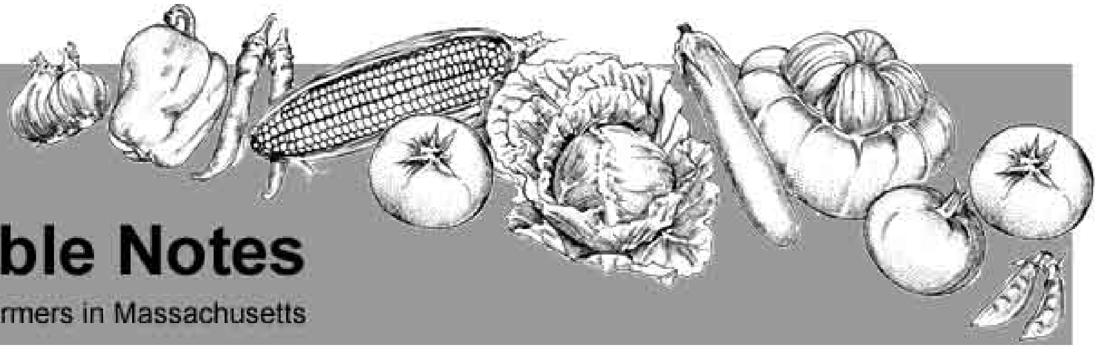
UMASS EXTENSION



Vegetable Notes

For Vegetable Farmers in Massachusetts

Volume 19, Number 3 May 22, 2008

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CROP CONDITIONS MAY 22, 2008

Over the past week temperatures have remained cool enough to delay warm season crop planting. Fields are ready to go but most growers are reluctant to plant until warmer temperatures arrive, which is forecasted to happen early next week. Cool season crops are growing well despite problems such as the lack of rain in northeastern MA and occurrence of seed corn maggot in some fields. Sweet corn that was planted under plastic or row cover is variable in height depending on location and plant date. Fields of corn that were direct seeded are starting to emerge from the soil. Slowly but surely the growing season is moving forward! Farmers' market and farmstand sales have been steady.

Given the high cost of fertilizer, everyone is looking for ways to get the best return on their fertilizer investments. See articles below for ways to save on fertilizer costs without cutting back on your crop yield.

-R. Hazzard & A. Brown, UMass Extension

SAVING FERTILIZER DOLLARS

You can maintain yields while saving fertilizer dollars. Here's how:

Soil test. This reveals the soil's nutrient status and the pH. If soils are outside of a 6.0 - 6.8 range (mineral soil, most vegetables) crops can't use fertilizer effectively.

Take nitrogen credits. Cover crops, manures, previous crops and soil organic matter (SOM) provide nitrogen - about 20 lbs N/A for every 1% SOM. A legume crop will supply ~40 lbs N minimum, with 2-3 times that from a well established legume sod. Even rye cover crops can supply 10-20 lbs N once the rye breaks down.

Don't apply all N preplant. Vegetables only need about 25 lbs N/A the first four weeks of growth. Sidedress the rest.

Don't lose N to the wind. Broadcasting urea or ammonium fertilizers can be lost through volatilization. Prompt tillage or applications that put the N in the soil prevent this loss.

Pre-Sidedress Nitrate Test (PSNT). Test your soil prior to sidedressing to see if more N is needed. If soils have 25-30 ppm nitrate you can cut the sidedress rate in half. Above 30 ppm no additional N is needed. (Check with a Vegetable Program Specialist for details.)

Reduce tillage. The quickest way to burn Soil organic matter is with conventional tillage.

Don't over apply P. If your soil level is high and soils are cool, use no more than 20 lbs actual P/A as a starter. If planting after June 10 on warm, high P soils, no additional P may be needed.

Fertilized mulched acre. When using plastic, think Fertilized Mulched Acre or FMA. If you're planting on 5 ft centers, with the plastic mulch covering 3 ft, the FMA is the area covered by mulch (3') divided by the row center distance (5'), giving 0.6 or 60%. If the recommendation is for 100 lbs of N/A, you can cut this to 60 lbs if you apply the N only to the area covered by the plastic.

Grow your own N in-season. Plant clover between rows of plastic mulch. It could add 20-30 lbs of N for next season.

Cornell online fact sheets: Cornell Nutrient Management Spear Program fact sheets on N and other crop nutrients at http://nmsp.css.cornell.edu/publications/factsheets. asp.; reduced tillage: http://www.hort.cornell.edu/reducedtillage/.

-Steve Reiners, Cornell Unversity, May 7, 2008 PestMinder 15.1 2, Cornell Cooperative Extension Vegetable Program

CHOOSING THE BEST SOURCE OF NITROGEN FOR THE CROP'S NEEDS

Increasing global demand for nitrogen fertilizers with limited increase in production capacity has resulted in much higher prices and limited availability of some nitrogen fertilizer materials. Also, safety, security and insurance concerns have resulted in very limited available of ammonium nitrate, which over the years has been a favorite sidedress and topdress material in vegetable production. Urea, urea-ammonium-nitrate, calcium nitrate and ammonium sulfate are the nitrogen materials most likely to be available for use this year. Growers may also want to consider the use of one of the slow release nitrogen materials. The following are a few comments about each of these materials.

Urea (46 percent N) will be one of the primary materials available. It is a synthetic organic nitrogen material (contains carbon as part of the base structure) that forms ammonia as it is broken down. If the urea is incorporated into the soil, the ammonia reacts readily with water to form the ammonium (NH4+) form of N that is held on the exchange sites of the soil. However, when urea is applied on the soil surface some of the N in urea may be lost by volatilization of the ammonia before it moves into the soil. The percent of N lost in this way from surface applied urea is more of a concern on soils with a pH near or above 7.0. If incorporated within two days after application, loss in most situations will be less than 2 percent. A rain or irrigation providing over 0.5 inch water will move the urea into the soil sufficiently to minimize loss. Loss does increase with temperature. In a pH 6.5 loam soil at 45oF, N lost during the first four days after application will be less than 3 percent and at 75oF lost during this time period may range from 5 to 10 percent. Potential for loss is also much greater in sandy soils than in loam and clay loam soils. Urea broadcast over plants usually results in minimal injury to the leaves. For crops such as lettuce, where any damage to the leaves is a quality issue, nitrogen materials should be sidedressed along side the row.

Urea-ammonium nitrate (UAN or 28 percent N) is a liquid material that is approximately a 50:50 blend of urea and ammonium nitrate. This material is a good material for sidedressing N. It can also be sprayed or dribbled in a band on the soil surface between rows of plants, but care needs to be taken to minimize the amount of material that gets on the foliage of plants. Spraying more than 3.5 gallons per acre directly over the foliage will cause some burn. Since half of the N is in the urea form, applying this material to the soil surface has the same risk of volatile N loss as with granular urea.

Ammonium and urea sources of nitrogen also have the potential to aggravate calcium disorders in certain vegetables. These disorders include blossom end rot of tomatoes, tip burn of leafy crops and cavity spot of carrots and parsnips. In the soil, urea is converted to ammonia and then to ammonium (NH4+). Ammonium competes with calcium for uptake by the plant. Large amounts of ammonium are present for several days (or longer) after application and can cause calcium disorders which may not be noticed immediately. Periods of heat and moisture stress or insufficient calcium soil levels contribute to the problem.

Urea and ammonium fertilizers can be safely applied as a pre-plant broadcast. The ammonium will be converted to nitrate before plants are in a sensitive stage. Pre-plant applications should be minimal; just enough to give small plants and seedlings a good start. More nitrogen can be applied later as a sidedress. Warm soils with over two per cent organic matter may supply enough nitrogen to make sidedressing unnecessary. The Pre-Sidedress Soil Nitrate Test (PSNT), available at most soil test labs, can help you decide if you need so sidedress nitrogen.

Calcium nitrate (15.5 percent N, 20 percent Ca) is a good material to use when additional calcium is need. The N is all in the nitrate form which is readily available for plant uptake, but is also more at risk for loss by leaching or denitrification with heavy rainfall events. Most vegetable growers use calcium nitrate to sidedress sensitive vegetables. Nitrate nitrogen does not inhibit calcium uptake. The calcium in calcium nitrate is helpful, but the main benefit comes from the lack of ammonium. Calcium nitrate is more expensive than urea and ammonium forms, but it doesn't take many boxes of high value vegetables to pay this back.

Potassium nitrate (13 percent N, 42 percent K2O) is a good material for supplying some additional potassium.

Ammonium sulfate (21 percent N, 23 percent S) is becoming more available in the market place. It is a good N source, especially where additional sulfur is needed. There is no concern for volatile N loss when this material is broadcast on the soil surface.

Slow-release N materials tend to release N over a 75 to 90 day period depending on the properties. With these materials, all of the nitrogen can be applied just prior to planting, and the N will gradually be released over the growing period of the crop, eliminating the need for sidedressing. Since the N is gradually released over time, the potential for N loss is reduced.

Cost of the various nitrogen materials vary considerably. Be sure to compare the costs of materials on the cost per pound of N, not per ton of material. The way to do this is as follows:

Cost per lb N = (Price per ton material) divided by (lbs of N in a ton of material).

For example, one ton of urea costs $598 and contains 920 lbs N (2000 x .46)

Therefore cost per lb N = ($598) ÷ 920 lbs N = $0.65/ lb N.

--Adapted from Darryl Warncke, Crop and Soil Sciences, Michigan State University. Reprinted from Michigan State Crop Advisory Team (CAT) Alert, Vol. 23, No. 4, May 14, 2008 with additions from John Howell, UMass Extension

HELP WITH CUCURBIT DISEASE MANAGEMENT

Managing cucurbit diseases is an increasingly complex and sometimes daunting task. Recent years have seen Plectosporium blight added to the already long list of diseases afflicting vine crops. Downy mildew has arrived earlier and thus has caused more losses in recent years. Phytophthora blight is an ever increasing problem with few good answers in sight. There are a lot of new fungicides on the market, but at the same time we are losing our most effective fungicide materials to resistance.

Creating an efficient, affordable and effective management program for cucurbit crops for these diseases can be difficult. One key component is early and accurate disease identification. Another is to know which products are effective against which diseases. This year we have some time and resources to devote to helping growers with these issues. Thanks to funding from the EPA the UMass Disease Diagnostics lab is able to accept samples from vine crops at no cost for a period of time this season. Members of the vegetable IPM team will be available to pick up samples, consult on spray programs, and help identify problems in the field.

Later in the summer, we will be testing irrigation water for contamination with Phytophthora capsici, evaluating a promising breeding line of butternut squash for genetic resistance to P. capsici, and testing field populations of downy and powdery mildews for resistance to commonly used fungicides. We'll post the results from our trials in VegNotes, and on the UMass Vegetable IPM website at www.umassvegetable.org.

If you would like a sample picked up, consultation on spray programs, or need help identifying problems in your cucurbit fields, please call Andy Cavanagh at 413-658-4925.

-Andy Cavanagh, UMass Extension

IPM AND THE UMASS EXTENSION PLANT DIAGNOSTIC LAB

Sound agricultural decisions about plant problems should be based upon good information. Plants that show signs of abnormal growth may be suffering from a plant disease, poor environmental or cultural conditions, or insect infestation. Insecticide sprays should be guided by monitoring, scouting, and using economic thresholds. Plant diseases can be caused by one of four classes of fungi as well as bacteria and viruses. Chemical treatments vary with effectiveness according to the causal agent. Some diseases cannot be effectively treated with chemicals; physiological or environmental "diseases" may require no intervention or a change in cultural practices. The most effective means of targeting chemical treatments against diseases is an accurate diagnosis of the problem, as well as knowing the cultural techniques that can eliminate the need for pesticide sprays.

The UMass Extension Plant Diagnostic Lab and Soil and Tissue Testing Lab can provide you with accurate information about the causes of plant problems along with detailed, scientifically based management recommendations. The Plant Diagnostic Lab is located at 108 Holdsworth NRC on the UMass campus. The Soil and Tissue Testing Lab is located in the West Experiment Station on North Pleasant Street. Both have special parking spots close by for anyone dropping off samples. Samples can also be mailed in. Please see www.umass.edu/agland for more information and directions, or contact M. Bess Dicklow at (413)545-3209, mbdicklo@umext.umass.edu

.-M. Bess Dicklow, UMass Plant Disease Diagnostics Lab

Seedcorn maggot and wireworm in seeds and seedlings

Over the past two weeks we have seen or had reports of seedcorn maggot and wireworm damage in early seeded crops

In the field if you find wilting, stunted plants or poor emergence and no clues of insect feeding or diseases on the above-ground parts, then dig up the plant and check for maggots and wireworms inside the seeds and stems.

Seed corn maggot attacks seeds -- especially larger seeds like corn, beans and peas – as well as seedlings of a wide variety of plants. The fly is nearly identical to cabbage and onion maggot flies, but it seems to become active somewhat earlier. Eggs are laid on soil surface near sprouting or decaying seeds, organic plant residue, or organic soil amendments such as manure or 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 mag¬got 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.

The wireworm is slender, jointed, usually hard-shelled, with three pairs of legs, and tan brown in color. This is the immature stage of the click beetle, which deposit eggs on soil during May and June. Grasses, sod and sorghum-sudangrass are favorite egg-laying sites. Eggs hatch to become wireworms that feed below-ground on seeds, roots, tubers and other plant tissue. Wireworms feed for several years before pupating and emerging as adults. Thus, a wireworm problem in the spring probably means there was an attractive grass crop present sometime in the past 3-5 years. Wireworms also prefer wet soils and moderate temperatures; they migrate up to reach warmer soils, but down to avoid excessive cold, heat, or drought.

Unfortunately, practices that enhance organic matter in the soil may actually worsen seedcorn maggot and wireworm problems. For example, one field where both seedcorn maggot and wireworm caused significant damage to early peas had been rotated through two years of rye cover crop to build organic matter. Another instance occurred after a thick winter cover of vetch and rye. 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. Where possible, delay planting for several weeks after a cover crop is incorporated to help reduce seedcorn maggot problems.

Often growers use floating row cover over early crops in order to exclude insect pests, only to find that these seedling pests cause trouble right underneath the cover. Both pests overwinter in soil, especially where there is a lush cover crop, and they will seek out food and egg-laying sites as soon as they become active in spring. That includes your prized transplants!

If you discover after planting that a field is infested with seedcorn maggot or wireworm, not much can be done to cure the problem except to wait and replant. Timing for replanting should be made based on assessing the size of the maggots

replant after 5 days. If wireworms are found, wait to replant until soil temperatures are above 70 degrees F, which forces them deeper into the soil.

Soil insecticide application for control of seedcorn maggot and wireworm is most effective when made prior to planting or laying plastic; however registered products are limited – see 2008-2009 New England Vegetable Management Guide and read the label. Commercial seed treatments often target these pests and reduce damage. Using transplants avoids these pests EXCEPT where plants are set under row cover or in areas that are already heavily infested.

GREENHOUSE APHID IDENTIFICATION AND BIOCONTROL

Part one of a two part series.

Several species of aphids can cause problems in vegetable and ornamental greenhouses. Most common are the green peach aphid, the cotton or melon aphid, the potato aphid, and the foxglove aphid. Proper identification is critical to biological control, and in some cases chemical control.

Cornicles can be found on all aphids. They are a pair of tube-like structures projecting from their posteriors. Cornicles can be used to identify different species, if you have a 10x hand lens. On green peach aphid, cornicles are the same color as the body, slightly flared and darker at the tip. In melon aphid, cornicles are shorter, and dark throughout their length, regardless of body color. In potato aphid, cornicles are long and thin and may be curved outward at the tips. They are the same color as the body. The foxglove aphid has cornicles of medium length, darkened at the tips.

Body color alone is not an accurate way to identify aphids, though it may be useful with other features. The green peach aphid is commonly light green-yellow, but can be darker green or sometimes pink/rose. Melon aphids are smaller, often dark green, almost black, but can be green, yellow or mottled. The potato aphid is a large, active aphid, usually green, but variable in color, often with a darker stripe down its back. The foxglove aphid is green, often quite shiny, with two darker patches on its abdomen at the base of the cornicles. The less common chrysanthemum aphid is shiny and dark brown.

The life cycle of aphids outdoors is quite complicated, at times involving sexual reproduction and egg-laying. In the greenhouse however, the life cycle is usually very simple. All individuals are female. They give birth to live young, which in turn can reproduce within 7-10 days. Individual aphids can give birth to 60-100 young depending on host plants and nutritional status over a 20-day period. Obviously, aphids can rapidly build up very large populations. Aphids are usually wingless, although adults may develop wings if the population density is high, allowing rapid dispersal.

Plant damage by aphids results from piercing tissue with their mouth parts and sucking out the sap, causing deformed leaves and flowers. They also excrete a sugary, sticky substance called honeydew, which promotes the development of black, sooty mold fungus on the leaf surface. Sooty mold is not pathogenic on the plant, but in severe infestations, it can interfere with photosynthesis. Aphids can transmit plant viruses (like cucumber mosaic virus). In ornamentals and vegetable plants or greens, the presence of the aphids themselves, their cast-off skins, honeydew and sooty mold reduces plant marketability.

Monitoring is essential to assure early detection of aphids and timely implementation of management strategies. Monitoring involves two different strategies: visual observation of the crops for wingless aphids, and yellow sticky cards for those with wings.

Inspect your greenhouse crops on a regular schedule for wingless aphids, and the small white flakes of cast-off skins produced as they molt. Initial infestations are usually at isolated within the greenhouse, but can rapidly spread. Heavier infestations can result in the presence of honeydew on leaves, making them shiny and sticky. Ants are often attracted to honeydew, so their presence suggests an infestation. Growing some varieties or crops known to be attractive to aphids can help with early detection.

Place yellow sticky cards throughout the greenhouse to monitor for winged aphids. They can move into the greenhouse from outside, typically in the spring and fall as migrating aphids begin flying. If winged individuals are produced within the greenhouse, there is an advanced infestation where adults are dispersing to find new host plants. Effective crop monitoring should identify infestations before they reach this stage.

-(adapted from Ontario Ministry of Agriculture fact sheet 06-081; www.omafra.gov.on.ca/english/crops/facts/06-081.htm)

TOMATO PITH NECROSIS IN HOOPHOUSE TOMATOES

High tunnels provide ideal conditions for the growth of early season tomatoes. This environment as well as a traditional greenhouse also provides ideal conditions for a newly emerging disease of greenhouse tomatoes, Tomato Pith Necrosis, which is caused by Pseudomonas corrugata and other soil-borne species of Pseudomonas.

This disease generally occurs on early planted tomatoes growing when night temperatures are cool, the humidity is high, and the plants are growing vigorously because of excessive levels of nitrogen. The disease is also associated with prolonged periods of cloudy, cool weather. Initial symptoms often appear just as the first fruit clusters reach the mature green stage and consist of yellowing and wilting of young leaves. Serious infections can result in chlorosis and wilting of upper portions of plants with brown to black lesions on infected stems and petioles. When stems are cut longitudinally, the center of the stem (pith) may be extensively discolored, hollow, and/or degraded. Stems may be swollen, numerous adventitious roots can form, and infected stems may shrink, crack, or collapse. The pathogen, a bacterium, is considered to be a weak pathogen on tomatoes that are growing too rapidly. There is no effective treatment for this disease; however, affected plants may recover if environmental conditions improve (warm, sunny weather).

The sources of this disease, and the ways that it develops and spreads, are not well understood. It is possible that the bacteria are seed-borne and they most certainly survive in the soil in association with infected tomato debris. Preventive measures to minimize the occurrence of this disease in high tunnels include: adequate ventilation to avoid high humidity levels (especially during cloudy weather), avoiding excessive nitrogen levels to prevent vigorous plant growth, incorporation of crop debris to speed decomposition of residue and associated bacteria, and crop rotation.

-M. Bess Dicklow, plant pathologist, University of Massachusetts Extension

APPLICATION FORM FOR SHELLED CORN FOR GREENHOUSE HEAT PROJECT

This issue of Vegetable Notes includes an application form for farmers who would like to be part of the Shelled Corn project. We have funding to provide cost-share for purchase of one corn furnace or boiler per farm (up to 50% of the cost, maximum $3000 per farm) for a limited number of farms. Although we may not be able to provide cost-share funds for all growers who are interested, we will be able to provide useful information and contacts to all interested growers. Our goal is to foster a regional network of renewable energy producers and users, with a focus on grain corn but also including other types of renewable energy. The emphasis of this project is on making the best possible use of our land for food and fuel production and not to detract from our ability to grow food crops. We're envisioning a system where fuel crops become a valuable rotational crop in vegetable farms and an alternative revenue stream for dairy farmers.

We have included an application as a supplement in this week's newsletter. It is also available on our website, www.umassvegetable.org. If you are interested in applying to be a part of one of these regional networks and receiving cost share for the purchase of a biomass furnace please fill out the application and return to it the address listed on the application form.

Vegetable Notes, Ruth Hazzard, editor and Amanda Brown and Andrew Cavanagh, assistant editors. Vegetable Notes is published weekly from May to September and at intervals during the off-season, and includes contributions from the faculty and staff of the UMass Extension Vegetable Program, other universities and USDA agencies, growers, and private IPM consultants. Authors of articles are noted; author and photographer is R. Hazzard if none is cited.