UMASS EXTENSION

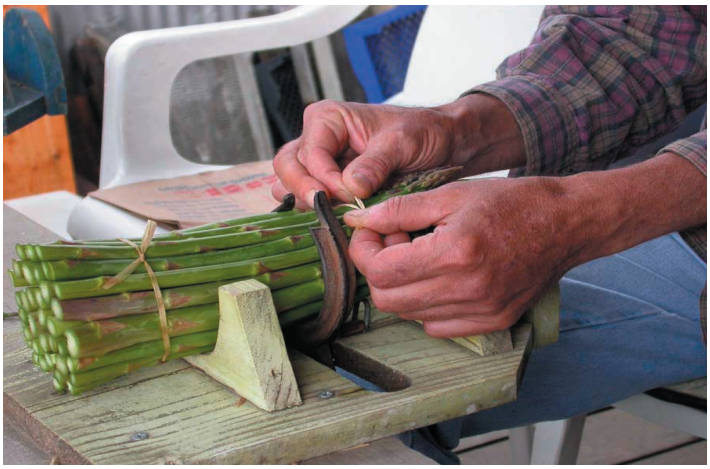
Vegetable Notes

For Vegetable Farmers in Massachusetts

Volume 18, Number 3 May 24th ,2007

Crop conditions

Last week's rains delayed fieldwork, but provided good soil moisture this week for planting and transplanting. Early planted crops like corn, cabbage, lettuce, and other greens are catching up from a late start and are growing well. Asparagus harvest is in full swing and quality is excellent. Growers have started transplanting the warm-season fruiting crops or are waiting till conditions warm up a bit more. Potatoes are breaking ground in early planted fields. The first cucumber and potato beetles have been sighted, but the active insect pest concerns are the root maggot flies and flea beetles. This is a critical point for making decisions about where and how crops will be planted to provide the best growing conditions and avoid pest problems. See checklist for preventing Phytophthora blight.



Tying Asparagus at Indian Head Farm, Berlin MA. Asparagus is always a labor intensive crop.

Dealing with Phytophthora blight: checklist for field preparation and planting

Phytophthora blight is the most destructive disease of cucurbits and peppers in the Northeast, and is getting worse each year. 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.

This article will focus on prevention: what you can do while preparing the field and planting the crop. No single method is sufficient to provide adequate control; a combination of cultural and chemical practices is required to reduce damage caused by *Phytophthora* blight. Future articles will address other cultural and chemical options.

The pathogen, *Phytophthora capsici*, is soil-borne and will remain in the soil for years, perhaps indefinitely. It is important to 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 would be difficult to estimate how far it can move. It is better suited to moving in water than air. It can also move on clods of soil on tractors and equipment. *Phytophthora capsici* does not appear spontaneously, but it can sometimes be difficult to identify the source of contamination on particular fields. Since it is not efficiently wind disseminated it tends to be "locally important" on specific fields or farms. Once a site becomes contaminated it will remain so, but the fields across the way may remain free of the pathogen as long as farm machinery does not bring it in. If contaminated fields drain into an irrigation pond, then irrigation can easily disperse it throughout the crop or onto another field.

The pathogen is very dependent on water to initiate disease and to move it from plant to plant. *Phytophthora* produces spores that can swim to susceptible hosts (very short distances). Splashing rain and irrigation water can easily move spores from plant to plant. Its dependence on soil moisture is obvious in fields that have low spots or areas that do not drain readily. The disease will always begin in these areas first. Anything that can be done to improve drainage in the field will help prevent the disease from getting started.

Crop Rotation

Wherever possible, avoid planting susceptible crops in contaminated soil. Practice long rotations: 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.

Growing in Infected Fields

The fact is, however, that many vegetable growers have little choice; given their crop mix and the fields they have available, 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. The critical point 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, here are some management practices that will help reduce disease. Be aware that 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 to break up hardpan and encourage drainage. Use this preplant 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 – where there is a low section that puddles, don't plant a susceptible crop – plant a non-susceptible plant . (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 and area of land that does not have the problem. Use a power washer to remove soil from tillage and planting equipment and tractor tires.

9. Use farm machinery as little as possible to avoid soil compaction.

10. Separate different susceptible crops (if possible) such that there is no opportunity for water to move from one planting to another.

Beware of Contaminated Irrigation Water

Researchers in Michigan have shown that *P. capsici* can move in river water, which is potentially very bad news for growers who irrigate out of rivers in MA. It is likely that any late summer irrigation out of rivers with contaminated fields upstream runs the risk of contaminating new fields. It is also possible that it can spread from irrigation ponds that have infected fields draining into them. It is likely that the pathogen is unable to overwinter in ponds or rivers, so the danger of infection from these sources will increase later in the season as the disease develops on fields upstream.

Using Resistant Pumpkin Varieties

Margaret McGrath of Cornell University and others are evaluating commercial and experimental varieties of pumpkins for resistance to *Phytophthora*. Pumpkins with hard, gourd-like rinds or shells were shown to be less susceptible to *Phytophthora* fruit rot when mature than pumpkins with conventional, softer rinds through research conducted with Lil'Ironsides and Apprentice (HMX 5682) at LIHREC. Iron Man (HMX 2690) is another new variety with the gene for hard rind from Harris Moran. Degree of control obtainable with hard-rinded pumpkins is high: proportion of fruit developing *Phytophthora* fruit rot when evaluated in 1997 and 1998 was 2 and 29% for Lil'Ironsides, respectively, 2 and 12% for Apprentice compared to 25-42% (1997) and 56-71% (1998) for horticulturally similar pumpkins with conventional rind. Rockafellow is also described as having a hard rind. Cannon ball has a tougher skin than conventional pumpkins and thus may also be less susceptible to *Phytophthora* fruit rot. Cannon ball, Iron Man, and Rockafellow also have resistance to powdery mildew.

Descriptions of pumpkin varieties with hard shell or tough skin:

• Apprentice: 1 lb fruit, 4-5 in diameter, round, dark orange, bush type

• Lil' Ironsides: 2 lb fruit, 6 in diameter, round flat, dark orange, vine type

• Iron Man: 3-4 lb fruit, 6-7 in diameter, round, dark orange, vine type, PMR

• Rockafellow: 2.5-3 lb fruit, elongated oval shape, very smooth, semi-bush type, PMR

• Cannon Ball: 5 lb fruit, 7-8 in diameter, round, dark orange, semi-bush type, PMR

Among bell peppers, the cultivars Conquest, Paladin, and Emerald Isle have resistance to *Phytophthora* (however, none of these have resistance to Bacterial leaf spot).

Transplant or furrow drench

New phosphorous acid fungicides (ProPhyt, Phostrol and Fosphite) (Resistance Group 33) have shown efficacy as a foliar application. They have a 4 hr REI and can be applied to all cucurbits at 2-6 pt/A on a 7-14 day interval up to 6-7 times/crop. PHI is 0 days. Cost is about $4.65-14.00/A/application for Fosphite. Phosphite ion, the active ingredient for these fungicides, affects fungal pathogens directly and promotes the plant's defense system. These fungicides are also labeled for use on asparagus, crucifers, leafy vegetables, onion, potato, and tomato.

In addition to foliar applications, ProPhyt is now labeled for use as a drench treatment to transplants before transplanting or as an in-furrow drench at planting. 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.

--Sources: Margaret McGrath, Long Island Horticultural Research and Extension Center (LIHREC) of Cornell University; Rob Wick., Bess Dicklow and Ruth Hazzard, Dept. of Plant Soil and Insect Science, UMass

WINTER SQUASH PERIMETER TRAP CROPPING FOR THE ORGANIC GROWER :

Report on a 2006 Farmer Research Project.

This project was designed to test organic perimeter trap crop-

ping (PTC) methods in winter squash. It was conducted at the Hampshire College Community Supported Agriculture Farm in Amherst MA, where we grow 14 acres of mixed vegetables using organic methods. It was funded through a Farmer/Grower grant from Northeast SARE.

We planted experimental plots with a Blue Hubbard squash as a PTC border, surrounding Butternut as a main crop. We tested two organic methods of controlling cucumber beetles on the trap crop and one method designed to deter feeding on the main crop. The two trap crop control methods were as follows: 1) Entrust, an organic formulation of spinosad, was sprayed on the Blue Hubbard crops to kill cucumber beetles, or 2) a reversed leaf blower was used to suction beetles from the trap crop, or 3) check (no treatment). In the main crop, we tested Surround, a kaolin clay coating treatment, as a repellent to deter the cucumber beetles from feeding on the main crop, compared to a check (no treatment). The experiment was set up with a set of small square treatment plots (each with a trap crop border and main crop interior) along each edge of the field, with a large area of butternut in the center.

Beetles quickly accumulated in large numbers in the Blue Hubbard plants at the beginning of the season, and insect numbers and damage were always much higher in the border plants than in the main crop Butternut plants on the inside of each plot, even in plots where no treatments were applied. In the main crop, beetle numbers never exceeded the action threshold of 1 beetle per plant.

Surround was applied prior to transplanting, and again in the field after each rain (which occurred frequently). The Entrust and vacuum treatments were also applied several times during the beetle-colonizing period. Surround treatments showed less damage on inner plants from the very start; the Entrust treatments also reduced damage in border plants, so the plants survived and we were able to harvest a crop. Entrust killed beetles promptly enough that we found significant numbers of dead beetles in the single rows of trap crop plants. We found that although vacuuming removed beetles from the trap crop, it is an expensive and awkward control method and not recommended.

Winter squash is an important part of our fall CSA crop mix. The reduction of cucumber beetle damage, especially while transplants are young, is imperative to good yields of winter squash. The most effective elements that we tried were the Blue Hubbard trap crop to concentrate beetles in the border, Entrust spray to kill beetles in the border, and Surround spray as a feeding deterrent on the main crop.

In the past we have tried PTC using pyrethrin (Pyganic) on the border, with the result that borders were destroyed by feeding damage. In this experiment, we harvested more than enough Blue Hubbard from the border, and we would rather use a different crop such as buttercup, which is more marketable. The economic feasibility of spraying depends on the number of sprays used and the equipment. Given that we have a backpack sprayer, it is feasible to apply Surround to main crop plants before transplanting, but not after planting. Entrust is expensive, but small amounts are needed to spray the border and backpack applications are feasible. In 2007, we plan to use Surround on the main crop plant in the trays before planting, plant buttercup or other attractive varieties in the border, and spray the border plants with Entrust but less frequently (weekly or biweekly).

Nancy Hanson, Manager, Community Supported Agriculture Program, Hampshire College Farm Center

CABBAGE AND ONION MAGGOT FLIES

A good indicator of the start of cabbage root maggot flight is blooming of the common roadside weed, yellow rocket. This weed has been blossoming for about two weeks in Massachusetts. Root maggot flies were captured on yellow sticky traps placed in Brassica crops for the past two weeks at the UMass Research Farm in South Deerfield, and eggs are being found in cabbage fields. Onion (*Delia antiqua*) and cabbage maggot (*Delia radicum*) flies look nearly identical but are likely to be found only near their host crop – brassicas, for cabbage maggot, and aliums, (primarily onion) for onion maggot. There is a period of time (6-10 days) after flight begins before eggs are laid. In degree-day accumulations, the Conn. River Valley is ahead of many areas of the state, but provides a good 'early warning' that wherever your are, it's time to test your eyesight, and to **scout cabbage and onion fields for root maggot eggs.**

Life cycle. Flies spend the winter as small brown pupae in the soil. Adults emerge in spring and adults can travel considerable distance in search of host plants (1/2 to 1 mile). Cabbage root maggot flies are rather delicate, hump-backed gray-brown flies, about 5-7 mm long. Onion maggot flies are very similar. Female flies seek out brassica or onion plants to lay eggs at the base of the stem. Cool, moist soil conditions favor survival of the eggs, and temperatures over 95 F kill them. By mid June, the soil temperatures in the upper ½ to 1 inch are usually so high (>100 degrees F) that soil temperature itself provides control.

When eggs hatch, larvae feed on roots and can cause complete destruction of the root system. In Brassica root crops such as turnips, radishes and daikon, feeding tunnels make the root unmarketable. In crops such as broccoli or cauliflower the first sign of a problem is wilting of the plant on sunny days and yellowing of outer leaves. Later, plants collapse, wilt down, and die. If you pull one up you will see the reason it is wilting is the roots are gone. You may still find the little white maggots feeding, or the

small brown, oblong pupae.

Monitoring. Flies are attracted to bright yellow color. Yellow sticky cards are inexpensive and easy to use; attach them with small wire stakes (see photo) and place near the soil. Check and change traps twice weekly to record changes in fly activity. In cabbage, flight typically declines after mid-May so that some late May or June plantings do not need a soil drench.

Monitoring cabbage for eggs. To check your field for eggs, look for the 1/8-inch long, torpedo-shaped white eggs that are laid along the stem, or on the soil next to the stem of young transplants. Often eggs are laid in neat rows, or inserted into the soil. They may be under a small clod of dirt near the stem. A pencil point helps stir the soil to look for them. Check 25 or more plants, in groups of 2-5 plants, scattered around the field. If you find more than an average of 1 egg/stem, it is likely to be a damaging population and a banded soil drench is recommended. Eggs may be more abundant in wetter areas of the field.

Soil Drench. Target the base of the plants and use at least 200 gallons of water per acre to help the insecticide penetrate to the root zone. At present, chlorpyrifos (Lorsban) is the only option. This material does not move readily in soil after the application is made, so it is important to provide adequate water so that the material penetrates several inches into the soil when it is applied. Under dry soil conditions, additional water may be needed to penetrate the soil. See the 2006-2007 New England Vegetable Management Guide for more details. This guide is also available online at www.nevegetable.org. The online version has updated information for 2007. Re-scout the field five to 7 days after application to note whether eggs have hatched; if there are few maggots active, then the application was effective. Because the materials are quite persistent in the soil, a second application is usually not needed. If you make several plantings, scout each planting (it takes about 15 minutes) to achieve the best timing for a soil drench. You'll be able to apply it when it is needed, and you can save the cost of application when it is not needed.

There is no organically allowed insecticide that has proven effective for this pest.

Floating row covers provide an effective barrier against this pest. Place the cover as soon as the transplants are set. Use in a rotated field, as flies overwinter in soil after late season crucifers and could emerge under the cover if the same field has spring brassicas. Replace cover after weeding operations. As soil temperatures rise, the first flight ends (late May to mid June) and crops grow large, covers can be safely removed. Note that seed corn maggot may emerge under row covers in any field where cover crops were grown or organic matter was incorporated the previous fall or in the spring.

Other cultural practices. Crop rotation contributes to keeping populations low. Fall tillage to bury crop residues and to expose over-wintering pupae is also important. However, if there is healthy growth of the crop, cultivation that brings soil up around the stem may help encourage formation of adventitious roots from the stem, which can help compensate for root loss even if maggots are present. Natural enemies in the soil may also help to suppress the population of maggot eggs and larvae.

SEEDCORN MAGGOT FOUND IN EARLY BEANS

Seed corn maggot attacks seeds and seedlings of a wide variety of plants. The fly is nearly identical to cabbage and onion maggot flies. Eggs are laid on soil surface near sprouting or decaying seeds, organic plant residue, or organic soil amendments (manure, seed meals). Decay from soil pathogens or previous insect feeding makes seeds or seedlings more attractive to seedcorn maggot. Moist, freshly turned soil is preferred over dry or saturated soil. Eggs hatch in 2-9 days depending on temperature, and maggots burrow down to find food. The maggot is yellowish-white, legless, with a pointed head and is about ¼ inch long when fully grown. Damage may be to the seed itself or to roots, stems or cotyledons.

Unfortunately, practices that enhance organic matter in the soil may actually worsen seedcorn maggot problems. Conditions that cause slow seed emergence (cold, wet soils) favor seedcorn damage, while those that favor faster crop growth (warmer soils, moderate moisture) help the crop get established before damage occurs. Delaying planting until several weeks after cover crop is incorporated may also help reduce seedcorn maggot problems.

This past week we found seedcorn maggot in early-planted beans. At first glance the beans appeared to have died from disease, but on close inspection we found maggots inside the seeds and stems. The wet periods of the past several weeks probably favored seedocrn maggot. Some varieties appeared to have fared better than others. The best solution is to replant, now that crop conditions favor faster germination.

PTC UPDATE: ALTERNATIVE BORDER CROPS

Over the past four years, you have probably have heard a lot about perimeter trap cropping to manage striped cucumber beetle in cucurbit crops. The system has proven itself as an effective, cost-saving method for managing this pest. Systemic or foliar insecticides in the trap crop border are effective in halting the beetles in the border and protecting the main crop.

One concern that we have heard frequently is that Blue Hubbard is difficult to market and other border trap crops were needed. In 2006 we evaluated buttercup and kabocha squash as border crops, and they worked just as well as Blue Hubbard. Markets for these crops are strong. Any *Cucurbita maxima* variety is likely to be very attractive. This species includes many giant and specialty pumpkin varieties; the only one we do not recommend as a border crop is Turk's Turban because unlike most *C. maxima* varieties, it is highly susceptible to bacterial wilt which is vectored by the beetles. For more details on PTC, please consult the UMass Vegetable website section on striped cucumber beetle:

http://www.umassvegetable.org/soil_crop_pest_mgt/insect_mgt/cucumber_beetle_striped.html

If you would like to try this system and have questions, you may call Andy Cavanagh at 413-577-3976.

R. Hazzard and Andy Cavanagh, UMass Extension

UPCOMING EVENTS

Seeds of Solidarity Visiting Day

Saturday June 9th, 10 am at Seeds of Solidarity, 165 Chestnut Hill Road, Orange, MA

Seeds of Solidarity Farm and Education Center in Orange MA," offers a free tour on Saturday, June 9th at 10am. Seeds of Solidarity was recently featured in the celebrated international journal "Living Lightly," Founders and farmers Ricky Baruc and Deb Habib provide an engaging tour of solar greenhouses, energy efficient buildings, abundant market gardens, solar electric and hot water systems, and biodiesel fueled vehicles, plus information about their programs that teach North Quabbin youth to "grow food everywhere." An optional potluck lunch follows the two-hour tour on this "Solidarity Saturday." The event is geared towards adults, but families are welcome. Says Habib, "We get calls from folks from the region and throughout New England interested in visiting our site—so we've created this visiting day, which is a wonderful way to meet and unite people too." For those unable to make the June date, there will be another Solidarity Saturday on October 6th. For directions and more information about Seeds of Solidarity and other summer and fall events visit www.seedsofsolidarity.org. Or contact Deb Habib, deb@seedsofsolidarity.org, (978) 544-9023 Free. No registration required.

Ricky Baruc & Deb Habib, Seeds of Solidarity Farm

Massachusetts Harvest for Students Week Coming in September

The MA Farm to School Project would like introduce the first annual **"Massachusetts Harvest for Students Week"**, which will launch the week of September 24, 2007. During this Week we will ask all schools, kindergarten through college, to purchase, serve, and highlight fresh locally grown food on their menus at least once and preferably all week.

Massachusetts Harvest for Students Week will help to spur new local food purchasing as well as increasing existing purchasing in schools across the state. These new relationships help to strengthen the state economy while introducing students to local, healthier food. We expect the demand for local food to greatly increase for this week so there is much potential for new farms to benefit!

Are you are farmer who would like to participate? Contact us for more information. MA Farm to School Project: (413) 253-3844, kelerwin@localnet.com or visit us at www.massfarmtoschool.org.

Megan Kohn and Kelly Erwin, MA Farm to School Project

SEMAP's 'Buy Fresh, Buy Local' Campaign 2007 SPRING KICK-OFF!

Friday, June 1 Westport Rivers Vineyard & Winery

417 Hix Bridge Rd., Westport MA

3:00-6:00 pm., Rain or Shine

SEMAP's Buy Fresh, Buy Local Campaign is connecting the consumer to Southeastern Massachusetts' freshest and most delicious local food. Through outreach materials, advertisements, and point of purchase materials, we make it easy to find and buy fresh, local food and farm products. Please join us to celebrate the launch of SEMAP's new "Buy Fresh, Buy Local" Campaign at our 2007 Spring Kick-Off Event! Taste great appetizers, wine and other goodies from our local chefs and businesses along with a raffle, music, and a chance to meet farm supporters. For more information or to preregister , email/call scogswell@semaponline.org, 508-542-0434. The Southeastern Massachusetts Agricultural Partnership (SEMAP) is a nonprofit organization whose mission is to help agricultural enterprises in southeastern Massachusetts achieve economic success.

Growers can also update/list your farm online using our Online Local Farm Guide. From the SEMAP website (http://www.umassd.edu/semap/welcome.cfm), click onto the blue link "Find Local Farms". It's easy and FREE, plus you can log on to change information at anytime.

Vegetable Notes, Ruth Hazzard, editor and Amanda Brown, assistant editor. Vegetable Notes is published weekly from May to September and at intervals during the off-season, Authors of articles are noted; author and photographer is R. Hazzard if none is cited. Where trade names or commercial products are used, no company or product endorsement is implied or intended. Always read the label before using any pesticide. The label is the legal document for product use. Disregard any information in this newsletter if it is in conflict with the label.