Dear Blueberry Grower:

As we begin the new season I hope you had a great winter. This is first edition of The Blueberry Bulletin. The 2011 Commercial Blueberry Pest Control Recommendations for New Jersey may be picked up at any extension office or downloaded from the Rutgers NJAES web site at http://njaes.rutgers.edu/pubs/blueberrybulletin/

Also, 'AT A GLANCE...' will continue, and is a summary of each week's information. I hope it is something you can and will use.

If you have a problem during the season, please call me.

Any comments, suggestions, constructive criticism about The Blueberry Bulletin newsletter would be greatly appreciated. Also if you have any specific problems which you feel should be addressed, please let me know.

Help me to serve you better.

Here's hoping for all a very successful 2011.

Sincerely,

Gary C. Pavlis, Ph.D.
Atlantic County Agricultural Agent

Editor - Blueberry Bulletin
GP/slp

A Summary of Brown Marmorated Stink Bug Damage in New Jersey Fruit Crops – 2010

Rutgers Cooperative Extension

This article was first printed in Hort News this past winter. The brown marmorated stink bug was also seen in blueberries at the end of the 2010, and many blueberry growers have since reported seeing it in and around structures and houses. While all the data and examples pertain to tree fruit, blueberry growers should also be aware of the types of damage and its severity.

The brown marmorated stink bug (BMSB), Halyomorpha halys, mushroomed into a serious insect pest throughout much of eastern Pennsylvania, New Jersey, western Maryland and the Cumberland-Shenandoah area during
2010. The insect was introduced from Asia, and first found near Allentown, PA in the mid 1990’s. It has an extremely wide host range, which includes tree fruits, small fruits, vegetables, ornamentals, and seeded crops such as corn and soybeans. The insect feeds by puncturing the fruit with piercing/sucking mouthparts, and injecting saliva which allows the insect to suck up the plant material through its mouthparts. Fruit tissue at the point of entry and just below into the flesh, then dies and the rest of the fruit grows around it. This leaves a sunken area on the skin at the point of entry, and browning, dead tissue in the flesh. Early injury on stone fruit can go all the way to the pit. The tissue dies, and as the fruit grows, can form cavities in the flesh. Photos of adults and nymphs feeding on peaches, apples and pears can be seen in figure 1. Internal feeding damage is illustrated in figure 2.

The insect had 2 generations in 2010. Overwintered adults disperse from overwintering sites in houses and other structures, or protected areas near farms. They enter the orchard, mate and lay eggs. Nymphs hatch from the eggs and undergo 5 nymphal instars before maturing into adults. First instar nymphs feed on what’s left from the chorion or egg shells. They then move out through the canopy in search of fruit for food as they mature through 4 additional instars. Adults mature, mate, and the cycle repeats. Unlike other fruit pests, after it arrives in the orchard, BMSB spends its entire life feeding on the fruit, and every life stage, other than the egg, causes damage. As the stink bugs become established in managed fields, they are heavily biased towards edge and border rows. In tree fruit this has resulted in higher populations near wooded borders and soybean fields.

Initial damage surveys were completed in 2010. Workers in several Mid-Atlantic States initiated a survey program using the same methodology in each state. We sampled 10 fruit from each of 10 trees on an outside row, and 10 fruit from 10 trees on several inside rows that were at least 5-6 trees in from the edge of the block. We assessed both samples for the number of fruit injured with 0,1,2,3,4,5,6,7,8, 9, or >10 injuries per fruit. We took a total of 68 samples across 18 farms for a total of 6,800 sampled fruit.

Mean damage levels were significant. We found just over 54% damage across all sampled fruit. Damage was significantly higher towards edge rows. Interiors of peach blocks averaged almost 54% damage, while edge rows averaged 65% damage. The pattern was similar in apples where an average of 42% damage was seen on interior rows compared to 59% damage on edge rows (Figure 3). One peach planting was seen with 97% damage. Other blocks were only slightly damaged, but damage was present throughout NJ at some level.

This insect cannot be controlled with many common tree fruit insecticides, including Imidan and Sevin. While we do not yet know what insecticides will be the most satisfactory, various pyrethroids gave some control in 2010. Unfortunately these materials have short residual properties, can disrupt orchard ecosystems, and insects can become resistant to them with repeated applications. Carbamates (methomyl), and several neonicotinoids have shown some activity in ongoing research tests. It is important to note that during 2010, the high damage levels seen were present even though most growers were using intensive insecticide programs. Since little is known about this insect, research programs need to be developed throughout the states that have become infested with BMSB. Over the next several years, researchers will attempt to address questions concerning its life history, environmental and temperature effects, monitoring and control tactics, and other management practices that can be used to control this insect.
Figure 1. Stink bugs on fruit – A. adults on peach, B. nymphs on peach, C. nymph on apple, D. nymph on pear. Note

Figure 2. Internal and external damage from brown marmorated stink bug – A. internal necrosis in peach, B. internal necrosis in apple, note depth of feeding where mouthparts extended into apple, C. water-soaked areas in peach, D. external damage on apple, E. recent bleeding spots on peach.
Table 1. Brown marmorated stink bug sample summary - 2010

<table>
<thead>
<tr>
<th>Date</th>
<th>Crop</th>
<th>Variety</th>
<th>Date</th>
<th>Crop</th>
<th>Variety</th>
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<tbody>
<tr>
<td>8/10</td>
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<td>Harrow beauty</td>
<td>8/27</td>
<td>Asian Pear</td>
<td>Mix</td>
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<td>Peach</td>
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<tr>
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<td>9/15</td>
<td>Apple</td>
<td>Red Del</td>
</tr>
<tr>
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<td>Mix</td>
<td>9/15</td>
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<td>Gold Del</td>
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<tr>
<td>8/23</td>
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<td>Mix</td>
<td>9/15</td>
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<tr>
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<td>Cresthaven</td>
<td>9/15</td>
<td>Apple</td>
<td>Red Del</td>
</tr>
<tr>
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<td>Encore</td>
<td>9/16</td>
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<td>Apple</td>
<td>Fuji</td>
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</tbody>
</table>

N=68 samples, 32 peach, 34 apple, 2 Asian pear, 18 farm sites

Figure 3. Average overall damage, from samples on edge, and from samples in internal rows.
For a final year, a workshop on Spatially-based IPM Monitoring and Management Techniques in Blueberries will be offered by personnel from Rutgers University.

**Location:**  P.E. Marucci Center  
125A Lake Oswego Rd.  
Chatsworth NJ 08019

**Date:** Friday, March 25, 2011

**Time:** 9:00-11:30 am

**Workshop Description:** The Blueberry IPM Workshop will provide growers and agricultural and government agents results from a 2-year project on spatially-based monitoring and management programs for key blueberry pests. Emphasis of the workshop will be placed on lessons learned from this project. Feedback from growers on future directions will be welcome. The workshop will cover the use of spatial tools for understanding blueberry maggot distribution in blueberry farms and risk analysis, use of IPM-based tools to reduce use of pesticides, cost analysis of an IPM-based program in blueberries, new reduced-risk strategies for pest control, and the future of Agrotrak, a pesticide database software for integrating on-farm record keeping with GIS. Admission is free.

**Presenters**
Cesar Rodriguez-Saona, Small Fruit Entomologist, Rutgers University  
Dean Polk, Fruit IPM Agent, Rutgers University  
Faruque Zaman, Research Associate, Rutgers University  
Gene Rizio, Fruit IPM Program Associate, Rutgers University  
Jayson Harper, Economist, Penn State University  
Peter Oudemans, Plant Pathologist, Rutgers University  
Marilyn Hughes, Agrotrak and GIS consultant

**Program**
9:00-9:15  **Refreshments** (bagels, donuts, coffee)  
9:15-9:20  **Introduction:** workshop objectives (Rodriguez-Saona)  
9:20-9:40  **Blueberry Scouting and Risk Assessment** (Zaman)  
9:40-10:00  **Pesticide Use** (Polk)  
10:00-10:20  **Cost Analysis** (Harper)  
10:20-10:40  **New Control Strategies – OB Mating Disruption** (Rodriguez-Saona)  
10:40-11:00  **Future of Agrotrak** (Hughes)  
11:00  **Concluding Remarks**

**Sponsor:** Costs of this workshop are defrayed by NE-SARE project LNE08-273 “Spatially Based Whole-Farm Integrated Crop Management (ICM) Systems for Northeast Highbush Blueberry Production”
Observations of hanging and harvested fruit during the 2010 season indicated scale infestations at several sites. The infestations appear as tiny whitish gray spots on the surface of the fruit. The spots are sometimes surrounded by a circular red discoloration. It is likely that the problem will be present again this season at least in the locations where it was active last year. This condition was observed on Bluecrop, Duke and Elliot.

Growers who wish to treat for this pest should plan to spray prior to bud break with a water volume of at least 50 gal/acre. Superior oil at 3 gal/acre is the standard treatment. Effectiveness is increased with the addition of the insect growth regulator insecticide (IGR), pyriproxyfen (trade names - Esteem 35wp@ 5oz/A and Knack @16 oz/A). Each choice would give a 1.73 – 1.75 oz a.i. of Pyriproxyfen in a tank mixed with oil. If treating between budbreak and prebloom, ultra-fine superior spray oil may be used (mixed with the IGR’s above) at the rate of 1 gal/acre in a volume of 50 gal/acre.

Lime Sulfur at 5gal/ac when used for Phomopsis may also suppress scale, but is not as effective as the oil/IGR above. DO NOT USE Lime Sulfur in any tank mix and do not use within 14 days of an oil spray or during periods of temps above 75. LS is labeled for use at delayed dormant by at least 1 company at a volume of 100 gal/ac. – CONSULT YOUR SPECIFIC LABEL

Use of Lime Sulfur will target BLACK SHADOW when used in the FALL.

OIL SHOULD NOT BE APPLIED WHEN TEMPERATURES ARE EXPECTED TO FALL BELOW FREEZING FOR 2 DAYS AFTER APPLICATION.
Regional Pest Alert

Spotted Wing Drosophila
Drosophila suzukii

Introduction

The Spotted Wing Drosophila (SWD), Drosophila suzukii, is a small vinegar fly with the potential to damage many fruit crops. In the North Central region, it was first detected in Michigan in late September 2010. Unlike most other vinegar flies that require damaged fruit to attack, SWD causes damage when the female flies cut a slit and lay eggs in healthy fruit. This insect is a pest of most berry crops, cherries, grapes and other tree fruits, with a preference for softer-fleshed fruit. Given the propensity for this insect to spread and its potential to infest fruit, it is important to learn about monitoring and management of SWD to minimize the risk of larvae developing in fruit and affecting fruit marketability.

Spotted Wing Drosophila was first discovered in the western United States in 2008 and moved quickly through the Pacific Northwest into Canada. In the spring of 2010, SWD was discovered in Florida on strawberries and detected later in the summer in The Carolinas. It has also been detected in Europe. Because the flies are only a few millimeters long and cannot fly very far, human-assisted transportation rather than natural dispersion is the most likely cause of the recent rapid spread.

Damage

Female SWD can cut into intact fruit using their serrated ovipositor to inject eggs under the skin. By being able to insert eggs into intact fruit, the larvae of SWD can be present during ripening, leading to a risk of detection in ripe fruit after harvest. During egg-laying, sour rot and fungal diseases can also be introduced, further affecting fruit quality. There is a greater risk of fruit contamination at harvest from SWD compared with native species that lay eggs only in already-damaged and rotting fruit.

The adult SWD lives for about two weeks, and can lay more than 300 eggs. This demonstrates their high potential for fruit infestation and distribution through a field if not controlled. Infested fruit do not show obvious symptoms of infestation at first, with only a small pin-prick visible from egg-laying. Within a few days, the fruit flesh

Identification of Spotted Wing Drosophila flies.
A: Adult male flies are 2–3 mm long and may be seen on the outside of fruit. B: The male SWD has two distinctive dots on the wings (females do not have the wing spots). C: Male flies also have two dark bands on the forelegs. D: On the female SWD, the serrated ovipositor is a distinctive morphological feature, longer than other vinegar fly species and with two rows of serration. Photos by Martin Hauser (A, C, D) and Gorak Arakelian (B).
Some small native flies have dark patches on the wings, but will start to break down, leading to discolored regions and eventual collapse of the tissues. By this point, the white larvae can be relatively easy to detect.

**SWD Management**

There are three important components to effective SWD management: Monitoring, Identification, and Control.

**Monitoring:** The first and most important step is to determine whether SWD are present. This can be done using a simple monitoring trap, consisting of a plastic 32 oz. cup with several 3/16”–3/8” holes around the sides of the cup, leaving a 3” to 4” section without holes to facilitate pouring out liquid. The holes can be drilled in sturdy containers or burned with a hot wire or wood burner in the thinner plastic cups. Pour 1” to 2” of pure apple cider vinegar into the trap as bait. To help attract flies and ensure that trapped flies do not escape, a small yellow sticky trap is placed inside the trap. Traps are hung in the shade in the fruit zone using a stake or a trellis wire. Check traps at least weekly for SWD flies, and to change the vinegar. Pour the old vinegar into a bottle or away from the trap location, and place traps back near the crop with fresh vinegar. Continue monitoring through harvest and post-harvest.

**Identification:** Some native species of vinegar flies and other insects will be attracted to the traps. These need to be distinguished from SWD flies. Vinegar flies are small (2–3 mm) with rounded abdomens. Examine the wings of trapped vinegar flies using a 30x hand lens. Some small native flies have dark patches on the wings, but will not have the distinctive dark dot that is present on both wings of SWD males. Female SWD are harder to identify, but this can be done by using a hand lens to examine the ovipositor (see photo). Keep a clear record of the number of SWD detected at each trap site. Given the importance of early detection, it is imperative that potential SWD detections in new areas are confirmed by sending samples in a ziplock bag or small vial to your state’s diagnostic laboratory along with date and location of collection. If the presence of SWD is confirmed, management activities should be initiated immediately.

**Control:** There are some important cultural controls that growers can adopt to minimize the buildup of populations. These include removing overripe fruit, wild host plants such as wild grape, raspberry, blackberry, etc. from nearby fields, and ensuring timely crop harvest. If SWD are detected in fruit farms, active management programs should be implemented immediately, including the cultural controls described above, coupled with monitoring and control of adult flies using insecticides with knock-down activity. Contact your local Extension Educator for pesticide recommendations for management of SWD. Additional monitoring should be done to determine the approximate distribution of SWD across various fields.

North Central region’s fruit growers already use IPM programs to manage fruit flies during the summer months, and these programs will provide some protection against SWD. However, female adult SWD lay eggs soon after emergence and will complete multiple generations under climate conditions in the North Central region.

For more information on spotted wing Drosophila, please visit

http://ncipmc.org/alerts/swd.cfm

Authors: Rufus Isaacs and Noel Hahn, Department of Entomology; Bob Tritten and Carlos Garcia, MSU Extension

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HOW THE BLUEBERRY DEGREE DAY CALCULATOR WORKS

Peter V. Oudemans, Ph.D.
Associate Professor and Extension Specialist
Plant Pathology

Last year, the blueberry calculator (http://benedick.rutgers.edu/Blueberryweather/) was put online. This web based tool has two components, the degree day calculator and the yearly historical data, and these are described below. This website is designed to provide predictions for blueberry development and degree day accumulation. All of the blueberry development predictions are based on the cultivar Duke.

Degree Day Calculator: This component calculates degree day accumulation from any biofix date for years 2000 through current day in 2011. This section is useful for comparing individual years.