UMASS EXTENSION

Vegetable Notes

For Vegetable Farmers in Massachusetts

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CROP CONDITIONS

This week brought too much more of the same rainy, cool, and dark weather. Sweet corn will be late across the state, and any July 4 corn in the markets will have to travel from points south. There will be new potatoes, along with peas, cauliflower, broccoli, cabbage, early carrots, scallions, lettuce and greens. Zucchini and summer squash are doing surprisingly well, coming in for wholesale and retail markets. Field tasks were difficult this week as soils are soggy and rains have been unpredictable and heavy. Schedules for cultivation, planting, and spraying are off. Visible new pests include scarab beetles (Japanese, Asiatic garden, and oriental beetles), sap beetles, squash bugs and their eggs, three-lined potato beetles, and potato leafhoppers. Squash vine borer flight was up in NH where traps are deployed; scout for signs of damage and target the base of stems. If you plan to use biocontrol for Mexican bean beetle, order now. This week we found melon aphid in okra and potato aphid in eggplant. In some cases aphids were dense enough to cause leaf curling but in others they were subject to an onslaught of ladybeetle larvae, parasitic wasps, and lacewings that were keeping them in check. Often beneficials will bring numbers down if you wait a few days. If you determine that aphid controls are needed consider one of the newer, selective aphid products. Visit www.nevegetable.org , the website for the online New England Vegetable Management Guide, which is fully updated with all the new products, current label information, and updates on pests and crops. A big change to sun, heat and drier weather would be more than welcome.

LATE BLIGHT UPDATE

Sales of Infected Tomato Transplants Threaten Tomato and Potato Crops and Home Gardens Throughout the Northeast

The threat of late blight on vegetable farms is extremely high all across the Northeast. Over the past week, the disease has been diagnosed on tomato transplants that have been sold throughout the Northeast, primarily at large chain retail stores. Infected transplants were found at stores in MA, CT, NY, RI, and ME. Although the original supplier has pulled all remaining plants from the shelves, those that were sold are now distributed in home gardens throughout the region. This means that inoculum has most likely been scattered across the region. Because of the especially conducive weather conditions that have continued non-stop for the past three weeks, all tomato and potato crops throughout the region are at risk. You can be sure that there is a source of inoculum within range of your farm.

As mentioned last week, late blight, caused by *Phytophthora infestans*, is very destructive. Uncontrolled it will kill plants faster than any other disease. It affects both potato and tomato crops. It produces spores very rapidly and these move to other plants in the field. Even more important, the disease spreads very easily from one garden or field to others, because the spores are easily carried in wind currents to infect susceptible plants in even the most remote area in our region. Recent weather conditions could not be more ideal for dissemination and infection of tomato and potato.

The occurrence of late blight in 2009 is different compared to most seasons in two ways. First, this is the earliest the disease has ever been reported over such a broad region of the country. The second reason is that infected plants were distributed to large chain retail stores and farm & garden supply stores throughout the region (Ohio to Maine). The inoculum is exceptionally contagious, spreading on garden center shelves to tomato plants not involved in the original and initial source of the inoculum. Never before has such an extensive distribution of infected plants occurred.

Please see Late blight alert in last week's Vegetable Notes (June 25) to review scouting and diagnostics.

http://www.umassvegetable.org/newsletters/current_news.html

Contact the Diagnostic Lab. If you suspect late blight in your field, it is important to confirm the diagnosis by contacting the UMass Diagnostic Lab at 413-577-3209.

http://www.umassvegetable.org/growers_services/diag_lab/index.html

Scouting and Symptoms. Scout potato and tomato fields twice a week. Look at leaves and stems under the canopy, as this is where the disease gets established first. Classic symptoms are large olive green to brown spots on otherwise healthy, green leaves with slightly fuzzy white fungal growth on the underside when conditions have been humid (early morning or after rain). Also look for brown lesions on stems, with white fungal growth developing under moist conditions.

For a photo gallery of what symptoms look like on tomato and potato:

http://www.hort.cornell.edu/department/Facilities/lihrec/vegpath/photos/lateblight_tomato.htm

http://blogs.cornell.edu/hort/2009/06/26/late-blight-a-serious-disease-killing-tomatoes-and-potatoes-this-year/

Tomato: http://www.nevegetable.org/index.php/crops/tomato-outdoor?start=4

Potato: http://www.nevegetable.org/index.php/crops/potato?start=4

Fungicides - Conventional. Given current high risk, a combination of protectant sprays work well (chlorothalonil, metiram or mancozeb) with a product that has 'kickback' activity such as Curzate (cymoxanil, fungicide group 27) or Previcur Flex. Curzate works well when plants are actively growing and temperatures are cool, conditions that exist now for both potatoes and tomatoes. Previcur Flex has similar activity, and should also be mixed with chlorothalonil. The pathogen has developed resistance to some fungicides such as metalaxyl and mefenoxam (Ridomil, Ridomil Gold), so these are no longer reliably effective. If environmental conditions remain conducive for late blight, apply a fungicide from a different mode of action class every 5-7 days such as Ranman, Forum, Tanos, Gavel, Reason (each mixed with a protectant), or Revus Top, or a phosphorous acid fungicide (ProPhyt, Fosphite, Phostrol) . Revus Top is a newly registered fungicide labeled for potato (14 days PHI) and tomato (1 day PHI) as well as pepper but appears not to be available in the Northeast at this time.

Fields with significant disease should be burned down with herbicide or plowed under. Each infected field is producing spores that will move to other farms in the area.

Management in organic crops

Apply fungicides preventatively, using a 5-day schedule when conditions are favorable. Copper is effective for protecting a crop, but copper has been found to be ineffective when used as the sole practice for controlling late blight once it has started to develop. The OMRI approved materials include basic copper sulfate (NuCop 50W) and copper hydroxide(Champ WG) May other formulations of copper are not approved for organic production. Note that copper washes off in rain, and needs to be reapplied after heavy rains. Oxidate may kill the spores on the surface (those protruding through the stomate), but would not kill the fungus within the leaf, thus it's likely the fungus could produce a new crop of spores, requiring repeated spraying to kill spores. There is no residual or protectant effect.

It is important to scout regularly and promptly destroy affected plants when found to reduce the amount of inoculum in a field. If the infection is localized in a small area, it is recommended that plants with symptoms be physically pulled up plus a few border plants. Ideally this would be on a bright sunny day. Then tarp the plants; spores will be killed by sunlight and heat under the tarp. Scout daily thereafter for a few days to see if more plants develop symptoms. Clean tools and equipment after working in infested fields to avoid moving spores on equipment and workers.

If a field becomes widely infected early in the season, it is advisable to take action to burn down or bury the plants by plowing or disking deeply. This is not an action taken lightly but may be a necessary last resort if whole fields become infected.

Garden Centers have been alerted to inspect all transplants and remove any that show symptoms. Transplants should be

placed in a plastic bag, secured and discarded in the trash or completely buried two feet or so underground so plants decompose and will not re-sprout. Plants should not be composted, put on a cull pile, left outside or transported to the field.

Home gardeners are being urged to search for symptoms and to protect garden-grown tomato and potato plants and to make sure that their plants don't become a source of spores that could infect commercial farms, as late blight spores are easily dispersed by wind.

UMass Extension and the Massachusetts Departments of Agricultural Resources, along with Extension and Dept of Agriculture organizations throughout the Northeast, have spread the word of this serious disease threat. The original supplier, working with Department of Agriculture in the affected states, has removed most of the initial source plants. Other transplants have been found to be infected as well, spreading beyond the original source.

Late blight webinar

On Thursday July 2, from 7:30 to 9:30 p.m., vegetable specialists from Rutgers University and Cornell University will be holding a webinar on late blight and other important diseases of tomato will for interested homeowners, master gardeners and extension personnel in the Northeast. All are invited to log-on by clicking on the following link at 7:30 on Thursday evening

https://sas.elluminate.com/m.jnlp?sid=783&password=M.0F6AA3BB4AF839F512A8243F881332

For more information, see http://www.umassvegetable.org/index.html

MEASURING INSECTICIDE OR FUNGICIDE FOR BACKPACK SPRAYERS

Growers with diverse crops and small plantings often need to be able to apply pesticides to beds or plots of several hundred square feet. It can be difficult to figure out how to calibrate a backpack sprayer for spraying a small area. Some labels give rates for backpack sprayers (ie amount per gallon of water), but most only provide rates per acre (ie amount per land area treated). Rates may have to be calculated by converting from the rate per acre (ie, per 43,560 sq ft) to rates for a few hundred square feet. Careful division gives you the amount you need. However, it is also critical to properly calibrate your sprayer by determining how much water you use to cover a given area.

For some products, spraying small areas may mean that you need to measure extremely small amounts. Some labels provide conversions of volume to weight, but many do not. For example, if you are using spinosad (Entrust formulation, a dry powder) you may need to weigh product in grams. If a gram scale is unavailable, then it is possible to measure Entrust by volume. Based on repeated samples, we found that, on average, the volume was 1.7 gm per teaspoon (shaved level and tamped slightly) of Entrust powder. One ounce (dry weight) equals 28.45 grams.

Liquid measured in (fluid) ounces is already a volume so it is easier to measure. One fluid ounce equals 29.6 milliliters (ml). Some pesticides call for very low rates per acre and may need to be measured in ml when treating small areas. Nicotinoid insecticides are an example. An inexpensive measuring device for ml can be found in the children's medicine section of drug stores.

Even if you are using pesticide products that are relatively safe, always store in a safe place, handle carefully, follow the directions on the label, and use the required protective gear for mixing, spraying, and cleaning your sprayer. Mix in a designated area that is away from workers and the public.

When calibrating and using your sprayer, be consistent. The amount of spray you apply to an area will depend on four variables: your walking speed, the pressure you select, your spray swath width, and the nozzle tip you've chosen. If you change any one of these, you change the amount of spray you apply.

Walking speed. This constant walking speed should be one that you can comfortably maintain over the entire time you intend to spray. It also must be the same speed at which you calibrate the sprayer. If you double your walking speed while maintaining pressure and swath width, you'll apply half as much spray. You would then require twice as much pesticide per gallon (that is, a greater concentration) to apply the same amount of pesticide per acre.

Pressure. If you change the pressure while you spray, you change output. Increased pressure results in higher output; the

exact relationship depends on your nozzle type.

Nozzle tip selection. The proper tip will depend on the situation. Tips are available that cover a wide range of output volumes, spray widths, and pressures. Most backpack sprayers come with a single flat fan nozzle, but a cone tip may be more appropriate for coving foliage.

Swath width/nozzle height. Tips are designed for use within certain heights and pressures. Within these ranges, some tips deliver narrow bands; others, like flooding tips, provide swath widths up to 7 feet. The wider each swath width, the less time the operator spends walking up and down fields. The height at which you hold the spray tip above the target influences the swath width. Spraying as close to the target as is practical minimizes drift and operator contact.

Below are examples of two different ways to calibrate and mix backpack sprayers.

First, check your sprayer coverage and operation. Select the spray tip or boom setup that provides the desired coverage. Add water, and spray the ground or dry pavement as if you were spraying your field. Check the spray pattern for uniformity (and proper spray pattern overlap if you're using a boom). You can also check it over the crop to see if you are getting good coverage. Adjust nozzle spacing and/or height until you achieve the desired pattern. Be certain you're getting uniform coverage before you proceed! Check fittings and hoses for leaks.

Method 1. Concentration: using the labeled rate per gallon for a backpack sprayer.

Pesticide labels for agricultural crops generally give the rate to use per acre. Some labels also provide a rate of product to use per gallon, or concentration, for backpack sprayers. If this is given, add that amount of insecticide to each gallon of water. Spray to cover the crop foliage, but not to runoff on the ground. Mix the amount you need to cover your crop area.

The following rates for two commonly used organic insecticides are listed on the product label:

Product	**Amount per gallon**	**Amount per 3 gal (1000 sq ft)**	**Rate per acre**
Entrust	.43 gm (0.015 oz)	1.3 gm (0.046 oz or 3/4 tsp)	2 oz
Surround WP	1 ½ -3 cups	4.5-9 cups	50 lb

If a gram scale is unavailable, then it is possible to measure Entrust by volume. Based on repeated samples, we have found that there is 1.7 gm per teaspoon (shaved level and tamped slightly) of Entrust powder. For Entrust, do not use more than 3 gallons of water per 1,000 sq ft.

Converting metric and english measures:

One ounce (dry weight) equals 28.45 grams. Liquid measure in (fluid) ounces is already a volume so it is easier to measure. One fluid ounce equals 29.6 milliliters (ml). An inexpensive measuring device for ml can be found in the children's medicine section of drug stores.

Method 2. Match the amount of pesticide to the amount of water needed to spray the crop area.

1. Calculate what portion of an acre is being sprayed. Determine sq ft of area to be sprayed (multiply bed or canopy width by row length by number of rows). Calculate how much of an acre this is (this may be a small fraction of an acre):

Acres to be sprayed = number of ft2 to spray / 43,560 ft2 per acre

2. Calculate how much pesticide to use. Multiply the rate per acre for the crop and pest (from the label) times the proportion of an acre to be sprayed.

Amount of pesticide needed = amount per acre X proportion of acre to be sprayed

3. Measure water needed per sq ft of crop. Add a known amount of water (eg 1 or 2 gallons) to the tank. Spray the water as if you were actually spraying your field. Remember, you must maintain constant pressure, constant walking speed, and consistent nozzle height and boom setup or wand motion to achieve the coverage you need. This amount will change with different crops and size of crop canopy. When the water is gone, stop and mark the spot. Measure the area you sprayed and calculate the square feet (length of swath x width). Calculate how many gallons needed per sq ft.:

Gallon per ft2= number of gallons used/ number of ft2 sprayed

4. Determine total water needed:

Gallons of water needed = gal./ft2 X number of sq ft to be sprayed.

5. Mix the required amount of pesticide in the required amount of water. It is best to add half the water, add the pesticide, agitate, then add the remaining water. Spray, using the walking speed, pressure, nozzle and boom setup or wand motion that you used for calibrating.

Ruth Hazzard, University of Massachusetts Extension Vegetable Program. Sources include Calibrating and Using Backpack Sprayers, C.G. Landgren, Oregon State University, Washington State University, University of Idaho. See http://extension.oregonstate.edu/catalog/html/pnw/pnw320/ for more details.

UPDATE ON RESEARCH ON ETHNIC CROPS

Research and Extension activities are in full swing at the UMass Research Farm in S. Deerfield, on cooperating farms and in markets in Massachusetts and the Northeast. Customers are beginning to see these crops in their markets now.

Taioba (Xanthosoma sagittifolium). Taioba is the leaf of tannia (Xanthosoma sagittifolium), a species originally from the Amazon that is very similar in growth and appearance to taro (Colocasia esculenta) which is from Southeast Asia. The leaves are used as a vegetable in parts of Brazil and West Africa. Leaves must be cooked to eliminate calcium oxalate, an irritant. This plant, despite being very tropical, grows well in our climate and there is a strong market demand among Brazilians and potentially non-Brazilians.

In 2009, research is focusing on developing sustainable culturally practices for production, propagation techniques to produce annual transplants, and continued market analysis. For research trials in 2009, corms were obtained from Brazil and forced in the greenhouse to produce transplants that were put into the field in early June.

Taioba in Brazil is a perennial, but must be grown as an annual in Massachusetts since it is extremely frost sensitive. Our current production system is to produce transplants from corms in the greenhouse and transplant them into the field after the danger of frost. Current recommendations for row spacing are one foot in the row, staggered for more space, on plastic six feet on the center.

Leaves can be harvested approximately four weeks after transplanting, depending on the size of transplants and climate, and each plant will produce a marketable leaf every 10 – 14 days. It is best to cut a fully-expanded leaf when there is another leaf that is unfolding – you can cut it anywhere on the stem. If you do cut the only fully-expanded leaf from the plant, make sure that you don't damage the next leaf that is bring produced from the stem, usually about 2 inches down from the bottom of the leaf.

Cooperating farmers in Lancaster and Martha's Vineyard are growing taioba on their farms to evaluate all aspects of this crop – from production to sales. Martha's Vineyard has over 3,000 Brazilians which provides a ready market for commercial farmers for this crop.

Maxixe (Cucumis anguria). Maxixe is a type of cucumber that was brought to Brazil from Africa during the slave trade. This crop was grown extensively in New England in the 18th and 19th centuries, known as "West India Gherkin" since it was thought to have originated from the West Indies. It was eaten raw and also pickled for consumption in the winter.

"Maxixe do Norte" is most popular variety of maxixe in the Northeastern states of Brazil where it is consumed boiled, fried, stewed or used fresh in salads. The fruits of maxixe, which are about the size and shape of a chicken egg, can have either supple spines or smooth skin and are pale green in color.

Grow maxixe using the same production practices as cucumbers. Maxixe is a frost sensitive crop, as all cucurbits, and should be seeded or transplanted after the threat of frost has passed. If starting as transplants, they should be started in the greenhouse four weeks before planting in the field. It is recommended to have two plantings since maxixe will produce fruit for about three to four weeks. The second planting should be started about four weeks after the first one to ensure season-long production. Maxixe will start producing marketable fruit around mid July (if started as transplants – later is

started from seed) and if two plantings are used, there should be production until late September or frost.

This season at the UMass Research Farm in S. Deerfield we are evaluating five seed sources of maxixe for the best characteristics and yield for our climate. We are also evaluating the optimum density for this crop and the effect of trellising on earliness, yields and fruit quality.

We are also working with four cooperating farmers, in Lancaster, Deerfield, Methuen and Edgartown (Martha's' Vineyard), to evaluate the production and market potential for this crop. As part of our research, a market analysis will be implemented to estimate the demand for this crop in select markets. In 2008, farmers on Martha's Vineyard had a successfully experience with the crop, selling maxixe retail for US $7.29/pound.

- Frank Mangan, Maria Moreira, Zoraia Barros, Celina Fernandes, Renato Mateus, Fernando Finger, Amy Koenig and Ruth Hazzard

Location	Z1	EII	Total
CT Valley			
South Deerfield	1	1	2
Deerfield	0	0	0
Sunderland	2	1	3
Hadley (1)	3	1	4
Hadley (2)	4	13	17
Granby	2	2	4
Hatfield	4	2	6
Easthampton	5	5	10
Central & Eastern MA			
Lancaster	0	2	2
Tyngsboro	5	1	6
Concord	1	3	4
Northbridge	0	0	0
Leicester	0	0	0
Dracut	0	2	2
Sahron	0	0	0
Rehobeth			
NH			
Litchfield, NH	2	0	2
Hollis, NH	0	0	0
Mason, NH	0	0	0

SWEET CORN REPORT

As the fourth of July weekend approaches, farm stands will be void of any corn. There may be a few growers who are able to hand pick a few ears but the majority of farms will have to delay picking for another week or so. Plants are looking a little yellow due to nitrogen leaching as growers struggle to sidedress between rain drops. There is a lot of silk out there but ears are still small and underdeveloped waiting for some desperately needed sunshine and warmer temperatures.

The first generation of European corn borer flight is over in most locations with trap counts at zero or slightly above. Scouting of pre-tassel and tasseling corn continued this week. Many fields are below threshold but "clean up" from the first generation may be needed to control eggs that were more recently hatched. All corn where tassels are beginning to emerge from the whorl should be scouted. This is the best time to control ECB before populations start moving down stalks into the ears. Look for feeding damage, frass or ECB larvae. Make sure to check the entire stalk of plants to see if borers are starting to move down towards the developing ears. Drop nozzles can be used to hit silks directly to control borers before they enter the ears. If 15% or more of plants are infested a spray is warranted. Scout again 3-4 days after spraying. It may take two sprays 5-7 days apart to bring infesting populations under control.

Corn earworm traps are up in silking fields. No flight has been caught in the Connecticut Valley. A few moths have been captured here and there across the state but no serious flight has been captured anywhere. Corn earworm migrates to New England on storm fronts that move up the coast line and river valleys in mid July through September. Heaviest numbers are typically found on the coast but ear worm can be a devastating pest anywhere in late season corn. Watching flight is a critical component to controlling corn ear worm. Flights of two or more moths per week are an indication that a damaging population of ear worm is present. Monitoring on your own farm is the best way to know when corn earworm has arrived. Place two traps per field in areas where fresh silk is present. Move traps weekly to ensure that they remain in fresh silk in order to attract adult moths as soon as they arrive. Remember to changes lures every two weeks. Watch for coastal storms which may bring greater numbers up to the Northeast over the next few weeks.

- Amanda Brown, UMass Extension Vegetable Program