 5-6 fl oz per acre gave effective control in commercial fields in trials on Long Island. The lowest labeled rate is 8 fl oz.

Novaluron (Rimon) is a relatively new pesticide chemical belonging to the class of insecticides called insect growth regulators (IGR). IGRs slowly kill the insects over a period of a few days by disrupting the normal growth and development of immature insects. Novaluron acts as an insecticide mainly by ingestion, but has some contact activity. IGR insecticides are comparatively safer to beneficial insects and environment. Target applications to the beginning of egg hatch when larvae are small. Use higher rates for larger larvae. Does not control adults.

cyromazine (Trigard): Insect growth regulator for small larvae just after egg hatch. Does not control adult beetles. Low rate will provide suppression only.

Azadirachtin (Neemix, Aza-Direct). Insect growth regulator for immature stages of insects including CPB. OMRI listed. Neem products have shown efficacy against CPB in trials and is rated as 'good' efficacy in the Ohio Vegetable Production Guide. May provide an alternative to spinosad for organic growers.

Nicotinoid insecticides may be soil applied (Admire Platinum, Venom), foliar applied (Actara, Assail, Leverage, Provado, or Venom), or applied to seed pieces (Cruiser, Gaucho MZ). Use should be avoided in the Connecticut Valley, where there are fields with CPB resistance to imidacloprid (Admire) that is 300 times that of susceptible populations. Control of CPB requires higher rates, does not last as long, or has been lost completely. There is cross-resistance among products in the nicotinoid group. For resistance management, do not use a product in this group on more than one generation per year. A single foliar application is less likely to cause resistance than a soil applied systemic, because it only affects part of the population and only one generation.

- R Hazzard; (sources include: D Ferro (UMass Amherst), J. Mishanec (NYS), J Boucher (CT), J. Whalen (DE), T. Kuhar (VA), , G Ghidhu (NJ), New England Vegetable Management Guide, Ohio Vegetable Production Guide)

CHECKLIST FOR CUCURBIT AND PEPPER FIELD PREPARATION AND PLANTING: HOW CAN I PREVENT PHYTOPHTHORA BLIGHT THIS YEAR?

Phytophthora blight is the most destructive disease of cucurbits and peppers in the Northeast, and is getting worse each year, especially in wet years like 2008. Growers' selection of fields for cucurbit and pepper crops is increasingly determined by which fields have a history of or a potential for this disease. Sub-soiling has become a standard practice for field preparation. Growers are looking for more rotation crops which are not susceptible. Vegetable growers' interest in growing grain corn seems to be driven as much by the need for rotation crops as for cheaper fuels for their greenhouses. Interest in reduced tillage and deep zone tillage are also driven in part by this problem.

No single method will guarantee control of this disease, but cultural practices are essential to reduce the risk of crop loss caused by Phytophthora blight. Now is the time to focus on prevention. There is a lot that you can do while preparing the field and planting the crop.

How it moves around. The pathogen, *Phytophthora capsici*, is soil-borne and will remain in the soil for years, perhaps indefinitely, in the form of long-lasting oospores. The pathogen is most likely moved around by human activity (equipment, irrigation, or people). Keep track of sites that are contaminated with Phytophthora. Do not rent land for susceptible crops without investigating the history of disease problems (there are other important soil-borne pathogens as well). Phytophthora blight is particularly important during wet weather or after long irrigations. Phytophthora can move through the air during windy storms and hurricanes but it is difficult to estimate how far it can move. It is better suited to moving in water and with soil than air. *Phytophthora capsici* does not appear spontaneously, but the source of contamination on particular fields is difficult to determine. Once a site becomes contaminated it will remain so, but nearby fields may remain free of the pathogen as long as farm machinery does not bring it in. Equipment should be power-washed between fields. If contaminated fields drain into an irrigation pond, then irrigation can easily disperse it throughout the crop or onto another field. Rivers and streams can also be sources of inoculum.

This pathogen likes water. The pathogen is dependent on water to initiate disease and to move it from plant to plant. Phytophthora produces zoospores that can swim to susceptible hosts (very short distances). Splashing rain and irrigation water can easily move zoospores from plant to plant. The disease will always begin in low spots or areas that do not drain readily. Improving drainage in fields will prevent the disease from really getting started.

Beware of contaminated irrigation water

Researchers in Michigan have shown that *P. capsici* can move in river water, which is bad news for growers who irrigate out of rivers in MA. Late summer irrigations from rivers with contaminated fields upstream present the risk of contaminating new fields. The pathogen can spread from irrigation ponds that have infected fields draining into them. It is not known if *P. capsici* is able to over winter in ponds or rivers, so the danger of infection from these sources increases later in the season as the disease develops on fields upstream.

Crop rotation. Wherever possible, avoid planting susceptible crops in contaminated soil. Practice long rotations and do not grow cucurbits, peppers, eggplant or tomato for at least five years after infections occur. Before planting, use a chisel plow to break up any hard pans and to improve drainage.

Using resistant varieties. Pumpkins with hard, gourd-like rinds or shells have been shown to be less susceptible to Phytophthora fruit rot when mature than pumpkins with conventional, softer rinds. These include Apprentice, Lil' Ironsides, Iron Man, Rockafellow, and Cannon Ball.

Among bell peppers, the cultivars Conquest, Paladin, and Emerald Isle have some level of resistance to Phytophthora, especially the crown rot phase (however, none of these have resistance to Bacterial leaf spot).

Growing in infected fields and preventing infection in new fields: a checklist.

The fact is that many vegetable growers have little choice, they have to use fields that have a history of Phytophthora blight. Some growers have found that it is possible, though not easy, to grow susceptible crops in fields infected with Phytophthora without a disease outbreak. Whether you are in an infected or uninfected field, the critical goal is to manage water so that there is NEVER STANDING WATER FOR LONGER THAN 24 HOURS ANYWHERE IN THE FIELD. If you must grow crops in a field with a past history of Phytophthora blight, there are some management practices that will help reduce disease. Extended periods of rain are very likely to result in significant disease development if the pathogen is present.

1. Use a V-ripper or other sub-soiling tool between rows or a deep vertical tillage equipment in-row, to break up hardpan and encourage drainage. Use this pre-plant and as needed during the season, especially after a hard rain to speed drainage of water out of the field.
2. Plant non-vining cucurbit crops (i.e. summer squash) and peppers in dome-shaped raised beds of at least 9 inches height. Use a transplanter that does not leave a depression around the base of the plant.
3. Breaks in raised beds—where beds run across the slope, cut breaks to allow water to drain. Don't allow raised beds to become dams that hold water.
4. Clear away soil at the ends of rows. Where raised beds reach the field edge, open up the end of the row to create drainage ditches.
5. Make sure the flow of water from within the field leaves the field – dig ditches if necessary!

6. Don't plant low areas to susceptible crops — plant a cover crop, corn or another non-susceptible crop, or leave it bare. (Better a small loss in yield than a total loss of the crop.)
7. Check your irrigation system for leaks and fix them – don't allow puddles of water to sit near your irrigation pumps or lines.
8. Avoid moving soil from contaminated land to clean fields. Use a power washer to remove soil from tillage and planting equipment and tractor tires.
9. Use farm machinery as little as possible throughout the season, to avoid soil compaction, and never work in fields when the soil is wet.
10. Separate different susceptible crops (if possible) such that there is no opportunity for water to move from one planting to another.

Preplant, transplant or furrow drench – early season chemical control in pepper and cucurbits

Chemical applications alone will not control *P. capsici* but may reduce disease severity when used as part of an overall management program. Phosphoric acid fungicides (ProPhyt, Phostrol and Fosphite) (Resistance Group 33) are labeled for control of *P. capsici* on cucurbits, and often used by growers in an attempt to control this disease. These materials have been tested in many states, and while a few trials have shown some efficacy against *P. capsici*, in many trials these materials failed to offer any significant level of control. Of these materials, only ProPhyte is labeled for use as a drench treatment. Research is being conducted on applying ProPhyt through drip irrigation during the season. This is an option that may provide early-season protection for crops grown in infected fields, though the effectiveness of any of these materials remains uncertain.

The prospects for effective control of the crown rot phase of Phytophthora blight are better in pepper than in cucurbits. Apply 1.0 pt Ridomil Gold 4E/A or 1.0 qt Ultra Flourish 2E/A (mefenoxam, Group 4). Apply broadcast prior to planting or in a 12-16 inch band over the row before or after transplanting. Make two additional post planting directed applications with 1 pint/A Ridomil Gold 4E or 1 qt/A Ultra Flourish 2E to 6 to 10 inches of soil on either side of the plants at 30-day intervals. For banded applications, divide the band width in inches by the row spacing in inches and multiply that times the rate per acre to get the amount needed for the banded application. When using polyethylene mulch, apply Ridomil Gold 4E at the above rates and timing by injection through the trickle irrigation system. Dilute Ridomil Gold 4E prior to injecting to prevent damage to the injector pump.

*-- Rob Wick, Bess Dicklow, Andrew Cavanagh and Ruth Hazzard, Dept. of Plant Soil and Insect Science, UMass;
Sources: Margaret McGrath, LIHREC, Cornell University; Andy Wyenandt, Assistant Extension Specialist in Vegetable Pathology, Rutgers University, NJ*

SWEET CORN UPDATE

Corn plants are growing well in response to the higher temperatures we had over Memorial Day weekend. Most growers have removed plastic and row cover by now on their earliest plantings and are continuing to plant when they can around the frequent rain showers this week. Corn that is under row cover is protected from the first corn borer flight that we are starting to see here in the Connecticut Valley. Flight started strong this year, with counts over 20 moths per week at three of six locations. In Sharon, MA trap counts reached 32 this week. We expect flight to begin or continue in cooler areas next week. Earliest corn is the most attractive, for moths laying eggs. If you want to know what's happening with ECB flight on your farm, the best way is to set up pheromone traps. Use two Scentry net traps, placed in weeds at the edge of the field, with a lure for each of the two strains of ECB (known as Iowa-Z-I and NY-E-II). Traps and lures can be obtained from Great Lakes IPM (517-268-5693). Ask for the 'New England sweet corn package' to get everything you need for the season. We are making first releases of *Trichogram-*

Location	Z1	EII	Total
Sharon	6	26	32
South Deerfield	0	20	20
Deerfield	2	11	13
Hadley	2	24	26
Granby	1	8	9
Easthampton	0	3	3

ma ostriniae in early corn in the Connecticut Valley and other locations where needed – timed for the first week when flight begins. For more information on setting up a sweet corn scouting program or releasing *Trichogramma ostrineae* on your farm visit our website www.umassvegetable.org or contact Amanda Brown at 413-545-3696.

-A. Brown & C. Huffman

UPCOMING MEETINGS

Putting Oilseeds and Grains into Your Rotation: Organic No-Till and Cover Cropping.

Barton Hall, UNH Thompson School of Applied Science, Durham NH.

Sat Jun 13. 9:30am-2:30pm.

Topics include organic no-till developments at Rodale Institute, organic weed management and cover crops for small grains growers, NRCS soil science and tools available for growers, and a demonstration of organic no-till equipment. \$20 registration fee includes lunch. For info, contact Barclay Jackson at 498-8252 or Suzanne Hebert at 862-3203.

New Hampshire Vegetable & Berry Twilight Meeting.

Emery Farm, Route 4, Durham NH.

Tues Jun 16. 5:30-8:00pm.

The meeting will focus on marketing, production & pest management of vegetable crops and small fruit (raspberry, strawberry and blueberry). For info, contact Geoffrey Njue at geoffrey.njue@unh.edu or 603-749-4445.

Pleasant Valley Farm Twilight Meeting, Methuen.

Tuesday June 23 5pm.

Topics include *Phytophthora capsici* management, drip irrigation systems, GAP, chipilin and mixixe, all-season lettuce production.

University of Massachusetts Crops Research and Education Center Field Day, South Deerfield.

NEW DATE: Thursday July 16, 4-8 pm

Topics and demonstrations will cover vegetable and agronomic crops including biomass energy crops. Dinner will be provided.

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

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