Field Observations from Southern Maryland

By Ben Beale
Extension Educator & CED, Agriculture
bbeale@umd.edu

✓ Harvest of main season vegetable crops began in earnest last week. Watermelons, cantaloupes, tomatoes, and peppers are all being picked.
✓ Tomatoes are doing well with early fruit showing good size. We have had a lot of issues with foliar leaf spot diseases in tomatoes including bacterial leaf spot, early blight and septoria. The foliar diseases have caused quite a bit of defoliation over the last 2 weeks. The wet weather coupled with windy conditions has made it difficult to apply preventative fungicides.
✓ We are also beginning to see stink bug injury in tomatoes and peppers.
✓ On the fruit side, blueberry harvest continues with reports of good yields.
✓ We are still getting reports of Spotted Wing Drosophila damage in blueberries, even in fields that have been spraying preventatively.
✓ Grapes are growing vigorously with the increased rainfall this year.
✓ Downy mildew can be observed in many vineyards.
✓ Peach harvest is well underway, with reports of a good crop.

Summer Observations from WyeREC

By Michael Newell
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Maryland Agricultural Experiment Station
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Strawberry Plasticulture
✓ Annual summer cover crops are planted to increase soil organic matter and alter the soil ecology to aid in breaking insect pest and disease life cycles.
✓ Don’t forget to order your fall planting material ASAP.

Strawberry Perennial Matted-Row
✓ After renovation, keep the plants healthy with timely irrigation and control of leaf diseases and insect pest.
✓ It’s not too early to order plants for spring 2014 plantings. Popular varieties can sell out.

Tree Fruit Peach
✓ Began harvesting our earliest peaches on July 3rd.
Some BMStink Bug damage was noted. Japanese beetles are making their presence known also.
✓ Brown Rot has not been an issue so far. Some minor fruit Anthracnose infections were observed.

Tree Fruit Apple/Pear
✓ Completed summer pruning, this should help minimized dormant pruning and produce a better structured tree for the future.
✓ We had over 9 inches of rain in June, which made it a challenge keeping up with the cover sprays; Summer diseases are always on my mind at this time of year.

Make plans to attend the 2013 WyeREC Horticultural Crops Twilight Meeting on Wednesday August 28 from 5-7:30PM. Get a chance to see what I’ve been talking about.

Vegetable Crop Insects

By Joanne Whalen,
DE Extension IPM Specialist
jwhalen@udel.edu

Melons
Continue to scout all melons for aphids, cucumber beetles, and spider mites. Be sure to read all labels carefully for rates and restrictions since some materials, especially miticides, are restricted to only one application as well as ground application only.

Peppers
As soon as the first flowers can be found, be sure to consider a corn borer treatment. Depending on local corn borer trap catches, sprays should be applied on a 7 to 10-day schedule once pepper fruit is ¼ – ½ inch in diameter. At this time, you will also need to consider a treatment for pepper maggot.
**PEST ALERT**

**Kudzu Bug Discovered on Maryland**

Alan W. Leslie  
Ph.D. Candidate, Entomology  
University of Maryland

Alan Leslie and Veronica Johnson at the University of Maryland, Entomology "Lamp Lab" have found the invasive insect known as the kudzu bug in Anne Arundel, Calvert, and Prince George's Counties on kudzu vines.

Go to the LAMP lab

Another person has also reported the insect on kudzu vines in Charles County to the SEED network.

Identification of the first find of the Kudzu bug in Delaware was recently confirmed as the result of a collaborative effort between the University of Delaware Cooperative Extension and consultants (who found the first bugs), the Delaware Department of Agriculture’s Plant Industries Section who submitted the bug found by the University of Delaware to the USDA identifier and the USDA folks who responded quickly to the request to provide a positive confirmation. The first find came from a pole lima bean field in Sussex County.

Entomologists in the south have done a great job of developing sound management strategies for Kudzu bug in soybeans that should apply to management of this bug in soybeans in Delaware. In addition, they have evaluated a number of insecticides labeled in soybeans for control of this insect and there are a number of effective labeled options.

Potatoes
Continue to scout fields for Colorado potato beetle, leafhoppers, and aphids. We have seen an increase in leafhopper populations and low levels of aphids continue to be found. Controls will be needed for green peach aphids if you find 2 aphids per leaf during bloom and 4 aphids per leaf post bloom. This threshold increases to 10 per leaf at 2 weeks from vine death/kill. If melon aphids are found, the threshold should be reduced by half.

Snap Beans
Continue to sample all seedling stage fields for leafhopper and thrips activity. As a general guideline, once corn borer catches reach 2 per night, fresh market and processing snap beans in the bud to pin stages should be sprayed for corn borer. Sprays will be needed at the bud and pin stages on processing beans. Additional sprays may be needed after the pin spray on processing beans. Since trap catches can change quickly, be sure to check our website for the most recent trap catches and information on how to use this information to make a treatment decision in processing snap beans after bloom. After the pin spray on processing beans, the spray schedule will be determined by a combination of both moth catches and field scouting.

To help keep everyone informed of their searches, the Maryland Kudzu Bug Survey Website has been launched; This website will help disseminate information on the insect as it is collected.

Alan and Veronica collected egg masses from Anne Arundel and Calvert Counties. This insect is a serious pest of soybeans where it has been introduced in southern states. They have not yet started scouting soybean plants for the insect, since most of the fields we have planted are still in the early stages of growth, but expect to begin sampling soybeans this week.
Information on the identification and management of Kudzu bug can be found at the following link:
http://www.kudzubug.org/

You should also follow Virginia’s Plant Pest Advisory since my colleague Ames Herbert does a great job of updating what is occurring in Virginia – including documenting the range of spread in Virginia and management options:

Here is a brief summary of information on management from the south on soybeans:

(a) A threshold of one immature nymph (big enough to see) per sweep should be used in fields that are flowering or developing pods. Information on the kudzu bug.org website also indicates that if adult populations are extremely high and beans are stressed for some other reason, a control should be considered. However, this is a judgment call since they do not have a threshold for adults at this stage of crop development.

(b) Since many fields will be planted late this year and you may see bugs on small plants, there is new research from Georgia regarding management on seedling and vegetative plants. They recommended treating at V2-V3 stage soybeans if you find an average of 5 bugs (adults and/or nymphs) per plant. The threshold increases to 10 bugs per plant for plants from 1-2 feet tall. The established threshold of one nymph per sweep should be used for plants above 2 feet tall. It should also be noted that you do not want to treat too early for adults and you will want to sample the entire field – not just field edges. In other areas, treating too early has resulted in the need to make multiple applications for this insect pest.

Most of the management work on Kudzu bugs has been done with soybeans regarding treatment timing and yield impacts. However there is current work being done in Georgia looking at host plant preference, including succulent beans. Initial findings are that they do not prefer non-soybean beans, but will occur on them. They will be continuing this work this summer and have more information by the fall. In the meantime, you will want to watch succulent beans to see if this trend is true in our area. We may have to use the information developed for soybeans this season to help us make management decisions in succulent beans if the need arises. We will keep you posted of any new finds as well as new management information as it is developed.

Table 1 Late Blight Disease Severity Value (DSV) Report

<table>
<thead>
<tr>
<th>Location</th>
<th>DSV</th>
<th>Simcast spray interval recommendation*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dorchester Co.</td>
<td>141</td>
<td>7-day</td>
</tr>
<tr>
<td>Germantown</td>
<td>204</td>
<td>7-day</td>
</tr>
<tr>
<td>Clinton</td>
<td>204</td>
<td>7-day</td>
</tr>
<tr>
<td>Owings</td>
<td>162</td>
<td>7-day</td>
</tr>
<tr>
<td>Severn</td>
<td>204</td>
<td>7-day</td>
</tr>
<tr>
<td>White Marsh</td>
<td>missing</td>
<td>8-day</td>
</tr>
<tr>
<td>Mechanicsville</td>
<td>163</td>
<td>7-day</td>
</tr>
<tr>
<td>Oakland</td>
<td>213</td>
<td>5-day</td>
</tr>
</tbody>
</table>

*Spray interval recommendation is based on production of a susceptible cultivar and application of a protectant fungicide such as chlorothalonil. A 50% emergence date of May 1 was estimated for Dorchester Co., Clinton, Owings, Severn, Mechanicsville, and White Marsh. A 50% emergence date of May 5 was estimated for Germantown, and May 10 for Oakland.

Table 2 Potato Late Blight Control Products

<table>
<thead>
<tr>
<th>Product name</th>
<th>Active ingredient</th>
<th>FRAC code</th>
<th>Minimum spray interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bravo</td>
<td>Chlorothalonil</td>
<td>M5</td>
<td>5</td>
</tr>
<tr>
<td>Ranman 405SC</td>
<td>Cyprofosin</td>
<td>21</td>
<td>7</td>
</tr>
<tr>
<td>Gravel 75DF</td>
<td>Zoxamide + Mancozeb</td>
<td>22+M3</td>
<td>7</td>
</tr>
<tr>
<td>Tinos DF</td>
<td>Fenamidone + cyantranil</td>
<td>11+27</td>
<td>7</td>
</tr>
<tr>
<td>Dithane DF</td>
<td>Mancozeb</td>
<td>M3</td>
<td>5</td>
</tr>
<tr>
<td>Curate</td>
<td>Cymanosil</td>
<td>27</td>
<td>7</td>
</tr>
<tr>
<td>Revas Top</td>
<td>Manidifolate + difenconazole</td>
<td>40+3</td>
<td>7</td>
</tr>
<tr>
<td>Revas</td>
<td>Manidifolate</td>
<td>40</td>
<td>7</td>
</tr>
<tr>
<td>Previcox Flex SC</td>
<td>Propoxuride hydrochloride</td>
<td>28</td>
<td>7</td>
</tr>
<tr>
<td>Forum SC</td>
<td>Dimethomorph</td>
<td>40</td>
<td>7</td>
</tr>
<tr>
<td>Presidio</td>
<td>Flusilzone</td>
<td>43</td>
<td>7</td>
</tr>
<tr>
<td>SuperTin 80WP</td>
<td>Fenitroxid hydroxide</td>
<td>30</td>
<td>7</td>
</tr>
<tr>
<td>PolyRam Metran</td>
<td></td>
<td>M3</td>
<td>5</td>
</tr>
</tbody>
</table>

Note: Late blight has been reported in Montgomery County, Maryland, and in Kent County, Delaware. We do not know any information about these strains, yet. Late blight forecasts are being generated for eight locations across Maryland based on the programs Blightcast and Simcast. All locations have reached the threshold for the initial fungicide spray. The information below indicates the current spray interval that Simcast has recommended. Simcast requires information on specific fungicide applications in a field. Therefore, I am reporting the Simcast spray interval as a guideline only. The spray intervals in Table 1, are based on the assumption that chlorothalonil, which has a 5-day spray interval, was used. Table 2 shows the residual activity of some other common fungicides used for potato late blight. If you have sprayed something other than chlorothalonil, find the product in the table and adjust your spray interval accordingly.

University of Maryland
Potato Disease Advisory
By Kate Everts, Vegetable Pathologist,
University of Delaware and University of Maryland; keverts@umd.edu

Note: Late blight has been reported in Montgomery County, Maryland, and in Kent County, Delaware. We do not know any information about these strains, yet. Late blight forecasts are being generated for eight locations across Maryland based on the programs Blightcast and Simcast. All locations have reached the
Late Blight Management in Organic Potatoes and Tomatoes
By Kate Everts, Vegetable Pathologist, University of Delaware and University of Maryland; keverts@umd.edu

Currently, late light has been reported in a conventionally managed tomato planting in Maryland and in a conventionally managed potato field in Delaware. Interested potato growers in Maryland and Delaware can receive regular Potato Late Forecasts, which are provided by both states. To receive these reports in Delaware contact Phillip Sylvester at 302-730-4000, and in Maryland contact Kate Everts at 410-742-8788 or keverts@umd.edu.

Because the information in these forecasts is more focused on conventionally managed fields and I have received several questions from organic potato and tomato growers on how to manage late light in their fields. Two excellent resources are available for organic growers. One was written by Dr. Amanda Gevens at the University of Wisconsin and can be viewed here at: http://extension.umd.edu/mdvegetables/vegetable-pathology/disease-alerts. The other article is from the extension web site eOrganic at: http://www.extension.org/pages/18351/organic-management-of-late-blight-of-potato-and-tomato-with-copper-products.

Both provide researched-based information on late light management in organic production. The articles are very comprehensive, but a few of the highlights are:

● In field trials of organically managed crops, copper products have provided the best control of late blight, although preliminary lab studies indicate some other products may also be effective.

● Be Proactive. Preventive treatments are necessary to manage late blight on an organic farm. It is always better to apply the products before late blight onset than to wait to treat after late blight is present.

● If late blight gets out of hand, the potato or tomato crop should be destroyed to limit risk for other fields on your farm as well as fields on adjacent farms. This is a community disease and management by all growers is necessary to reduce damage within a region.

● When deciding if it is worthwhile to try to manage the disease (vs. destroying the crop), consider how close the crop is to harvest. One study estimated that applications of copper treatments for late blight will prolong potato plant productivity for two to four weeks. Remember also that the length of time a crop will survive is dependent on the weather; cool temperatures and lots of rain will make the disease progress very rapidly.

A late blight scouting video with great photos and information has just been developed and can be viewed at: YouTube

Cucurbit Downy Mildew Update
By Kate Everts, Vegetable Pathologist, University of Delaware and University of Maryland; keverts@umd.edu

Downy mildew on cucumber has been reported in Delaware and Maryland as of July 3. Our region remains at high risk for onset of downy mildew on additional cucurbits species. In addition, expect further spread of downy mildew to cucumber more fields in the region.

Forecasting models located at: http://cdm.ipmpipe.org/ indicate that the pathogen is likely to spread to Delaware and Maryland. Growers should consider applying fungicides protectively to prevent severe losses resulting from the disease. Fungicide recommendations can be found in the Cucurbit Downy and Powdery Mildew Article found in this issue of WCU or at the University of Delaware website: http://extension.udel.edu/ag/vegetable-fruit-resources/commercial-vegetable-production-recommendations/.
The European Pepper Moth (EPM), *Duponchelia fovealis* (Zeller), a relatively new invasive species, has been confirmed in a Maryland greenhouse operation. Greenhouse managers and Extension people working with greenhouse growers should be alert and monitor for this new pest. How much economic damage the European Pepper moth might cause in the United States is still unknown but we do know that this pest is being detected in many states in greenhouse operations.

Since this pest has rapidly spread itself across the United States and Canada, traditional containment through quarantine, has been discarded as impractical. In 2011 extensive monitoring was conducted in several counties in Georgia, since pepper production is the biggest vegetable crop produced in this state. Lance Osborne, head of an APHIS-sponsored national taskforce, enlisted David Riley to peg the numbers, location and economic threat of the bug in South Georgia. Riley is a vegetable entomologist with the University of Georgia College of Agricultural and Environmental Sciences. Grady has found the European pepper moth is firmly established in the southern part of Georgia but it is not causing loss in field produced peppers. They are finding it damaging lantana in greenhouse operations in Georgia.

In Florida, the EPM, has been detected in counties in greenhouse operations. Extensive monitoring in field production vegetative and fruit field operations has not detected this pest damaging vegetable in field growing conditions. It might be the insect is adapted to the close growing conditions in a greenhouse environment and not suited for most field production facilities. In greenhouse environment the foliage touching the substrate surface may make ideal conditions for this moisture loving pest. In an email communication with Graeme Murphy, Canadian Entomologist in Ontario, the European pepper moth has been recorded as a problem in greenhouse grown chrysanthemums and other cut flower species.

The moth is native to both freshwater and saltwater marshlands of southern Europe (mainland Spain, parts of France, and Portugal), the eastern Mediterranean region (Greece, Italy, Corsica, Macedonia (the original area that was part of the former Yugoslavia), Malta, Crete, Sardinia and Sicily), the Canary Islands, Syria and Algeria. The problem is that the larvae of this moth has been recorded on more than 70 host species in a wide range of plants families. It appears that this caterpillar has adapted to several new species of plants.

In the United States the moth was detected on begonia in San Diego County, California in 2004. This population was eradicated, In 2010 it showed up again in San Diego county. By September of 2011 it had been detected in 17 counties in California. It has also been detected in Alabama, Arizona, Colorado, Florida, Georgia, Kentucky, Mississippi, New York, North Carolina, Oklahoma, Oregon, South Carolina, Tennessee, Texas and Washington. I want to emphasize that it is not known whether this pest is mainly a greenhouse problem only or whether is could cause damage in field plantings. It does damage a number of ornamental plants but a really big concern is its potential damage to vegetable and fruit crops in greenhouse environments. If it is the right environment EPM has the potential to be a pest that can cause significant damage to strawberry crops, cucumber, green peppers, squash, and tomatoes. We need to keep a close eye on this pest and make sure it does not become an expanded problem. Fortunately, so far in the states that have sampled, it has not been detected damaging crops in the field production areas.

I spoke with Dr. Greg Hodges, Bureau chief of Entomology, Nematology and Plant Pathology about the monitoring for European pepper moth being conducted in Florida. Greg Hodges is working with Lance Osborne in monitoring in Florida for this pest. So far, they have only found it to be a greenhouse problem. There are extensive vegetative and fruit field plantings in Florida but they have not detected the moth in traps or larvae in vegetable crops in the field to date. The outdoor environment may not be suitable for this pest. This would be great news because we just don’t need another invasive species damaging vegetables and small fruit in field production.

In June of 2012 the European pepper moth larvae were found infesting zonal geraniums, petunia and *Echovena* plants in Central Maryland in a commercial greenhouse. Two alert greenhouse managers picked the caterpillars boring in the base stems of plants and submitted sample tour CMREC lab. We identified the caterpillars with help from entomologist at University of Florida and USDA-ARS. An MDA taxonomist, Gaye Williams, has subsequently confirmed our identification of this pest. We are working with the growers to bring this infestation under control.

If you work with greenhouse growers who produce ornamentals and vegetable crops in greenhouses then you should alert them to be on the lookout for the European pepper moth.
If you work with greenhouse growers of ornamentals or vegetable growers it might be worth purchasing a pheromone traps baited with the EPM pheromone to make sure this pest is not active in their fields. If they find a caterpillar that looks like the one in this article then get a sample in for identification immediately.

**What damage is inflicted by the larvae?**

The eggs are laid on foliage and hatching larvae of EPM feed on leaves, stems, fruit and will feed on roots and base of stems near soil level. When they first hatch the larvae feed mainly on leaves making round or crescent shaped holes. This is damage that can be visual monitor in an IPM scouting program. Older larvae consume whole leaves or they can feed on roots or at the base of the plant at soil level. In some cases they girdle the base of a plant. With some vegetables and fruit the larvae bores into the fruit. Later instar larvae burrow into soft woody or herbaceous stems causing a boring damage in which fungi can make entry. In the zonal geranium bought into our lab the stems had been holes in the stems and this is what workers first detected. As the larvae prepare to pupate they web silk together usually on foliage close to the soil.

**Life cycle**

The moth is active at night and lays white colored eggs in small clusters on the undersides of foliage, usually close to a main vein. Eggs have been recorded on stems and on the tops of leaves but usually are found on undersides of foliage. The egg clusters are in groups of 3 to 10 usually laid in overlapping patterns. The eggs turn pink, then red as the embryo develops and end up brown colored just before hatching. The larvae have a dark colored head capsule and a dark colored hardened dorsal plat just behind the head. On segments just behind the head there are two rows of transverse spots. There is at least one stout hair sticky out of each spot. The larvae feed mainly at night and avoid light. When we placed live larvae under a dissecting microscope with light source they were active trying to move out of the light area. As the larva grow their body color changes to a creamy white to a dirty brown color. The larvae lose their spots just before pupation.

The length of development depends on temperature but in a greenhouse at 68°F the egg stage is 4 – 9 days, the larval stage is 3 – 4 weeks, one to 2 weeks for pupation and adults for one to two weeks. Females mate soon after emerging. The males and females are strong fliers and have been recorded to fly up to 62 miles.

**Controlling an infestation:**

**Cultural control** - removing debris and lower leaves will reduce habitat for the larvae. The problem with this that most plants grown in greenhouses are grown to have leaves all of the way to the soil level. If this moth becomes established in the greenhouse then making the effort to remove lower foliage will help reduce larval populations.

**Chemical control**

Fortunately this caterpillar is susceptible to several classes of pesticides. The problem is that larvae feeding on foliage are fairly easy to hit with pesticides. Older larvae which bore into stems or fruit are very difficult to make contact with insecticides. Bacillus thuringiensis with repeated sprays can be directed to foliage to kill larvae feeding on the foliage. Spinosad materials should also be effective in controlling the caterpillars. Acephate in preliminary trials has been shown to one of the more effective materials for control.

**How can you Monitor?**

There are pheromone baits and traps for European Pepper Moth available from Koppert Company, Synetna biological division, and Biobest Company. A baited delta and funnel traps work in capturing males. This should be combined with scouting the susceptible plants for feeding of larvae. Again, this pest was fond in a greenhouse environment and not in outdoor growing conditions.

**BMSB and SWD Update for Central & Western Maryland**

By Bryan Butler, Principal Agent, UME Carroll County & Mid-Maryland Tree Fruit Agent

As of last week we are officially picking up SWD in traps. However, I am pleased to report that in general we are holding our own with both of our new invasive pests. Traps counts for both insects have been up and down and the relationship between trap counts and fruit damage is certainly a work in progress. At this time the best way to stay ahead of these pests appears to me to be good old boots on the ground observation. Keeping a close eye out in known hot spots and then looking a little closer when in doubt can give you the edge in controlling the damage from these pests.

As I have mentioned previously most hot spots where SWD problems cropped up were left unprotected for extended periods of time; again this year our first detections have been in fields that are on a minimal or no spray program. This year we are sampling fruit as well as running traps on Central Maryland farms. We are collecting 100 fruit from small fruit crops so that we can find out just what is really in the fruit if anything. The larva were reared out from the fruit in a chamber with sterile sand in the bottom, so far strawberries, sweet cherries, tart cherries, and an initial sample of black raspberries have all been SWD free although there were other insects present. As is always the case, if fruit is left to over ripen and not treated you might not have SWD as a significant problem but there are certainly other opportunist that can cause damage. Again this season I have also noted Japanese Beetles and sap beetles in small fruit as the biggest issues followed by Brown Stink bugs especially on the edges of fields. I have been surprised with the numbers of sap beetles in blackberries prior to ripening on farms that have large amounts of mixed small fruits.
We still have a long season ahead of us and the situation is certainly dynamic and we cannot let our guard down but, remember that there have been a lot of pests that have damaged fruit for a long time and we certainly need to reduce damage but we have to be careful not to throw away years of IPM and Beneficial insects by throwing the kitchen sink at these new pests when we find the first one. In an effort to help growers understand and manage SWD below are links to our completed series of factsheets on SWD. I have had the pleasure to cooperate with Kathy Demchak, Penn State Small Fruit Specialist and Dr. David Biddinger, Penn State Biocontrol Specialist on this series and monitoring project and would like to thank them for the opportunity to partner on this project.

Can a Tropical Cover Crop be used to Help Manage Insect Pests in Maryland Zucchini Plantings

Cerruti RR Hooks1 and Jermaine Hinds2
1Associate Professor and Extension Specialist, UMD
2Former UMD Graduate Student; Current PhD Candidate, Penn State University

Summary
Zucchini is often colonized by economically important insect pests such as cucumber beetles. We evaluated the impact of interplanting a summer cover crop with zucchini on insect and spider (arthropod) populations. Field experiments were conducted in which the tropical plant, sunn hemp (Crotalaria juncea L.) was interplanted with zucchini as a living mulch and compared with arthropods found on zucchini grown in bare-ground (no cover crop) plots during 2009, 2010 and 2011 growing seasons. The experiment compared also two types of fertilizer usage including the application of synthetic or organic fertilizer in the form of chicken manure. Foliar counts of arthropods on zucchini plants showed lower numbers of the striped cucumber beetle in sunn hemp diversified compared to bare-ground zucchini plots. Also, fewer spotted cucumber beetles were found on zucchini plants in plots with sunn hemp. Aphid abundances were variable during the study and lower in plots with sunn hemp at one study site in 2009. Among predators, spiders were more abundant on zucchini plants in plots with sunn hemp during 2009. Fertilizer type however, did not have an effect on arthropod numbers on zucchini plants.

1. Introduction
There are several economically important insect pests of zucchini. The striped and spotted cucumber beetles are among the most common and economically important insect pests of cucurbit crops. Striped cucumber beetles overwinter as unmated adults in wooded areas, weedy borders and in plant debris near field edges. Adult beetles emerge from their overwintering sites in spring in search of suitable host plants and mates. After mating, gravid females migrate to emerging cucurbit crops and lay eggs in late May to early June at the base of cucurbit host plants or within cracks in the soil. Spotted cucumber beetles migrate to northern states later in the summer, arriving in cucurbit crops in late July to August.

Cucumber beetle populations usually experience two generations per year, but can begin a partial third generation in warmer regions. Although, cucumber beetle populations can peak during June and July, they remain an important pest throughout the growing season.

Larval and adult beetles are capable of inflicting serious damage and mortality to zucchini seedlings early in the growing season. Adult cucumber beetles girdle the stems of young zucchini plants causing early season stand loss, while larval stages feed underground on plant roots. On more mature plants, cucumber beetles will feed on the foliage, pollen, floral tissues, and fruit, potentially impacting fruit set and marketable yield. Additionally, cucumber beetles are capable of vectoring, bacterial wilt, an important cucurbit disease in which bacteria colonizes the vascular tissue of cucurbits and impedes nutrient flow. Infected plants wilt and die due to lack of nutrients. Other cucurbit pests such as the squash vine borer, squash bug, melon aphids and whiteflies have the potential to cause yield reductions through the removal of plant tissue, transmission of viruses and causing plant phytoxemias.

Crop diversification is an agricultural practice that was commonplace in earlier civilizations and more recently, it has been suggested that multiple plant species be grown in close proximity as a method to help manage insect pests. Earlier ecologists believed that plants susceptible to insect infestations can be better “protected” from insect pest colonization by planting non-host plant in their vicinity. This may occur through reduced crop apparentness and/or increased natural enemy colonization and activity. One method to increase crop diversification is to grow the cash crop with a summer cover crop.

Sunn hemp is a tropical, herbaceous, annual legume native to India. Sunn hemp is grown mostly for use as a green manure, livestock feed and fiber production. Rapid growth and large amounts of biomass accumulation contributes to sunn hemp's architectural complexity, allowing it to potentially function as a barrier to disrupt insect colonization of the cash crop or as a refuge that can harbor predators that will prey on insect pests. In Hawaii, studies have shown that sunn hemp, interplanted as a living mulch with zucchini, is effective in reducing silverleaf whitefly and aphid numbers and their associated plant impairments. However, the insect pest complex associated with cucurbits grown in Hawaii differs from the complex found in Maryland. Thus, field studies were conducted to investigate the potential of using sunn hemp as an interplanted living mulch to help manage insect pests in Maryland zucchini fields with specific interest in striped and spotted cucumber beetles. A secondary interest included
investigating the impact of an organic and synthetic fertilizer on arthropod populations.

2. Materials and Methods
To investigate impacts of sunn hemp living mulch on arthropod populations associated with zucchini, field experiments were conducted at the University of Maryland’s Central Maryland Research and Education Center in Upper Marlboro, MD and Wye Research and Education Center in Queenstown, MD during the 2009, 2010 and 2011 field seasons. Each study site contained four plots of bare-ground zucchini and four plots of zucchini interplanted with sunn hemp. In 2010 and 2011, each plot was divided in half and each half received either organic or synthetic fertilizers. The synthetic fertilizer used was comprised of 5-10-10 (N-P-K) and the organic fertilizer used was pelletized chicken manure. The sunn hemp-zucchini plots consisted of 12 sunn hemp rows and were planted so that each row of zucchini was surrounded on either side by a row of sunn hemp. The number of sunn hemp rows established during the 2011 field trial differed from 2009 and 2010 in that 24 sunn hemp rows were planted with an inter-row spacing of two feet and instead of clipping the sunn hemp and planting the zucchini between the clipped rows of sunn hemp. In 2011, before zucchini transplanting, all sunn hemp rows were flail mowed and alternating sunn hemp rows were then strip-tilled and zucchini seedlings were transplanted into tilled strips.

Beginning 14 days after zucchini transplanting (DAP), zucchini plants were visually inspected for the presence of arthropods including melon aphids, whiteflies, squash vine-borers, squash bugs, adult striped and spotted cucumber beetles, and predators including lacewings, lady beetles and spiders. Visual inspections consisted of whole plant counts of all arthropods found on leaf surfaces, stems and flowers.

Areas of soil immediately surrounding the base of zucchini plants were inspected also for the presence of arthropods. In addition to foliar counts, three yellow sticky cards were placed randomly within each field plot just above zucchini plant height to help quantify insect numbers and movement within plots.

3. Results
During each growing season, before zucchini planting, sunn hemp plots produced approximately 2330 kg/ha of dry biomass, similar to growth in a warmer climate. Commonly found insect pests included striped and spotted cucumber beetles, squash bugs, squash vine-borers, melon aphids and whiteflies. Predators included lady bugs, lacewings, carabid beetles, and spiders. Only cucumber beetles, aphids and spiders were consistently abundant enough for treatment comparison. Cucumber beetle numbers exceeded the action threshold of one beetle per plant at both study sites in 2009 and 2010. However, at the Upper Marlboro site in 2011, cucumber beetle populations were low and never reached recommended action threshold levels of one beetle per plant.

3.1 Stripped Cucumber Beetles
During the 2009 growing season, striped cucumber beetles were initially encountered 21 DAP in both treatment plots at the Queenstown study site. Beetles peaked between 28 and 35 DAP and declined thereafter. During that time, fewer striped cucumber beetles were found on zucchini plants in sunn hemp than in bare-ground plots. Similarly, fewer striped cucumber beetles were found in sunn hemp compared to bare-ground plots at the Upper Marlboro site.

During the 2010 growing season, striped cucumber beetles were initially found at 14 and 21 DAP in bare-ground and sunn hemp plots, respectively at the Queenstown study site. Beetle numbers were lower in sunn hemp compared to bare-ground zucchini plots. At Upper Marlboro, striped cucumber beetle populations were initially found at 21 and 28 days in bare-ground and sunn hemp plots, respectively. Fewer striped cucumber beetles were found in sunn hemp than bare-ground zucchini plots. In contrast to 2009 and 2010, in 2011 fewer striped cucumber beetles were found in bare-ground plots at the Queenstown site.

3.2 Spotted Cucumber Beetles
In 2009 at Queenstown, spotted cucumber beetles were first recorded 14 DAP in both bare-ground and sunn hemp plots. Fewer beetles were found in sunn hemp plots. However, at Upper Marlboro, spotted cucumber beetles were found in similar numbers on zucchini plants in sunn hemp and bare-ground plots. In 2010 at the Queenstown site, spotted cucumber beetle numbers were found in similar numbers among treatment. However, fewer spotted cucumber beetles were found in sunn hemp plots at Upper Marlboro. In 2011, spotted cucumber beetle numbers were found similarly in both treatment plots.

3.3 Aphids
In general, aphid occurred sporadically. In 2009, winged melon aphid numbers were lower in sunn hemp than bare-ground zucchini plots at Queenstown. However, aphid numbers were similar in both treatment plots at Upper Marlboro. In 2010 and 2011, aphids were mostly absent at both study sites during the sampling period and thus, numbers were too low (less than 1 aphid per plant) for comparing their numbers among treatment type.

3.4 Natural Enemies
At Queenstown in 2009, spiders were more abundant on zucchini plants in sunn hemp than in bare-ground zucchini plots. Similarly, at Upper Marlboro, spiders were more abundant in sunn hemp plots. Their numbers were significantly greater on most sampling dates. During subsequent study years (2010 and 2011) sunn hemp interplanting did not have a significant effect on spider abundance within zucchini plants.

4. Discussion
The objective of this study was to investigate the influences of sunn hemp, interplanted as a living mulch on insect and spider populations associated with zucchini plantings. Given the growth periods, sunn hemp biomass accumulation in Maryland was comparable to the tropical and subtropical climates of Hawaii and Florida. Zucchini plants interplanted into sunn hemp generally contained lower numbers of striped and spotted cucumber beetles. Aphid populations appeared to be less influenced by the presence of sunn hemp. Spiders were the only predators found in high enough densities to
warrant comparisons and were more abundant in sunn hemp than bare-ground plots at both sites during year 1 (2009).

However, similar numbers were found in bare-ground and sunn hemp plots during years 2 (2010) and 3 (2011). In 2009 and 2010, sunn hemp treatment plots contained significantly fewer striped cucumber beetle on zucchini plants later in the season. Spotted cucumber beetles were found in lower numbers than striped cucumber beetles and their numbers were generally lower in sunn hemp than bare-ground treatment plots. Reduction in cucumber beetle populations in sunn hemp plots may be partially contributable to microclimatic differences between sunn hemp and bare-ground plots. Cucumber beetles are known to be highly sensitive to cucurbitacins emitted by cucurbit plants. Because they are highly sensitive to cucurbitacins, it is unlikely that cucumber beetles would have difficulty locating cucurbits intercropped with sunn hemp. Further, their population reduction in sunn hemp plots was most obvious during the latter part of the season which suggests early season colonization may not have been a significant contributor to lower numbers in sunn hemp plots.

In 2011, other than late-season sampling dates at the Queenstown field site, there were no significant treatment differences in cucumber beetle populations. This may have been due to the implementation of a different sunn hemp management protocol. In 2009 and 2010, the sunn hemp was clipped to a height of ~18 inches before zucchini planting and in 2010 flail mowed to a height of ~8 inches. As a result, the sunn hemp never exceeded 12 inches in height during 2011. At this reduced height, it is unlikely that sunn hemp rows created adequate barriers or microclimatic differences during most of the zucchini growth cycle to differentiate it from bare-ground zucchini habitats. Further, this change in protocol seems to have contributed to greater number of striped cucumber beetles colonizing zucchini in sunn hemp than bare-ground plots at the Queenstown site.

Melon aphid populations were variable during the study. Overall, they did not appear to be influenced by the presence of sunn hemp. In studies conducted in Florida and Hawaii, buckwheat and white clover interplanted with zucchini significantly reduced populations of whiteflies and aphids. Non-host plants can help increase the ratio of plant to soil background, thereby camouflaging crops from aphids. In contrast to the study conducted in Hawaii where the cover crop completely covered the ground, sunn hemp grown in the current study did not result in complete ground coverage. As such, the ratio of plant to soil background may have not been sufficient to reduce aphid colonization.

Spiders were found at similar or greater abundance on zucchini plants in sunn hemp compared to bare-ground plots. Cucumber beetles are known to exhibit anti-predator behaviors when encountering spiders. Studies have revealed that cucumber beetle feeding and emigration rates from host plants increased in response to visual and tactile cues produced by foraging spiders. More spiders on zucchini plants in sunn hemp plots may have prompted greater cucumber beetle emigration from these plots.

In cucurbit plantings, insecticides are used often to manage insect pests. The plant diversification strategy presents a more sustainable approach by exploiting behavioral aspects of herbivores and their associated natural enemies. The current study was aimed at investigating the impact of a tropical cover crop used as interplanted living mulch, on insect pests associated with cucurbit plantings in a temperate US zone. Results from this study showed that striped and spotted cucumber beetle populations were lower in sunn hemp treatment plots. Because whitefly numbers were low and aphid populations were variable during the three study years, impacts of sunn hemp on their densities could not be adequately accessed. Though, sunn hemp is considered a tropical plant, our findings suggest that sunn hemp grown as a living mulch may be used to help reduce pest populations in Maryland zucchini fields. However, sunn hemp can impact cropping systems in several ways such as improving soil quality and health and aiding in nematode and weed suppression. Thus, future studies should concomitantly look at the influences of sunn hemp on several factors that may impact zucchini performance.

University of Maryland Extension will be conducting “2nd Annual Eastern Shore Potato Field Workshop” on Wednesday, July 10th from 4 - 7 pm at 26996 Ocean Gateway, Hebron, MD.

The event will take place at the field between the intersections of Porter Mill Rd and Memory Gardens Lane near Hebron, Maryland and just off Route 50 as it approaches Salisbury. Signs will be posted on adjoining roads.

Anyone who is growing potatoes or interested in growing potatoes should attend this meeting. Participants will get to see new varieties, agronomic practices for optimizing yield and quality, Colorado potato beetle and other potato insects, and disease management for potato production in Maryland and Delmarva Peninsula.

Attendees will earn Maryland/Delaware/Virginia pesticide re-certification in private and commercial agricultural categories.

It is a free meeting to attend. Please register, it will help us to plan for handouts and pit beef dinner. Contact Rhonda Barnhart at 410-228-8800 or rbarnhar@umd.edu for registration, details and directions or register online at: http://www.extension.umd.edu/dorchester-county/potato-field-workshop. See the Attached Flier
Food Safety Training for Cantaloupe Producers and Packers
By Donna Pahl
GAP’s Educator, FEA
University of Maryland
dpahl@umd.edu

The Maryland Department of Agriculture (MDA) and the University of Maryland will be conducting a food safety training workshop focused on cantaloupe production and packing practices. This one-time workshop will take place at the Maryland Department of Agriculture (MDA), and will emphasize the proper growing, washing, packing, and storage practices of cantaloupes to minimize the risk of microbial contamination. The training will also include an overview on proper record-keeping, and a section for food safety plan-writing practices.

The 2011 Colorado cantaloupe outbreak has focused attention on the contamination of cantaloupes during packing, washing and cooling. *Listeria monocytogenes* was the bacteria identified by the Food and Drug Administration in the Colorado outbreak as causing the illnesses and deaths. Under existing federal regulations, FDA has the authority to conduct environmental assessments of fruit and vegetable packing and washing operations for microbial contamination of the product. The Food Safety Modernization Act proposed regulation for produce has additional requirements for the production, packing and washing of fruits and vegetables. To assist producers in determining if their food safety practices are adequate to prevent microbial contamination and meet FDA requirements, we are holding a one-day food safety training focusing on cantaloupes. Producers of other fruits and/or vegetables who wash and pack produce would also benefit from this training. In addition to Good Agricultural Practices (GAPs) in cantaloupe production, we will talk about Good Handling Practices (GHPs) in the post-harvest packing, washing and cooling of cantaloupes. The training will provide assistance in writing and implementing a GAP/GHP program for both wholesale growers and direct marketers.

Topics to be covered include: cantaloupe production and postharvest practices to minimize microbial contamination, the federal Food Safety Modernization Act, basics of GAP and GHP, addressing water pre-harvest and post-harvest water quality issues, environmental testing for bacteria including *Listeria monocytogenes*, writing a food safety plan, and MDA/University of Maryland programs to assist producers in implementing GAP and GHP. A portion of the training will be spent helping producers write their own food safety plans. Producers are encouraged to bring their own personal laptops. Laptops will also be provided to those who cannot bring them.

The training will be held from 9:00 a.m. – 4:00 p.m. on July 15, 2013 at the Maryland Department of Agriculture, 50 Harry S. Truman Parkway, Annapolis, MD 21401 in Conference Rooms 110 and 112. Registration check-in begins at 8:30 a.m.

The training fee is $20 which includes lunch and materials. For a copy of the registration form, call Sherry Weygant at 410-841-5769 or email: sherry.weygant@maryland.gov.

Please register with Andrew Ristvey
NO LATER THAN July 26th, 2013
410-827-8056 x 113
aristvey@umd.edu

Mid-Season Aronia Twilight Tour,
Wednesday July 31th, 2013, at Wye Research and Education Center
Queenstown, MD,
5:00 to 7:30 p.m.

A mid-season Aronia Twilight Tour will be held at Wye Research and Education Center. This program will consist of a variety of information about Aronia culture and research program updates.

While Aronia is a hardy plant, a few pests have shown problematic. New pests like Brown Marmorated Stink Bug and Spotted Wing Drosophila will be discussed along with the old problems like Japanese Beetle and Rust.

Information presented will include the latest updates and potential control measures. Also, does a soil analysis confuse you? What does ENR mean or buffer pH? Learn the significance of each parameter tested and how soil amendments work. Also presented will be our research summaries and plans for the year. This program will be for both the veteran Aronia growers, and for those just starting or thinking about it.

There is no cost for this event, but registration is necessary. Light fare and beverages will be served, along with Aronia ice cream.

See the Attached Flier.
WMREC Horticultural Crops Twilight

When:
Wednesday, August 21, 2013 - 5:00pm to 7:30pm
Add to Calendar: iCalendarOutlookGoogleYahoo

Where:
Western Maryland Research and Education Center
University of Maryland Extension
18330 Keedysville Road
Keedysville, MD 21756
United States

Sandwiches and refreshments will be provided. Registration is not required, but will help us to plan for handouts and refreshments.

Please RSVP to 410-386-2760/888-326-9645 or e-mail mabott@umd.edu Questions? Contact Bryan Butler at bbutlers@umd.edu or 888-326-9645

See the Attached Flier.

WyeREC Horticultural Crops Twilight

When:
Wednesday, August 28, 2013
5:00 pm – 7:30 pm

Where:
Wye Research and Education Center
211 Farm Lane
Queenstown MD 21658

Sandwiches and refreshments will be provided. Registration is not required, but will help us to plan for handouts, food and drinks. Reply to: Debby Dant, 410-827-8056 X115, ddant@umd.edu or Michael Newell, 410-827-7388, mnewell@umd.edu

See the Attached Flier.

CDMS Pesticide Labels and MSDS

See the Attachments!

1) Eastern Shore Potato Field Workshop.
2) Cantaloupe Food Safety Meeting.
3) Aronia Meeting.
4) WMREC Horticultural Twilight
5) WyeREC Horticultural Twilight
6) Vetica - New Insecticide from Nichino America
7) Vetica Supplemental Cucurbit Label
8) Vetica Supplemental Leafy Brassicas
9) Vetica Supplemental Snap beans

Vegetable & Fruit Headline News
A bi-weekly publication for the commercial vegetable and fruit industry available electronically in 2013 from April through September on the following dates: March 21; April 18; May 9 & 23; June 6 & 20; July 11 & 25; August 15; September 12.

Published by the University of Maryland Extension Agriculture and Natural Resources Profitability Impact Team

Submit Articles to:
Editor,
R. David Myers, Extension Educator
Agriculture and Natural Resources
97 Dairy Lane
Gambrills, MD 21054
410 222-3906
myersrd@umd.edu

Article submission deadlines for 2013: March 20; April 17; May 8 & 22; June 5 & 19; July 10 & 24; August 14; September 11.

Note: Registered Trade Mark® Products, Manufacturers, or Companies mentioned within this newsletter are not to be considered as sole endorsements. The information has been provided for educational purposes only.
Participants will learn about new varieties, agronomic practices for optimizing yield and quality, Colorado potato beetle and other potato insects and disease management for potato production in Maryland and Delmarva Peninsula.

Attendees will earn Maryland, Delaware & Virginia pesticide re-certification credits.

**Directions:**

**MD:** Traveling Eastbound on Rt. 50 towards Hebron, MD, turn left at Hebron Mini Market Chicken Man (now Farmer’s Wife’s Farm Market).

**MD:** Traveling Westbound on Rt. 50 towards Hebron, MD, turn right at Hebron Mini Market Chicken Man (now Farmer’s Wife’s Farm Market).

**DE:** Traveling south on Rt. 13, toward Rd 535, merge onto US-50 W/Salisbury Bypass via the ramp to Cambridge, continue to follow US 50 W to Hebron. Turn right at Hebron Mini Market Chicken Man (now Farmer’s Wife’s Farm Market).

GPS coordinates: 38.434363,-75.675938

**2nd Annual Eastern Shore Potato Field Workshop**

**Wednesday**

**July 10, 2013**

**4:00 pm—7:00 pm**

**26996 Ocean Gateway**

**Hebron, MD**

**SIGNS WILL BE POSTED, PLEASE FOLLOW ARROWS**

“It is the policy of the Maryland Cooperative Extension Service that no person shall be subjected to discrimination on the grounds of race, color, gender, disability, religion, age or national origin.”

**IF YOU HAVE A DISABILITY THAT REQUIRES SPECIAL ASSISTANCE FOR YOUR PARTICIPATION IN THIS PROGRAM PLEASE CONTACT THE UNIVERSITY OF MARYLAND EXTENSION OFFICE AT 410-228-8800 PRIOR TO JULY 10, 2013**
2nd Annual Eastern Shore Potato Field Workshop

Come, see and feel new potato genotypes of table stock and processing tubers in varying colors of purple, red, and yellow.

Anyone who is growing potatoes or interested to grow potatoes should attend this meeting.

This event is free and open to the public. Contact Rhonda Barnhart at 410-228-8800 or rbarnhar@umd.edu for registration, details and directions or register online at http://extension.umd.edu/dorchester-county/potato-field-workshop

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>4:00 – 4:15</td>
<td>Registration</td>
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<tr>
<td>4:15 – 4:45</td>
<td>Nitrogen fertilizer management in potatoes</td>
</tr>
<tr>
<td></td>
<td>Dr. Amy Shober, Assistant Professor, University of Delaware</td>
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<tr>
<td>4:45 – 5:15</td>
<td>Wireworm and Colorado potato beetle pest management</td>
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<td>Dr. Tom Kuhar, Professor, Virginia Tech</td>
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<tr>
<td>5:15 – 5:45</td>
<td>Agronomy and risk management strategies for Delmarva grown potatoes</td>
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<td></td>
<td>Sudeep Mathew, Agent, University of Maryland Extension</td>
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<tr>
<td>5:45- 6:15</td>
<td>Irrigation Basics: Maintaining consistent soil moisture</td>
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<td>James Adkins, Associate Scientist, University of Delaware</td>
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<tr>
<td>6:15 – 6:45</td>
<td>Update on potato late blight and fungicide spray programs</td>
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<td></td>
<td>Dr. Kate Everts, Professor, University of Maryland</td>
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<tr>
<td>6:45 – 7:00</td>
<td>Evaluations, Q &amp; A, tour plots and pit beef dinner</td>
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SPONSORS
The Maryland Department of Agriculture (MDA) and the University of Maryland (UMD) will conduct training for cantaloupe producers who want to learn more about implementing good agricultural practices (GAPs) and good handling practices (GHPs).

Topics to be covered include:

- 2011 Colorado cantaloupe outbreak
- Basics of GAP/GHP
  - Water Quality Issues
  - Wildlife/Livestock Issues
  - Compost/Manure Use
  - Worker Hygiene
  - Post Harvest Washing, Packing and Cooling
  - Environmental Assessments for Microbial Contamination
- Food Safety Plan Writing
  - Producers are encouraged to bring their own laptops
  - Laptops will be provided for use by those who cannot bring one
- MDA/U of MD GAP/GHP Assistance Programs
- FDA Requirements/Proposed Food Safety Modernization Act

Training registration fee is $20 per person which includes lunch and training materials. Make checks payable and mail to MDA, FQAP, 50 Harry S Truman Parkway, Annapolis, MD 21401 with the registration form. Registration must be received by July 12, 2013.

Contact: Sherry Weygant at 410-841-5769 or Sherry.Weygant@maryland.gov

REGISTRATION FORM

Farm/Producer Name: __________________________________________________________

Address: ___________________________________________________________________

City: __________________________  State: _________________  Zip: ____________________

Phone: _______________________  Email: _________________________________________

Participant Name(s) and Titles:

PCA 23603  AOBJ 7647
Mid-Season Aronia Twilight Tour

Wednesday July 31\textsuperscript{th}, 2013
5:00 to 7:30 PM
at
Wye Research and Education Center
Queenstown, MD

A mid-season Aronia Twilight Tour will be held at Wye Research and Education Center. This program will consist of a variety of information about Aronia culture and research program updates.

While Aronia is a hardy plant, a few pests have shown problematic. New pests like Brown Marmorated Stink Bug and Spotted Wing Drosophila will be discussed along with the old problems like Japanese Beetle and Rust. Information presented will include the latest updates and potential control measures. Also, does a soil analysis confuse you? What does ENR mean or buffer pH? Learn the significance of each parameter tested and how soil amendments work. Also presented will be our research summaries and plans for the year. This program will be for both the veteran Aronia growers, and for those just starting or thinking about it.

There is no cost for this event, but registration is necessary. Light fare and beverages will be served, along with Aronia ice cream.

Please register with Andrew Ristvey
NO LATER THAN July 26\textsuperscript{th}, 2013

410-827-8056 x 113
aristvey@umd.edu

Directions: Wye Research and Education Center is located on Cheston Lane, from Carmichael Road, off of RT 50 at near the Prime Outlets in Queenstown, MD.
This educational meeting is intended to provide producers the opportunity to get a firsthand look at several of the ongoing projects at the University of Maryland’s research facility in Keedysville.

**Highlights include:**

- Updates from University of Maryland Extension and Penn State University researchers and specialists – Bryan Butler, Dave Myers, Kate Everts, Chris Walsh, Jerry Brust and Kari Peter
- The latest on the Brown Marmorated Stink Bug (BMSB) and Spotted Wing Drosophila on Vegetables and Fruit
- Update on disease control in vegetable crops
- Tour of ongoing projects including:
  - Pumpkin IPM Spray Trials
  - New NC 140 cg rootstock trial trellis planting with Cripp’s Pink and Brookfield Gala on G.202 rootstock budded directly from tissue culture, G.202, G.935 and G.41 rootstocks all budded from stool bed plants
  - Apple seedling evaluations
  - BMSB spray trials using Surround®
  - Mobile and stationery high tunnels

Sandwiches and refreshments will be provided. Registration is not required, but will help us to plan for handouts and refreshments.

Please RSVP to 410-386-2760/888-326-9645 or e-mail mabbott@umd.edu

Questions? Contact Bryan Butler at bbutlers@umd.edu or 888-326-9645

Equal Opportunity Employer with Equal Access Programs

If you need special assistance to participate in this program, please contact the University of Maryland Extension Carroll County office by August 7, 2013.
This educational meeting is intended to provide producers and the general public the opportunity to get a firsthand look at several of the ongoing Horticultural Crops projects at the University of Maryland’s research facility in Queenstown.

Highlights include, but not limited to:

• Updates from University of Maryland Extension and University researchers and specialists

• The latest on the Brown Marmorated Stink Bug (BMSB) and Spotted Wing Drosophila on Fruit and Vegetables

• Updates on disease control in vegetable crops

• Tour of ongoing projects, including
  ❖ Pumpkin IPM Spray Trials
  ❖ Asian Pear Variety Trial
  ❖ NC140 Size-Controlling Rootstock Evaluation
  ❖ Aronia Trials
  ❖ Impact of Buckwheat on the mortality of exotic and native Pentatomids in Organic Sweet Corn planting

***Sandwiches and refreshments will be provided. Registration is not required, but will help us to plan for handouts, food and drinks. Reply to: Debby Dant, 410-827-8056 X115, ddant@umd.edu or Michael Newell, 410-827-7388, mnewell@umd.edu***
Vetica Insecticide: Practical IPM tool in pest management

by: Steve Bogash, Regional Horticulture Educator, Penn State Extension

New contact insecticide (IRAC Group 28 + 16) is now available to help manage Lepidopteran insects like the Yellowstriped armyworms which was problematic in 2012.

Last season, the folks at Nichino America provided us with a sample container of their latest insecticide, Vetica, for on research farm trials. Vetica is primarily labeled as a Lepidoptera (caterpillars) management material. Vetica is a tank mix of flubendiamide and buprofezin, which are insecticides in IRAC Group 28 and Group 16. The timing of this trial could not have been better as our Pennsylvania Vegetable Marketing Board funded tomato trials became infested with Yellowstriped armyworms for the first time ever in 2012 at both the Penn State Southeast Agriculture Research and Extension Center (Landisville Farm) and at the Franklin County Horticulture Education Center, Chambersburg. Our trials were not alone as many growers reported this ‘new’ pest as well. We had them in both the high tunnels and in field grown grape and cherry tomatoes. See the archives of the Penn State Vegetable Gazette for more on Yellowstriped armyworms.

Armyworms in general are tough to control as compared to many others in the Lepidoptera family, so we went with the highest labeled rate of 17 fluid ounces per acre. As the trials are primarily (but not exclusively) in high tunnels with substantial vegetation we dispersed this material in 120 gallons of water per acre in order to get complete penetration of the canopy. Vetica was very effective in controlling this pest at both sites and in both the high tunnel and field applications.

One feature of Vetica that really meshes well with other farm activities is the 1-day preharvest interval (PHI) for fruiting vegetables and brassicas. Short PHI materials are particularly important in high tunnel production for tomatoes and peppers. Longer PHI’s reduce growers’ ability to balance pest management with crop maintenance and harvesting.

Vetica Insecticide, from Nichino America, Inc. is a highly active foliar insecticide that rapidly controls the most damaging larvae. Vetica has an excellent fit in Integrated Pest Management programs and is considered nontoxic to beneficial insects. Vetica will not flare secondary pests such as aphids or mites. Vetica can be used on cucurbit vegetables (pumpkin, cantaloupe, watermelon); fruiting vegetables (tomato, pepper, eggplant); succulent beans (snap bean, lima bean, wax bean, PHI 14 days); brassicas (cole crops); and leafy vegetables (PHI 7 days).

Vetica acts fast to stop insects from feeding and deliver long residual control. Because Vetica is a contact insecticide, good spray coverage is essential for optimal control. Nichino recommends 16 fluid ounces of Vetica per acre, and no less than 20 gallons of water per acre. Vetica can be applied 2 to 3 times per crop cycle, depending on the crop. Please refer to the Vetica label for specific instructions.

Vetica starts working immediately on target pests, resulting in rapid feeding cessation, paralysis and death. Vetica provides outstanding efficacy on all important Lepidopteran insects including armyworms, loopers, and diamondback moth. When used in well-timed, consecutive applications, Vetica is also labeled for the control of whiteflies, leafhoppers, and planthoppers.

*Reprinted from Penn State Vegetable Gazette, April 2013*
Vetica® Insecticide
EPA Reg. No. 71711-32

For Use on Cucurbit Vegetables

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. This labeling and the EPA approved container label must be in the possession of the user at the time of application.

The use of adjuvants is prohibited when using the labeled pre-harvest interval of 1-day for cucurbits.

New use directions appear on this supplemental labeling that supersede the Section 3 container label.

NOTICE: Before using this product, read the First Aid, Precautionary Statements, Conditions of Sale and Warranty, and complete Directions for Use found on the container labeling. All applicable directions, restrictions, and precautions on the EPA registered label are to be followed.

CUCURBIT VEGETABLES (CROP GROUP 9)

Chayote (fruit); Chinese waxgourd (Chinese preserving melon); Citron melon; Cucumber; Gherkin; Edible gourd (includes, hyotan, cucuzza, hechima, Chinese okra); Momordica spp. (includes balsam apple, balsam pear, bitter melon, Chinese cucumber); Muskmelon (hybrids and/or cultivars of Cucumis melo includes true cantaloupe, cantaloupe, casaba, Crenshaw melon, golden pershaw melon, honeydew melon, honey balls, mango melon, Persian melon, pineapple melon, Santa Claus melon, snake melon); Pumpkin; Squash (includes summer squash types such as crookneck squash, scallop squash, straightneck squash, vegetable marrow, zucchini and winter squash types such as acorn squash, butternut squash, calabaza, hubbard squash, spaghetti squash); Watermelon (includes hybrids and/or varieties of Citrullus lanatus)

<table>
<thead>
<tr>
<th>Pest</th>
<th>Formulated Product Rate/Acre (lb ai/Acre)</th>
<th>Directions for Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Armyworms</td>
<td>12.0 to 17.0 fl oz/acre</td>
<td>For ground application, use a minimum of 20 gallons of water per acre.</td>
</tr>
<tr>
<td>Cabbage looper</td>
<td></td>
<td>For aerial application, use a minimum of 5 gallons of water per acre.</td>
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<tr>
<td>Corn earworm</td>
<td></td>
<td>Do not make more than 3 applications per crop cycle.</td>
</tr>
<tr>
<td>Cutworm species</td>
<td></td>
<td>Allow at least 7 days between applications.</td>
</tr>
<tr>
<td>Melonworm</td>
<td></td>
<td>Do not apply more than 38.0 fl oz per acre per crop cycle.</td>
</tr>
<tr>
<td>Pickleworm</td>
<td></td>
<td>Pre-Harvest Interval: 1 day</td>
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<tr>
<td>Rindworm species</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Squash vine borer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tobacco budworm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leafhoppers</td>
<td>14.0 to 17.0 fl oz/acre</td>
<td></td>
</tr>
<tr>
<td>Whiteflies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leafhoppers (suppression) Whiteflies (suppression)</td>
<td>12.0 to 13.0 fl oz/acre</td>
<td></td>
</tr>
</tbody>
</table>
Vetica® Insecticide
EPA Reg. No. 71711-32

For Use on Brassica and Turnip Greens

DIRECTIONS FOR USE
It is a violation of Federal law to use this product in a manner inconsistent with its labeling. This labeling and the EPA approved container label must be in the possession of the user at the time of application.

New use directions appear on this supplemental labeling that supersede the Section 3 container label.

NOTICE: Before using this product, read the First Aid, Precautionary Statements, Conditions of Sale and Warranty, and complete Directions for Use found on the container labeling. All applicable directions, restrictions, and precautions on the EPA registered label are to be followed.

APPLICATION RATE CHART

<table>
<thead>
<tr>
<th>BRASSICA (COLE) LEAFY VEGETABLES (CROP GROUP 5)</th>
<th>Notes and Use Restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broccoli; broccoli, Chinese (gai lon); broccoli raab (rapini); Brussels sprouts; cabbage; cabbage, Chinese (bok choy); cabbage, Chinese (napa); cabbage, Chinese mustard (gai choy); cauliflower; cavalo broccolo; collards; kale; kohlrabi; mizuna; mustard greens; mustard spinach; rape greens</td>
<td></td>
</tr>
<tr>
<td>TURNIP TOPS or TURNIP GREENS</td>
<td>Broccoli raab (raab, raab salad), hanover salad, turnip tops (turnip greens)</td>
</tr>
<tr>
<td>Alfalfa looper</td>
<td>10.0 – 20.0 fl oz/acre</td>
</tr>
<tr>
<td>Alfalfa caterpillar</td>
<td></td>
</tr>
<tr>
<td>Armyworms</td>
<td></td>
</tr>
<tr>
<td>Cabbage looper</td>
<td></td>
</tr>
<tr>
<td>Cabbage webworm</td>
<td></td>
</tr>
<tr>
<td>Corn earworm</td>
<td></td>
</tr>
<tr>
<td>Cross-striped</td>
<td></td>
</tr>
<tr>
<td>cabbageworm</td>
<td></td>
</tr>
<tr>
<td>Cutworm species</td>
<td></td>
</tr>
<tr>
<td>Diamondback moth</td>
<td></td>
</tr>
<tr>
<td>Garden webworm</td>
<td></td>
</tr>
<tr>
<td>Green cloverworm</td>
<td></td>
</tr>
<tr>
<td>Imported cabbage worm</td>
<td></td>
</tr>
<tr>
<td>Leafhoppers (suppression)</td>
<td></td>
</tr>
<tr>
<td>Planthoppers</td>
<td></td>
</tr>
<tr>
<td>(suppression)</td>
<td></td>
</tr>
<tr>
<td>Saltmarsh caterpillar</td>
<td></td>
</tr>
<tr>
<td>Southern cabbageworm</td>
<td></td>
</tr>
<tr>
<td>Tobacco budworm</td>
<td></td>
</tr>
<tr>
<td>Tomato hornworm</td>
<td></td>
</tr>
<tr>
<td>Whiteflies (suppression)</td>
<td></td>
</tr>
</tbody>
</table>
**SUPPLEMENTAL LABEL**

GROUP  28  16  INSECTICIDES

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**Vetica® Insecticide**  
EPA Reg. No. 71711-32

For Use on Snap Beans

**DIRECTIONS FOR USE**

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. This labeling and the EPA approved container label must be in the possession of the user at the time of application.

New use directions appear on this supplemental labeling that supersede the Section 3 container label.

NOTICE: Before using this product, read the First Aid, Precautionary Statements, Conditions of Sale and Warranty, and complete Directions for Use found on the container labeling. All applicable directions, restrictions, and precautions on the EPA registered label are to be followed.

---

**SNAP BEANS**  
(Bush beans, Green beans, Snap beans, String beans, Wax beans)

<table>
<thead>
<tr>
<th>Pest</th>
<th>Formulated Product Rate/Acre</th>
<th>Directions for Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Armyworms</td>
<td>12.0 to 17.0 fl oz</td>
<td>• For ground application, use a minimum of 20 gallons of water per acre.</td>
</tr>
<tr>
<td>Bean leafroller</td>
<td></td>
<td>• For aerial application, use a minimum of 5 gallons of water per acre.</td>
</tr>
<tr>
<td>Bean leaf skeletonizer</td>
<td></td>
<td>• Do not make more than 3 applications per crop cycle.</td>
</tr>
<tr>
<td>Corn earworm</td>
<td></td>
<td>• Allow at least 14 days between applications.</td>
</tr>
<tr>
<td>Cutworm species</td>
<td></td>
<td>• Do not apply more than 38.0 fl oz per acre per crop cycle.</td>
</tr>
<tr>
<td>European corn borer</td>
<td></td>
<td>• Pre-Harvest Interval (PHI): 14 days</td>
</tr>
<tr>
<td>Garden webworm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gray hairstreak caterpillar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green cloverworm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lesser cornstalk borer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loopers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saltmarsh caterpillar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow woollybear caterpillar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leafhoppers</td>
<td>13.6 to 17.0 fl oz</td>
<td></td>
</tr>
<tr>
<td>Plant hoppers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whiteflies</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This supplemental label expires on July 31, 2013 and must not be distributed after this date.

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SL-71 070711-2 10-26-2011  Expiration Date: 07/31/2013  
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