

The University of Maryland Extension Agriculture and Natural Resources Profitability Impact Team proudly presents this bi-weekly publication for the commercial vegetable and fruit industry.

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Vegetable Crop Insect Update

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Vegetable Crop Insects – August 27, 2010

In many locations, trap catches remain high and in a few locations we are starting to see a slight decline. Therefore, the potential for corn earworm and corn borer pressure remains high in fall vegetable crops statewide. You will need to scout fields at least twice a week as well as check local trap catches at:

<http://ag.udel.edu/extension/IPM/traps/latestblt.html> or call the Crop Pest Hotline (in state: 800-345-7544; out of state: 302-831-8851).

Cabbage

Continue to sample for cabbage looper, diamondback larvae, beet armyworm, fall armyworm and Harlequin bug. Although the pyrethroids will provide control of Harlequin bugs they are not effective on diamondback or beet armyworm in our area. So be sure to scout and select controls options based on the complex of insects present in the field.

Lima Beans

Continue to scout for stinkbugs, lygus bugs, soybean loopers, beet armyworm and corn earworm. Moths can still be found laying eggs in fields. Be sure to sample for corn earworm larvae as soon as pin pods are present. A treatment will be needed if you find one corn earworm larvae per 6 ft-of-row. If soybean loopers become a problem this year, remember that they are a migratory pest, difficult to control and pyrethroid resistance has been documented in states to our south. The Belt SC federal label was recently expanded to include legume vegetables and soybean looper is on the label. It now has a state label as well. The Lannate LV label lists loopers on the label. Be sure to check the label for rates, restrictions (including plant back restrictions) and days from last application to harvest.

Peppers

At this time of year, corn borer, corn earworm, beet armyworm and fall armyworm are all potential problems in peppers. So be sure to select the material

that will control the complex of insects present in the field. Be sure to check local moth catches in your area by calling the Crop Pest Hotline (in state: 800-345-7544; out of state: 302-831-8851) or our webpage at <http://ag.udel.edu/extension/IPM/traps/latestblt.html>. We continue to see aphid populations increasing, especially in fields where pyrethroids have been used on a weekly basis. Labeled materials are only effective if applied before populations explode.

Snap Beans

With the high trap catches, you will need to consider a treatment for both corn borer and corn earworm. You should also watch for beet armyworms and soybean loopers. Sprays are needed at the bud and pin stages on processing beans for worm control. With the diversity of worm pest that may be present in fields, be sure to scout fields and select materials that will control the complex of insects present. For the most recent trap catches in your area and to help decide on the spray interval between the pin stage and harvest for ECB control in processing snap beans, you will need to call the Crop Pest (in state: 800-345-7544; out of state: 302-831-8851) or check our website

<http://ag.udel.edu/extension/IPM/traps/latestblt.html> and <http://ag.udel.edu/extension/IPM/thresh/snapbeanecbthres.html>.

There has also been a report of an increase in whitefly populations. Be sure to check the Vegetable Crop Recommendations for materials labeled for whitefly control on snap beans

<http://ag.udel.edu/extension/vegprogram/pdf/Beans.pdf>.

Spinach

Continue to watch for webworms and beet armyworms. Both moths are active at this time and controls need to be applied when worms are small and before they have moved deep into the hearts of the plants. We are seeing an increase beet armyworm populations being found in vegetable crops – so it will also be important to select a material that will provide beet armyworm control. As a reminder, the pyrethroids have not provided effective beet armyworm control in past years. It also appears that webworm populations may be heavier than normal (typical during hot, dry seasons) so it is important to apply controls before any

webbing occurs. Remember that both insects can produce webbing on the plants. Generally, at least 2 applications are needed to achieve control of webworms and beet armyworm, especially under heavy pressure.

Sweet Corn

With the continued high corn earworm trap catches, be sure that a spray is applied as soon as ear shanks are visible on plants (before you see any silk). If fall armyworms are present in the whorl, you will need multiple whorl sprays for this insect before the ear shank spray to achieve effective control and to prevent larvae from dropping into the ear zone. Once fields are silking, you will need to check both blacklight and pheromone trap catches for silk spray schedules since the spray schedules can quickly change:

<http://ag.udel.edu/extension/IPM/traps/latestblt.html> or call the Crop Pest Hotline (in state: 800-345-7544; out of state: 302-831-8851). Be sure to check all labels for days to harvest and maximum amount allowed per acre.

Brown Marmorated Stink Bug Runs Amok

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By now everyone has heard about the brown marmorated stink bug (BMSB) *Halyomorpha halys* that was accidentally introduced into the United States in shipping containers arriving from Asia. The first confirmed specimen was collected in Allentown, PA in October 2001, although there is evidence that it was collected from black light traps in New Jersey as early as 2000. Since becoming established in Pennsylvania, the BMSB has spread throughout the mid-Atlantic as far south as Virginia. It also has been found in several southern and Midwestern states.

The BMSB more than likely has a single generation per year in Maryland. Adults emerge from overwintering sites during late May through the beginning of June. They mate and lay eggs from June through August and probably into September. The eggs hatch into small black and red nymphs that go through five molts throughout July and August. Adults begin to show in mid-August. Their flights for overwintering sites start in mid-September and continue through October.

If you look at web sites that discuss BMSBs many maintain that it is just a nuisance pest and mostly to home owners, but not to commercial fruit or vegetable growers. That has all changed this year. Fruits such as apple, peach, and raspberries have been attacked in

western and to a lesser degree in north central Maryland. When BMSBs feed on apple they cause cat facing as well as deformation and internal brown spotting of peaches rendering all of the fruit unmarketable for fresh market. It also has been found feeding on sweet and field corn (where there is no kernel development), tomato (where there is fruit distortion and cloudy spot), pepper (fruit distortion and cloudy spot), and to a lesser degree on okra and sunflower in central and southern Maryland (Fig 1). The damage from BMSB feeding is especially bad on some vegetables where it can deform the fruit more severely than other stink bug species (Fig 1). Whether this is due to greater amounts or different types of enzymes in its saliva is not known. The BMSB also seems to more readily introduce yeast contaminants into its feeding sites that further degrade the fruit. I have found some populations of BMSB in almost every vegetable field I have looked at over the last few weeks. In most cases the pest is doing some damage, but not a great deal. The worst vegetables for damage appear to be tomato and pepper.

I do not know if BMSB populations will continue at these extraordinarily high levels in the next couple of years. We had a "perfect storm" develop this summer for the Brown marmorated population to explode. We had a severe drought early in the summer along with extreme heat. These two factors literally dried up the usual wild plant hosts of not only BMSB but other pests as well and drove them into our fruit and vegetable fields. The dry weather appeared to be conducive to BMSB survival as their population exploded in August. We probably will not have these same conditions next year and will most likely not see these high populations again--hopefully. However, we just don't know enough to predict accurately what the situation will be in the coming years. I, like many others, will be conducting studies next year to see if we can find some consistent strategies for their control (this will include organic treatments too). This pest is something we should be watching for in our vegetable fields and taking note of, but it should not cause panic.



Fig. 1 Brown marmorated stink bug nymph and adult



Fig. 2 Damage to various vegetables by Brown marmorated stink bug



Situation Statement: Abnormally High Ear Damage in Attribute a Bt Sweet Corn

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For more than a decade, producers have grown market-quality Attribute sweet corn with no or minimal insecticide control. However, weather and insect populations during the 2010 growing season have together brought about a 'perfect storm' situation with regards to ear damage and insect control. The fact is that we are seeing unpredicted high levels of ear damage in the Attribute hybrids, particularly in the mid-Atlantic and southern growing regions. It is important that producers understand specifically what factors have caused this outbreak.

First, moth activity of corn earworm and fall armyworm has been well-above normal levels compared to historical records. In most areas, heavy flights came earlier and were 2-3 times higher than levels experienced during the same period over the past five years. The reason for the high populations is largely weather related. The high temperatures have facilitated rapid development of both worm species, thus producing more rapid generation turnover; in other words, more generations per growing season and an extra generation makes a huge difference in the population size later in the summer. Moreover, dry soil conditions in many growing areas have favored higher survival of the pupal stages and better moth emergence, since both species pupate in the soil.

The continuous high moth activity over the past 3-4 weeks has resulted in heavy egg-laying, well beyond

Pumpkin Spray Programs Should Include a Fungicide for Downy Mildew

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Pumpkin growers that still have healthy vines, and fruit that still needs sizing, should be adding a fungicide for **downy mildew** at this time, if you have not done so already. Downy mildew has not been as aggressive on pumpkin as it has been on cucumbers, but it has been diagnosed on pumpkin in the Salisbury, MD vicinity. Apply Previcur Flex, Ranman, Tanos, or Presidio plus a protectant fungicide such as chlorothalonil for downy mildew control.

the fresh silk stages, and multiple ear infestations of equal numbers of corn earworms and fall armyworms are common. Many producers, especially in the mid-Atlantic region, have not experienced heavy ear infestations of fall armyworm. The feeding pattern of these worms is somewhat different from that of corn earworms, which primarily hatch from eggs on the silks, enter the ear through the silk tube and feed primarily on the ear tip. Fall armyworm eggs are laid on the leaves, and the developing larvae feed on the leaves and husks for some time before they enter the ear. When they do, they often bore through the husk and cause kernel damage on the lower portions in the developing ear. The Bt trait of Attribute sweet corn suppresses corn earworm feeding and mainly confines the minor injury to the ear tip, which is generally commercially acceptable depending on the market outlet. However, fall armyworms are less susceptible to the expressed Bt protein in Attribute sweet corn and consequently they cause more husk damage and side injury, resulting in unmarketable ears.

The mixed infestations of both worm species have led to greater ear damage for several reasons. Both species are cannibalistic, which means many larvae are consumed by others within the ear and this allows the survivors to avoid some exposure to the Bt protein, grow older and become more tolerant to the Attribute trait. Also, the combination of multiple infestations and larval interaction in crowded ears often results in older earworms exiting the ear ahead of time and then re-enter through the husk on the side of the ear, causing more serious kernel injury.

Finally, there is the possibility that both worm species may have developed some resistance to the expressed protein in Attribute sweet corn, though there is no sound scientific evidence that this has occurred. It is a known fact that fall armyworm has developed resistance to another type of Bt corn in Puerto Rico. It is also known that corn earworm populations have become more resistant to the pyrethroid insecticides, so much of the damage that producers have experienced with treated Attribute sweet corn could be attributed to poor control efficacy.

In summary, producers need to understand that the 2010 growing season has been an atypical year with regards to earworm and fall armyworm pressure as well as the weather conditions that promote outbreaks of these pests. Given the steady increase in moth activity that began the end of July, fields of Attribute sweet corn silking during August probably needed at least three supplemental silk sprays. However, keep in mind that next year could be completely different and with any luck back to the normal levels of moth activity and ear infestations.



More Than an Ornamental?

Marigolds as a Natural Pest Solution

Project conducted by:
Armando Rosario-Lebron
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More Than an Ornamental?

Marigolds as a Natural Pest Solution

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Marigolds (*Tagetes* sp.) have been long known as an ideal companion plant for small gardens. Gardeners have used them to help the growth of plants such as eggplant, chili peppers and potatoes. When planted in these small scale home plots, it is believed to release above ground chemicals that deter certain pests. Some home gardeners also use marigold sprays as an organic insect repellent. As an ornamental plant it also provides visual appeal to the home garden. This is typically how marigold is used. As a result its potential use as part of a pest management plan in cropping systems is often overlooked. Although several studies have evaluated its effects on nematode pests, little is known about marigold's impact on populations of beneficial insects and pests.

A field experiment is being carried out at the University of Maryland Central Maryland Research and Education Center to examine the effects of marigold on broccoli growth and productivity and the abundance of insect pests and beneficial arthropods. In previous studies,

marigold was grown prior to peas, carrots and potatoes as part of a crop rotation scheme to suppress nematode pests. In experiments similar to the one being conducted in Upper Marlboro, it was intercropped with soybean and water spinach. In those studies it was shown to reduce root damage to the crop plants caused by plant-parasitic nematodes.

Although marigold flowers may attract both pest and beneficial insects to the target crop, we hope marigold can be used to provide an economically viable option for the suppression of multiple crop pests impacting cropping systems. The specific aims of this project include:

- Determine the effect of marigold on organisms below the soil.
- Determine the impact of Marigold on beneficial insects.
- Determine how Marigold intercropping affects broccoli marketable yield.
- Deliver a sustainable solution for pest reduction in broccoli and other cropping systems.



Added Weaponry for Integration into the Arsenal against Eggplant Pests

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The Colorado potato beetle is the major insect defoliator of potato in North America but is also known for its ability to defoliate eggplant. The CPB life history is well adapted to agricultural environments which make controlling it an arduous task. There has been much published research devoted to developing management tactics for CPB in potato fields; and although CPB is a prominent eggplant defoliator, limited work has been aimed at creating management tactics for CPB in eggplant. Similarly, published research on management tactics for flea beetles and other insect pests of eggplant is lacking and those studies devoted to developing strategies for flea beetle control focused on insecticide use. However, flea beetles are important eggplant pests. Eggplant, potato and tobacco flea beetles are prominent eggplant pests. Their feeding may cause extensive shot-hole damage and despite eggplant's high growth rate, large populations can retard growth, reduce yield, and kill

young plants. The yield potential of eggplant is greatly influenced during its early growth cycle. Thus, insect populations early on are often a primary determinant of final yield.

The use of cultural control methods for managing insects in eggplant has lacked research awareness. However, there are certain behavioral aspects of the CPB that opens it to cultural control methods. For example, CPB use visual and olfactory cues in locating host plants. Adults are attracted to volatiles produced from potato plants and in particular plants that have been fed upon by beetles or artificially damaged. Colorado potato beetle is capable of moving by flight and walking. However, adult dispersal starts at the moment of beetle eclosion and newly emerged beetles walk after emerging from the soil. Further, summer generation adult beetles need to feed 5-10 d before their flight muscles are completely developed and they are capable of taking flight; Thus, after completing soil pupation, CPB must walk over the ground surface to reach adequate feeding sites. As such, this behavior is the weak link in the CPB seasonal life cycle. Therefore, an overall successful management strategy for CPB may be partially hinged upon our ability to form a "walking barrier" between their habitats of emergent to an eggplant crop or disrupt the cues needed for them to locate eggplant. This could be achieved by surrounding the eggplant by or planting it into an established nonhost plant.



Cover crops have shown great potential for use as barriers to CPB colonization and if properly managed can be used to increase early season plant vigor and thus minimize losses from flea beetle injury. As such, cover cropping can be an important addition to the current IPM arsenal for managing eggplant pests. Increased knowledge of the positive impacts of cover crops in agricultural systems may lead to novel insights required for their successful integration into current IPM programs. Field experiments are being carried out to examine the ability of crimson clover to reduce populations of CPB and plant injury from flea beetles. Cover crop plots of crimson clover are established and grown during the fall and winter months. In early spring, eggplant is transplanted into the senescing crimson clover (dying mulch).

Specific aims of this project are to:

- 1) Determine if crimson clover can impact numbers of predatory and pest arthropods in eggplant.
- 2) Quantify the effect of crimson clover on CPB egg predation.
- 3) Quantify the impact of crimson clover on eggplant productivity and marketable yields.
- 4) Deliver an economically viable management option to growers and educators for the suppression of eggplant pests.





The 2010 Pumpkin and Sweet Corn Twilight Meeting will be held on Tuesday, September 21st, at the Wye Research and Education Center in Queenstown from 4:30-7:00 PM.

This year there will be 20 pumpkin varieties, Bt sweet corn variety trials, and sampling of Aronia products. Our speakers will be University of Maryland experts Jerry Brust, Kate Everts, Galen Dively, Andrew Ristvey, Mike Newell, and Sudeep Mathew.

A light dinner will be available and although there is no cost for this program, please register by September 17 with Debby Dant at 410-827-8056 X115, or ddant@umd.edu.

	WMREC FRUIT & VEGETABLE TWILIGHT MEETING Thursday, September 23, 2010 4:30 p.m. - 7:00 p.m.
	Western Maryland Research & Education Center 18330 Keedysville Road, Keedysville, MD 21756
	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:	
<ul style="list-style-type: none"> • Updates from University of Maryland Extension researchers and specialists — Jerry Brust, Bryan Butler, Galen Dively, Kate Everts, and Chris Walsh • Maryland pumpkin trials with 20 varieties • New NC 140 cg rootstock Trial 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 • Bt sweet corn varieties • Mobile high tunnel with strawberry, tomato and raspberry production 	
Sandwiches and refreshments will be provided. Registration is not required, but will help us to plan for handouts and refreshments. Please RSVP to 301-432-2767 x350 or cmason@umd.edu .	
To view data from last year's Pumpkin Variety Trials, visit http://carroll.umd.edu/Agriculture/PumpkinExperiment.cfm	
Questions? Contact Bryan Butler at bbutlers@umd.edu or 888-326-9645	
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- Bt sweet corn varieties
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Vegetable & Fruit Headline News

A bi-weekly publication for the commercial vegetable and fruit industry available electronically in 2010 from March through September on the following dates: March 18; April 1 & 15; May 6 & 20; June 3 & 17; July 8 & 22; August 5 & 19; September 2 & 16.

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Article submission deadlines for 2010: March 17 & 31; April 14; May 5 & 19; June 2 & 16; July 7 & 21; August 4 & 18; September 1 & 15.