UMASS EXTENSION

# Vegetable Notes

For Vegetable Farmers in Massachusetts

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## IN THIS ISSUE:



## WATCH FOR STEM AND BULB NEMATODE OF GARLIC AND ONION

Infection of garlic with the stem and bulb nematode, *Ditylenchus dipsaci*, has become a disturbing trend in garlic production in Massachusetts, New Hampshire, and New York. This nematode was seen in the UMass Extension Diagnostic Lab repeatedly and has been found throughout New York where significant onion and garlic production occurs. The stem and bulb nematode, *Ditylenchus dipsaci* is a well known pest of Allium species, flower bulb crops (Narcissus, Hyacinth, and tulips), flowering shrubs (Hydrangea), and rhizomatous plants such as Iris and Gladiolus species. The nematode is common in all temperate regions and is easily spread by infected bulbs, rhizomes, or infected plant material. Symptoms of the nematode feeding on leaf tissue include twisting and malformation of leaves, blisters, and swellings that can resemble thrips injury. Bulb damage can be mistaken for Fusarium basal plate rot with bulb decay occurring both at the neck and the basal plate of the bulbs. Deformed growth and swelling of the bulbs results in a disease commonly known as 'bloat'. In advanced stages, bulb roots may completely disintegrate. Lesions caused by the stem and bulb nematode can become colonized by fungi and bacteria leading to complete decay of bulbs. Very large populations of nematodes can be extracted from bulbs and infested leaves simply by incubating pieces of tissue in water.

*D. dipsaci* is an obligate parasite of plants and populations of the nematode exhibit marked host preferences. The nematodes aggregate into a mass (nematode wool) and with slow drying can persist in a dehydrated state for many years. The nematodes' long term survival potential and wide host range enables persistence in infested fields for long periods of time. Long rotations out of onion and garlic production and starting with certified, nematode free planting material are primary management tools. Unfortunately, many small, specialty garlic growers plant repeatedly into the same fields and trade bulbs widely among growers and to the public, resulting in the widespread distribution of *D. dipsaci*. Chemical, physical, and cultural methods of control have been used to restrict damage, but most chemical treatments are no longer registered for use. Hot water treatment of bulbs can be effective but must be done accurately and with careful monitoring to avoid heat damage. Starting with certified disease-free planting material and prompt removal and destruction of infested plants can limit nematode damage.

*- M. Bess Dicklow, UMass Extension Plant Pathologist*

## BROWN MARMORATED STINK BUG

The brown marmorated stink bug (BMSB), *Halyomorpha halys* (Stål) (Hemiptera: Pentatomidae), is an exotic insect new to North America. Large numbers of adult BMSB were first identified in fall 2001 in Allentown, PA; however, undetermined sightings likely date as far back as 1996. This Asian native, sometimes called the yellow-brown or East Asian stink bug, has since been found in several Pennsylvania counties, in New Jersey on plant material and in blacklight traps, and in western Maryland on buildings in 2003. In 2004, BMSB also was detected in West Virginia. Populations have been documented in Southern NH and individual sightings have been confirmed in MA.

## Origin of BMSB

BMSB is a known pest of fruit trees and legumes in its native China, South Korea, Japan, and Taiwan. The adults might have entered the United States as stowaways in packing crates from Asia. The first Western Hemisphere identification was made in October 2001; however, there are reports that indicate it was present in the same area as early as 1996.

## Host Range


*Brown Marmorated Stink Bug Adult*

BMSB is polyphagous, with a long list of host plants including many fruit and shade trees and other woody ornamentals as well as legumes and various vegetables. In Asia, it has been reported as a significant pest of fruit trees and soybean. Asian hosts include Pyrus spp. (pear), Prunus spp. (cherry, peach, and apricot), Malus spp. (apple), Morus spp. (mulberry), Ficus spp. (fig), Diospyros spp. (persimmon) as well as Arctium spp. (burdock). The expanding host list in the United States includes Pyrus serotina (Asian pear), Prunus persica (peach), Paulownia tomentosa (empress tree), and Buddleia spp. (butterfly bush, where leaf feeding was observed). Other U.S. plants on which BMSB feeding is known include Catalpa spp., Rosa rugosa, Phaseolus spp. (bean), Abelia spp., Lonicera spp. (honeysuckle), Acer platanoides (Norway maple), Vitis spp. (grape), and Rubus spp., (raspberry).

## Potential Impact and Spread

Adult BMSB can fly and thereby expand their range; but, as with many other pests, dissemination also could be accomplished by hitchhiking on vehicles and through commerce. Human activity will undoubtedly speed the spread of this pest. Because of its wide host range and the damage resulting from its feeding, BMSB has the potential to have a very tangible impact on agricultural crops, particularly those that are not normally treated for insect pests during the growing season. Currently, it is believed that BMSB is increasing its local population levels and will likely extend its range to other northeastern states in the near future. Surveys are ongoing in several states to detect and monitor this pest and its potential impact on agriculture. However, because this stink bug initially feeds on common landscape ornamentals, homeowners are likely to be the first to spot new infestations.

## Life History and Identification

BMSB overwinters as adults in houses and other protected places. Adults emerge from their overwintering sites in April. This typically shaped stink bug ranges in length from 14 to 17 mm and is dark mottled brown. The last two antennal segments have alternating broad light and dark bands. The exposed abdominal edges also have alternating dark and light banding. From June to August, females lay clusters of 20–30 light green, barrel-shaped eggs on the undersides of leaves. Newly hatched nymphs are yellowish mottled with black and red. Older nymphs are darker with banded legs and antenna, like the adults. Adult BMSB are most similar in appearance to Brochymena, a very common group of native grey-brown stink bugs. However, *Brochymena spp*. lack the alternating light and dark antennal markings. *Brochymena spp.* also have distinct teeth on the


*Brown Marmorated Stink Bug Nymphs and Eggs*

lateral edges of the pronotum, whereas the lateral pronotal edges of BMSB are smooth.

**Damage**

BMSB feeding can cause small necrotic areas on leaves and fruit. Fruit damage may include water-soaked lesions and/or cat-facing damage, ranging from mild to severe. In addition to plant damage, BMSB can become a major nuisance to people as adult bugs congregate in overwintering sites, invading houses and other buildings, in a manner similar to box-elder bugs, Asian ladybird beetles, and cluster flies. When disturbed, the bugs produce a characteristic odor that adds to their nuisance potential.

If you suspect you have encountered BMSB, contact your State Department of Agriculture, University Diagnostic Laboratory, or Cooperative Extension Service. Specimens should be collected and positively identified before any action is taken.

*- Source: this article was adapted from a publication produced and distributed by the NE-IPM center, in cooperation with USDA–CSREES Integrated Pest Management Centers, Maryland Department of Agriculture, USDA-APHIS, and the Land-Grant University System.*

## 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. 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. Some 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.

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 with out 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. It is best suited to moving in water and with soil rather than through the air, and human activities that move soil or water from one field to another can greatly facilitate the spread of this pathogen. Phytophthora capsici does not appear spontaneously, but the source of contamination on particular fields is difficult to determine. The pathogen can be isolated on specific fields or farms. Once a site becomes contaminated it will remain so, but nearby fields remain free of the pathogen as long as farm machinery, run-off, or irrigation from a contaminated water source doesn't introduce the pathogen.

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 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 (however, none of these have resistance to Bacterial leaf spot), especially the crown rot phase.

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 no matter what you do, but the practives outlined in the following check list may help your crops survive under moderate conditions.

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.

*-- Rob Wick, Bess Dicklow, Andrew Cavanagh and Ruth Hazzard, Dept. of Plant Soil and Insect Science, UMass;*

## FUNGICIDE UPDATE

**Blocker Fungicide (a.i. Pentachloronitrobenzene [PCNB]) Unavailable, Terraclor expiring, and Ranman supplemental label added for Brassicas.**

The EPA has issued a "Stop Sale, Use or Removal Order" to American Vanguard corporation (AMVAC) and AMVAC Chemical Corporation for registered pesticide products containing PCNB due to potential violation of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). Pesticides containing PCNB, such as Blocker, are not being distributed by

AMVAC until further notice. Growers who have product can still legally apply the material and will not be in any violation, according to EPA. Some may still be able to find distributors that have material in stock, which can be purchased, but supplies of the material are very limited and will not be replenished until the situation is resolved. However, AMVAC reports that they are working to rectify the situation and hope to be able to resume sale and production this season. Growers and dealers can place orders now to expedite receiving product if EPA lifts the order. AMVAC has indicated that orders made now can be cancelled if Blocker becomes available after its need for this season is over. Terraclor is another product with PCNB that also can be used if growers have it; however, Chemtura stopped sale and production in 2009 thus it is less likely that dealers have Terraclor. The MA state product registration for Terraclor expires on June 30 2011.

Blocker has primarily been used to control clubroot, and some crucifer growers with a history of the fungus have relied on this material. It is also labeled for diseases caused by Rhizoctonia in crucifers (wire stem), potatoes (stem canker and black scurf), and beans (root rot), white mold in beans, and white rot in garlic.

**Ranman for Managing Clubroot:** The fungicide Ranman now has a supplemental label that includes clubroot in crucifers (as well as downy mildew), thus there is a fungicide alternative while Blocker is not available. Ranman has been effective in several evaluations conducted at the Muck Crops Agricultural Research Station in OH where conditions are very favorable (acidic soil) and clubroot is severe. Severity was reduced by up to 56% with Ranman at the highest rate tested and plant vigor was greatly improved in these experiments. A PCNB fungicide was not included in these experiments, but Ranman was more effective than other fungicides tested. According to the manufacturer, FMC Corporation, good incorporation and maintaining moist soil are key to maximizing control of clubroot with Ranman. Soil should be moist when Ranman is applied at planting and kept moist afterwards. Till Ranman into moist soil or drench into soil with ample water. The label states to apply as a transplant drench or in at least 50 gallons of water and incorporate 6□8 inches deep. Ranman starts to become inactive when soil dries. The supplemental label needs to be in the possession of the user at the time of application. Labels can be obtained on the web at http://www.cdms.net/LDat/ld7M7007.pdf

Other measures that provide some control of clubroot include very long rotations and raising the soil pH to 7.2 or higher with hydrated lime.

*- adapted from Sandra Menasha and Margaret McGrath, Cornell Cooperative Extension*

## TOMATOES/POTATOES: LATE BLIGHT DETECTED

A very low level of late blight (LB) has been detected in potato seed from multiple sources in WA, WI and MI. Extensive sampling and testing is occur-ring there to determine the extent and severity of the disease but results have shown only very weak infection to date. Researchers have not been able to culture the disease.

LB has also been detected on tomato and potato plants in a Connecticut greenhouse. From Sharon Douglas, The Connecticut Agricultural Experiment Station: “Mother’s Finest” tomatoes were grown from seed collected locally last year. Foliar and stem lesions were observed 4/22. “Australian Crescent” potatoes were grown from organic seed purchased from a commercial supplier out-of-state and showed stem lesions around the same time. Potato tubers had shown no obvious symptoms. Other tomatoes and potatoes in the greenhouse don’t show symptoms yet.

From Meg McGrath, Cornell University, 4/28, Long Island Fruit & Vegetable Update: Infected potato seed is likely the source of the pathogen for this CT outbreak of LB. It can be difficult to detect infected potato seed. There may be very limited symptoms, especially with the new strains (genotypes) like US22 that are more aggressive on tomato than potato and are less aggressive in tubers than US8, which had been the main strain occurring in potato. There is thought to be a higher risk for potato seed infected with a tomato strain of LB developing foliar symptoms because sprouts are less likely to be killed than with a more aggressive potato strain.

Last year LB also developed around this time on tomatoes in greenhouses and high tunnels in a few locations in the region. Nearby plantings of potato were suspected as being the source of the pathogen for these outbreaks. Source plants were not found, how-ever. This ‘obligate’ pathogen is thought to only be able to survive over winter in potato tubers in areas where there are not living tomatoes or potatoes throughout the winter (e.g. southern Fl).

Aggressively pick out rotted or suspected potato seed tubers and treat seed with a mancozeb-containing seed treater, or

Evolve. Disinfect cutting knives frequently, keeping seed lots separate. Tomato plants as well as potatoes should be inspected for symptoms of LB routinely and thoroughly throughout this season beginning now. If suspect plants are found, immediately contact a member of the CCE, Cornell Vegetable Program and promptly submit fresh samples of symptomatic green tissue enclosed in a blown up plastic bag.

*- C. MacNeil, Cornell Cooperative Extension Vegetable Program, Veg Edge Weekly, Volume 7, Issue 6.*

## SPRING MANAGEMENT OF OVERWINTERING COVER CROPS: DON'T WAIT TO PUT RYE UNDER

One of the frightening things about using a rye cover crop is when it rains all spring, and the rye is over your cap by the time you can get to it. Rye that tall is really challenging

to manage, and even when you get the ground worked, it takes a long time for the ground to be good for vegetables. Fortunately, there is no need to cut it close on killing that winter cover crop. Most overwintering cover crops give you the most value if you kill them quite early. April is the best time to kill many cover crops. They can be killed

with an herbicide that works at lower temperatures, and smaller plants can often be killed with shallow disking. April weather doesn't offer lots of chances to get on the ground, but it is worth taking those chances when they happen. For getting nitrogen value out of grains like rye, the best time to kill them is when they have recently greened up and have just started to grow – perhaps six to eight inches tall. When rye is larger than that, the nitrogen concentration drops, leading to N tie-up when your crop needs it. An early kill can give you 30 to 50 lb N credit (yes, from those little plants!), while killing at boot can be a significant debit. Killing at boot also makes the rye slower to break down, gives less time for it to break down before you need to plant, and the crowns make it more difficult to prepare a seedbed. The risk of missing the chance to kill it also goes up.

Annual ryegrass, on the other hand, only becomes sufficiently sensitive to glyphosate when it's warm enough for it to really grow. Once that happens, don't delay because the young growth is the source of nitrogen.

Fall-sown crucifers usually die in the fall (radish, mustard) or early spring (turnip). The latter is better for recovering N. In either case, there is little regrowth in the spring. The reason to control them early in the spring is to avoid volunteers from stray survivors. If you see yellow (or pink radish) flowers in the field, it should be a signal to act.

The boot stage is a commonly recommended age for killing that is usually much too late. It is relevant in two situations: if the rye (usually a rye-vetch mix) is to be killed by mowing or rolling, the stems are susceptible at this point. The vetch is also at its maximum nitrogen content. I consider that a special case where the late kill is appropriate.

In my research program, we tested whether the crop inhibition is reduced if one uses triticale or wheat, which are less allelopathic. We killed all of them with herbicide at early to midboot, incorporated and let them break down. We transplanted tomatoes, peppers and cabbage, and direct seeded corn, beans and cucumber. All these crops showed about a 25% reduction in growth in the first month. It made no difference which cover crop. That result shows how deleterious late control of small grains can be, and it is not all allelopathy. It may seem premature to kill cover crops before they put on much biomass in the spring. You do forego some addition of active carbon. However, the cost of adding the extra organic matter just before planting is too high. It is better to get the nitrogen value and the soil improvement for the extensive root growth, and to work on organic matter production at the end of the growing season.

*- Thomas Björkman, Cornell University*

## CHANGES TO THE H-2A FINAL RULE: WHAT THEY MEAN FOR AGRICULTURE EMPLOYERS IN MASSACHUSETTS

Agriculture employers in Massachusetts who participate in the H2A Farm Labor Program have noticed a shift in procedures and enforcement recently. This shift is impacting farms and agriculture employers in Massachusetts and across the country. The intent of this article is to help clarify what the shifts are and the impact to farms and farm labor throughout

the state.

**What has changed and why?**

In February of 2010 the Department of Labor issued the Final Rule for the H-2A agriculture worker program. This Final Rule has a number of changes for agriculture employers. The stated reason for the changes is that they "strengthen worker protection for both U.S. and foreign workers and ensures overall H-2A program integrity."

It is important to note that this stated change is in line with other immigration enforcement measures enacted by the federal government. Immigration Customs Enforcement which is in charge of enforcing the immigration laws against employers has adopted a policy of increased audits and enforcement. The stated reason for these changes is to "protect" the U.S. workforce and ensure only qualified workers legal to work in the United States are hired.

**What is the impact to agriculture employers?**

The impact of these changes is very real, frustrating and costly to agriculture employers. And Massachusetts is not the only state grappling with the effects of these changes. As an agriculture employer who participates in the H-2A program you will see the following changes:

1. You will have to hire domestic H2A workers for up to 50% of the work contract period.

Many Massachusetts Agriculture Employers are experiencing an increase in workers being sent from local State Workforce Agencies (SWA). They are being required to hire all domestic workers sent to them regardless of experience.

An advisory issued by the US Department of Labor in February of 2011 states the following:

"As long as a foreign H-2A worker is employed in a certified position during the first 50 percent of the contract period, the employer must provide employment to any able, willing qualified and available U.S. worker who applies to the employer until 50% of the period of the work contract has elapsed, regardless of the number of H-2A workers covered by the employer's certification."

2. The 2010 Final Rule requires employers to begin recruiting U.S. workers before filing their H-2A applications with the Department of Labor.

An agriculture employer participating in the H-2A program will be required to initiate pre-filing recruitment 75-60 days before the employers first date of need. So this means before you even begin the process of becoming an H-2A employer you must recruit domestic workers for the available positions.

3. Employers must pay the highest applicable rate of pay.

This is a change from the 2008 Final Rule, and the implication to an agriculture employer is increased labor cost. You must pay the highest applicable wage rate, whether it is the AEWR, the prevailing hourly wage rate, the prevailing piece rate, the agreed-upon collective bargaining rate, or the Federal or State minimum wage rate.

4. Agriculture employers will experience an increase in enforcement actions for violation of the H-2A Final Rule requirements.

The H-2A Final Rule increases program integrity through strengthened audit, revocation and debarment procedures, and financial penalties.

5. The State Workforce Agencies will no longer complete I-9's and verify the employment eligibility of applicants.

Under the 2010 Final Rule SWA's will no longer be required to conduct I-9 employment eligibility verification. This means this SWA's may refer domestic or foreign workers who have not been vetted for employment eligibility. What this means for agriculture employers is that they MUST diligently and accurately complete all I-9's and verify eligibility.

**What is the future and what can you do?**

The future of the H-2A program is in limbo, and some may argue that the future of US agriculture is in limbo because of this. The best way to make a difference is to be heard and be an active voice of opposition to the current and proposed

changes. Attached is a link to recent congressional hearings on the H-2A program. These hearings indicate where Congress would like to take the program. judiciary.edgeboss.net/wmedia/judiciary/.../immi041311.wvx

A helpful resource and organization for all agriculture employers is the National Commission of Agriculture Employers (NCAE); and finally you may contact me with any questions regarding the current and proposed changes. I have been working with agriculture employers across the country as they grapple with the impact of these changes to their H-2A program and their business.

*- Brenda SmithBy Brenda J. Smith, J.D.*

## UPCOMING MEETINGS

**Workshops for Beginning and Established Farmers presented by UMass Vegetable Program Extension Educators**

**Nuestras Raices Farm, 24 Jones Ferry Rd, Holyoke, MA**

**Insecticide Application and Pesticide Safety - Ruth Hazzard, UMass Extension Vegetable Production Educator.**

**May 14 2011, 10:00am-12:00pm**

Participants will learn how to identify damaging pests, and the basics and safety of choosing an insecticide for application.

To register call Amy at 413-535-1789

**USDA Good Agricultural Practices (GAP) Training Program**

**Sponsored by UMass Extension, MA Dept of Agricultural Resources, USDA Agricultural Marketing Services, Bay State Organic Certifiers**

**Friday May 20 8:30-5:00**

**University of Massachusetts Collaborative Services Facility, Berkshire Room**

**333 South Street, Shrewsbury, MA 01545-4169**

This day long program will focus on developing a farm food safety plan, a review of risk assessment, and incorporating the USDA GAP & GHP (Good Handling Practices) audit into the farm food safety plan. Worker training, water, manure, compost management, packinghouse sanitation, pest control and traceability will also be discussed. The key presenters for the training are Dr. Richard Bonanno, Ph.D. UMass Extension Educator and Ken Petersen, USDA Agricultural Marketing Services, Fresh Products Branch.

Preregistration required. Space is limited. The cost is $50.00 for the first registration. Cost for additional employees is $10.00 each which includes the presentation, pesticide credit, refreshments, but not the GAP manual. Send the check payable to "UMass" to Doreen York, Agriculture & Landscape Program, 210 Bowditch Hall, 201 Natural Resources Rd., University of Massachusetts, Amherst, MA 01003. If you have questions, please contact Doreen at 413-545-2254 or email at dyork@umext.umass.edu. Note that we cannot accept cash payments. No walk-in registrations will be accepted.

*Vegetable Notes. Ruth Hazzard, Amanda Brown and Andrew Cavanagh, 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.*