

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.

Volume 2 Issue 1 April 14, 2011

## Field Observations from Southern Maryland

By Ben Beale  
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Farmers are busy laying plastic mulch and getting cool season crops in the ground. Early season sweet corn planting seems to be behind previous years given the cooler weather. Tomatoes in high tunnels are setting the first fruit and look good so far this year. No major pest problems to report.



## Spring Observations from WyeREC

By Michael Newell  
Horticultural Crop Program Manager, UME  
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April 12, 2011

### Peaches

Apply appropriate fungicides for Brown rot/blossom blight. A few excellent products are Rovral, Rally, Tilt, Indar, Elite and Vanguard. Sulfur is rated as a good product. Always read and understand the products label that you plan to use. Always consider "resistant management" when developing a spray program.

### Apples & Asian Pears are in Full bloom

Use "MaryBlyt" disease prediction model for FireBlight sprays. As of April 12, 2011 there has only been a moderate chance of infection here at Wye REC.

#### Download the "MaryBlyt" program at:

<http://www.caf.wvu.edu/kearneysville/Maryblyt/index.html>

Do not wait until your apples or pears are in bloom to learn this program! **Read about MaryBlyt at:**

<http://www.caf.wvu.edu/kearneysville/maryblytfaq.html>

#### Read about FireBlight at:

[http://www.caf.wvu.edu/kearneysville/disease\\_descriptions/omblight.html](http://www.caf.wvu.edu/kearneysville/disease_descriptions/omblight.html)

### Plasticulture Strawberries

Strawberry Festival plants have 6-8 open flowers at this time. It's time for the first bloom spray. A few excellent products are Captevate, Elevate, Pristine, Rovral and Topsin-M. Always try to alternate materials from different pesticide classes (resistant management).

Preparations for frost protection are complete. Use floating row covers and/or overhead sprinkler irrigation for frost protection. Be sure to test your system before it is actually needed. Subscribe to a Web-based weather advisory service or install a "frost-alert" system to stay on top of frost protection.

With early "heat waves", we need to be on the lookout for strawberry bud clipper. Although not a regular issue with plasticulture, it can cause damage on later blooming varieties. Lorsban 4E (pre-bloom) has been effective. Treatment threshold is one clipped bud per linear row foot.

Temperatures in the upper 80's can cause bud/blossom damage. Use sprinkler irrigation to help cool the plants in the afternoon. Although overhead irrigation would be more effective, well-watered plants can cool themselves through transpiration, if overhead irrigation is not available.

Remember, leaf and leaf petiole samples for nutrient analysis are the only sure method of determining the nutritional needs of the plant.

### Perennial Strawberry System

Overwintering straw cover should be pulled back to increase earliness, leaving a thin layer close to the plants to keep soil from splashing onto the fruit. The pulled back straw can also be redeployed for use if frost protection is needed. Prior to bloom, a spray for bud clipper may be warranted. This pest may be worse on fields close to the woods.

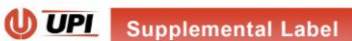
Depending on variety and previous fertility program, 20- 30 lbs of nitrogen may be needed at first leaf push. Too much nitrogen applied now can result in poor quality fruit. Additional nitrogen will be used at renovation and again in mid-August.

# Downy Mildew Confirmed on Squash Transplants

By Kate Everts, Vegetable Pathologist, University of Delaware and University of Maryland; [keverts@umd.edu](mailto:keverts@umd.edu)

I just wanted to alert everyone that downy mildew on yellow squash and zucchini has been confirmed (by Tony Keinath) at a Home Depot store in South Carolina. The plants were grown at Pure Beauty Farms, Miami, FL, 33187 and labeled with Home Depot tags as zucchini squash "green bush".

While South Carolina is far away, in the recent past we have had epidemics of vegetable diseases that were exacerbated because diseased plants were spread by sales to home gardeners. I would like to take this time to request that everyone keep their eyes open at the big box stores (Lowes, Home Depot, etc) and other sources of vegetable transplants this spring. If you see anything suspicious (on cucurbits, tomatoes, or anything else) please get samples to Karen Rane in Maryland; Nancy Gregory or Bob Mulrooney in Delaware. I would also be happy to look at suspect plants.



Approved pending in some states:  
**MANZATE® PRO-STICK™ FUNGICIDE**  
EPA Reg. No. 7056-224

**DIRECTIONS FOR USE**  
It is a violation of Federal law to use this product in a manner inconsistent with its labeling. MANZATE PRO-STICK™ Fungicide must be used only in accordance with the use directions on this label.

**USE RATES AND APPLICATION TIMINGS**  
(See table on pages two and three attached)

**IMPORTANT:**  
BEFORE USING MANZATE PRO-STICK™, READ AND FOLLOW ALL APPLICABLE DIRECTIONS, RESTRICTIONS, AND PRECAUTIONS ON THE EPA REGISTERED LABEL.

## Mancozeb Label Updates

By Bob Mulrooney  
DE Extension Plant Pathologist  
[bobmul@udel.edu](mailto:bobmul@udel.edu)

Good news on the fungicide front. Tolerances were established for **mancozeb** to replace some of the uses that maneb was labeled for. Maneb is no longer being manufactured. This has led to the first labels of mancozeb for use on broccoli, peppers, cabbage and leaf and head lettuce. Manzate Pro-Stick from UPI has a supplemental label for these uses, pending state approvals. I am sure the other manufacturers of mancozeb will have labels shortly. See the linked label for details:

<http://agdev.anr.udel.edu/weeklycropupdate/wp-content/uploads/2011/04/ManzateProStickVegSupplement.pdf>.

This label expansion was needed especially for control of anthracnose on peppers. These additions are not in the 2011 Commercial Vegetable Recommendation Guide so you need to be aware of that.

## Mites and Aphids in Strawberry Plantings

By Jerry Brust  
IPM Vegetable Specialist, UME  
[jbrust@umd.edu](mailto:jbrust@umd.edu)

Over the last few weeks I have visited several strawberry fields with most being in high tunnels, and have noticed infestations of aphids and especially mites. The mites were found in most of the strawberry patches I looked at, while aphids were in about a quarter of them. There were two species of mites found: the twospotted spider mite, *Tetranychus urticae*, and the strawberry spider mite, (sometimes called the strawberry red spider mite) *T. atlanticus*. Strawberry spider mite adults are generally red, but overwintering twospotted spider mites are also a red-orange and therefore most of the mites that can be seen with a naked eye will be reddish in color. Spider mites overwinter as adults in the soil or leaf litter, although they may remain somewhat active on strawberry plants in high tunnels through the winter. I found in quite a few high tunnel strawberries, but not on outdoor strawberries, mite eggs. The light yellowish eggs are pearl-like in appearance and are attached to the undersides of leaves or on stems (Fig. 1).

Aphid species found were the melon aphid, *Aphis gossypii* and the green peach aphid, *Myzus persicae*. Aphids are still in low numbers outdoors, but in some places in the high tunnels aphids have started multiplying rapidly when we had those few days of warm weather. These overwintering populations of aphids and mites can be difficult to control as they are "entrenched" in the strawberries. Growers should check their strawberries for both mites and aphids now, especially if you have them in a high tunnel or under a row cover.

The most difficult thing to accomplish for good control is getting adequate spray coverage. Many of the spray applications do a good job of covering the top of the leaves, but do a poor job of reaching the underside of the trifoliates. The underside area of the leaf that usually sees very little chemical deposition is in the 'palm' of the leaf (Fig 2). These are the areas where mites and aphids can still be found even after a few sprays and need to be carefully checked a few days after an application. Good coverage is essential. One grower used a leaf blower-like back pack sprayer and applied 9 gallons of spray onto three rows of strawberries in a 14X100ft area. Two applications of 1% (by volume) horticultural oil were applied about 7-8 days apart. He got excellent spray coverage on the underside of his leaves and consequently excellent control of the mites and the few aphids that were present using the horticultural oil. Control of the adults and nymphs was around 98%. By using two applications about one week apart it is possible to control both the adults and nymphs, but also the newly hatched eggs. Oil is a good management tactic to use at this time of year as the plants are small and any possible burn from using the oil

is a very low risk. An added benefit of the oil is that it is rather inexpensive. I would like to see growers use something like oil now and save the other chemicals for later in the season when plants are much bigger and there is a flare up of mites or aphids. Using oils now also will greatly reduce any development of mite resistance to chemicals over the course of the season. Acramite and Agri-Mek are two excellent miticides, but Acramite should only be used once during a season and resistance is possible with either if multiple applications are made and there is poor coverage. Thionex or Provado (or other neonicotinoids) can be used for aphid control.

## Effective Insecticides for Brown Marmorated Stink Bugs

Based on laboratory bioassay results & field screening trials as of February 7, 2011  
By Kent Smith, USDA-ARS  
[kent.smith@ars.usda.gov](mailto:kent.smith@ars.usda.gov).

See the Attached Tables Pages 9-11

## Suburban Deer Management Workshop

May 26<sup>th</sup>, 2011  
Bowie, MD

[www.naturalresources.umd.edu](http://www.naturalresources.umd.edu)


Local government officials, land managers, park managers, police, homeowner associations, non-profit organizations, private property owners, business owners and other decision-makers are invited to attend the workshop, Suburban Deer Management: Options and Choices for Decision-Makers, on May 26, 2011 at the Elks Club in Bowie, MD from 8:30 a.m. to 3:30 p.m. The workshop is being offered by the University of Maryland Extension in partnership with the Maryland Department of Natural Resources.

Deer contribute greatly to our quality of life; however, they have become overabundant in suburban and urban areas, creating major challenges to local decision-makers on how to deal with citizens and their differing views on the issue. On one hand, there are serious safety issues to deal with such as Lyme disease and deer-vehicle collisions. Deer also cause extensive damage to residential landscapes, crops, and natural forests. Some think that populations must be reduced through lethal options and others think that only non-lethal means should be used, such as fencing, repellents, and managing vegetation. Some want a combination of the two methods.

The workshop is specifically designed for local decision-makers and managers to provide an opportunity to learn from case studies and current research what methods have been used, their effectiveness, and more importantly, how to implement a community-based deer management program in their area. The atmosphere will provide a comfortable learning environment where you can ask hard questions and learn from real life applications. Rather than be reactive, what you learn at this workshop will allow you to work proactively in your locale and, hopefully, avoid the pitfalls. Case studies of successful programs are showcased and the most up-to-date reference materials provided.

More information about registering for the program is available at: [www.naturalresources.umd.edu](http://www.naturalresources.umd.edu) or by contacting Pam Thomas at the University of Maryland Western Maryland Research & Education Center at 301-432-2767 ext 315.

The registration cost is \$25 per person which includes lunch and materials.






# Fact Sheet

Fact Sheet 822

## Managing Slugs in the Garden and Beyond

**Introduction**

To many people slugs are unattractive and unwanted garden pests. Their extended eyestalks and slimy bodies are distinguishing characteristics. Slugs may be described as "snails without shells" or "mucus machines." I like to think of them as "slimy thugs." Their unwarranted attacks on defenseless crops can be excessively brutal and their footprints (slime trails) are always left at the crime scene. Some of the most infamous thugs include the gray garden slug (*Deroceras reticulatum*, Picture 1a), banded slug (*Arion fasciatus*, Picture 1b), marsh slug (*Deroceras laevis*, Picture 1c), and dusky slug (*Arion subfuscus*). A good detective can readily distinguish slug damage from that of cutworms or other pests by the presence of footprints. However, unlike traditional thugs, their brutality and violent behavior is not directed at innocent citizens but mostly cultivated plants. Although slugs have a range of favorite foods, including cabbage, cereals, lettuce, green vegetables, strawberries and root vegetables, they tend to mostly attack seedlings. Their feeding habits can cause serious damage in several cropping systems. Slugs contain a high percentage of water and require contact with moist environments to avoid desiccation. To avoid drying out from overexposure to heat and sun, these creatures spend

Picture 1a–1c. Gray garden slug (*Deroceras reticulatum*), banded slug (*Arion fasciatus*), marsh slug (*Deroceras laevis*).

## Managing Slugs In the Garden and Beyond Fact Sheet 822

By Cerruti Hooks, Assistant Professor & IPM Extension Specialist, University of Maryland  
[crrhooks@umd.edu](mailto:crrhooks@umd.edu)

With a cool and potentially wet spring slugs may become problematic, especially when no-tilling into cover crops. *Managing Slugs in the Garden and Beyond*, UME Fact Sheet 822 will provide an excellent understanding of the life cycle of slugs. The fact sheet also provides helpful control tactics.

Download the entire fact sheet at:

<http://www.hgic.umd.edu/content/documents/FS822ManagingSlugs.pdf>

## MDA DEVELOPING NEW ONLINE PESTICIDE DRIFT TOOL

### Farmers Encouraged to Register Sensitive Crops, Fields to Prevent Potential Drift

ANNAPOLIS, MD (April 8, 2011)

Maryland Secretary of Agriculture Buddy Hance today announced a new online tool under development to protect sensitive crops from unintended herbicide exposure. Growers of grapes, tomatoes, tobacco, fruit trees, ornamentals and other specialty vegetable crops are encouraged to register their crops and field locations with the Maryland Department of Agriculture to ensure they are included in the database.

"Controlling pesticide drift is an important issue for pesticide applicators," said Secretary Hance. "The innovative Sensitive Crop Locator database will be a valuable tool to help protect sensitive crops from unintended herbicide exposure. We encourage farmers to register their sensitive crops and field locations with MDA to ensure they are included in the voluntary database."

Crop and field location information will be included in the new voluntary statewide Sensitive Crop Locator database to assist pesticide applicators in identifying locations where sensitive crops are grown in order to take extra precautions for preventing the potential exposure of these crops to spray drift from neighboring fields. Applicators can search, identify and locate sensitive crops adjacent to areas where they intend to spray pesticides. The database, developed with specialty crop funding, will also offer pesticide applicators access to maps and aerial photographs.

The off target movement of herbicides from the site of application, referred to as drift, may cause injury to desirable plants located in adjacent fields, or property. Spray drift is typically the result of small spray droplets being carried off-site by air movement. The main weather factors that cause drift are wind, humidity and temperature changes. Drift can injure foliage, shoots, flowers and fruits resulting in reduced yields, economic loss and illegal residues on exposed crops.

Download the registration form online at:

[www.mda.state.md.us/pdf/sensitive\\_crop\\_application.pdf](http://www.mda.state.md.us/pdf/sensitive_crop_application.pdf).

Click here for a brochure with more information:

[www.mda.state.md.us/pdf/drift\\_sensitive\\_crops.pdf](http://www.mda.state.md.us/pdf/drift_sensitive_crops.pdf), or contact MDA's Pesticide Regulation Section at 410-841-5710.

## Two New 2011 Syngenta Supplemental Herbicide Label Changes or Additions for Vegetables in Maryland

By Chris Munsterman

Technical Support Representative

[chris.munsterman@syngenta.com](mailto:chris.munsterman@syngenta.com)

***Obtain the entire supplemental labels from your chemical supplier and read the label thoroughly prior to using the following products:***

### **1) Supplemental Label PHI Change from 90 PHI to 30 PHI for Dual magnum on Tomatoes, Supplemental Label Excerpt:**

**90 Day PHI** - If the single application rate of Dual Magnum is greater than 1.33 pt/A (up to 2.0 pt/A) do not harvest tomatoes within 90 days of application.

**30 Day PHI** - If the application rate of Dual Magnum does not exceed 1.33 pt/A do not harvest tomatoes within 30 days of application.

When applying at 1.33 pt/A with a 30 day PHI, the following restrictions apply:

- Do not exceed two applications per growing season.
- The use of adjuvants is prohibited.
- Applications may be made using ground equipment, in concentrated spray volumes.
- Applications may be made as a foliar broadcast spray to the soil within a week of transplanting and again at blooming/fruitletting to the row middles as a banded/directed application 38-77 days after the first treatment.

### **2) New Reflex Label Supplemental Label for White Potatoes as Preemergence Only, Supplemental Label Excerpt:**

Reflex - Product Use Restrictions on White Potatoes, labeled for preemergence use only:

- Do not exceed 1 pt/A of Reflex per season. Refer to Reflex Regional Use Map for the maximum rate of Reflex (or other fomesafen containing products) that may be applied per year or alternate year in each geographic region.
- Do not harvest potatoes treated with Reflex within 70 days of application.
- Do not apply Reflex to sweet potatoes or yams.
- Do not apply Reflex as a preplant incorporated application in potatoes or crop injury may occur.
- Do not apply to emerged potato plants or severe crop injury will occur.

**Note: Potato varieties may vary in their response to Reflex; always determine crop tolerance before using.**





## Spray Programs for Multi-Tree Fruit Orchards

By R. David Myers  
Extension Educator  
[myersrd@umd.edu](mailto:myersrd@umd.edu)



Many local orchards are composed of multi-tree fruit combinations producing for fresh market apples, peaches, pears, plums, nectarines, and cherries. Aggressive fruit tree spray programs are required to achieve high quality fruit. These multi-tree fruit orchards create many spray management challenges for the achievement of good pest control in accordance to label guidelines.

Therefore, the following multi-tree fruit orchard spray program for the control of major tree fruit pests and diseases may offer some assistance: **Labeled as noted in 2011 for All Tree Fruit – Pomes: Apples & Pears Stones: Peaches, Plums, Nectarines, and Cherries.**  
**2011 Tree Fruit Spray Guide Available for download at:**  
<http://annearundel.umd.edu/files/MultiTreeFruitSpraySheet2011.pdf>  
**See Attachment – Page 7**

## New Website

### Respirator Fit Testing & Fumigation Law Compliance

R. David Myers,  
Extension Educator, UME  
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#### 2011 Fumigant Application Requirements:

- ✓ Effective 12/01/2010, EPA requires that all fumigant applications include: 1) Fumigation Management Plans; 2) Applicator Education; 3) Buffer Zones; and 4) Neighbor Notification.
- ✓ Effective 12/01/2010, EPA requires that at least two individuals from each farm applying fumigants be **respirator fit tested** and **medically cleared** for respirator usage.

#### Website Links:

Respirator Fit Testing & Fumigation Law Compliance – Including, "How to Conduct a Respirator Fit Test"  
<http://annearundel.umd.edu/files/Respirator%20Fit%20Fumigation%20Law.pdf>

Respirator Fit Test Presentation, Bay Area Fruit School  
[QACTV Respirator Fit Test](#)  
[Bay Area Fruit School, WYREC, 2/23/2011](#)

Respirator Fit test Card  
<http://annearundel.umd.edu/files/Respirator%20Fit%20Test%20Card.pdf>

Respirator Fit test Record Form  
<http://annearundel.umd.edu/files/Respirator%20Fit%20Test%20Record%20Form.pdf>

Respirator User Medical Questionnaire  
<http://annearundel.umd.edu/files/Respirator%20Medical%20Questionnaire.pdf>

EPA on-line "Soil Fumigant Tool Box"  
[http://www.epa.gov/opp00001/reregistration/soil\\_fumigants/index.htm](http://www.epa.gov/opp00001/reregistration/soil_fumigants/index.htm)

EPA Fact Sheet  
2010 Site-Specific Fumigant Management Plans and Post-Application Summaries (PDF)  
[http://www.epa.gov/opp00001/reregistration/soil\\_fumigants/factsheets/sfm-sitespec-mgmt-plns-upd.pdf](http://www.epa.gov/opp00001/reregistration/soil_fumigants/factsheets/sfm-sitespec-mgmt-plns-upd.pdf)

## Spray Programs for Multi-Small Fruit Plantings

By R. David Myers  
Extension Educator  
[myersrd@umd.edu](mailto:myersrd@umd.edu)



Many local farms are composed of multi-small fruit combinations producing for fresh market blackberries, raspberries, blueberries, strawberries and grapes. Aggressive fruit spray programs are required to achieve high quality fruit. These multi-small fruit plantings create many spray management challenges for the achievement of good pest control in accordance to label guidelines.

Therefore, the following multi-small fruit spray program for the control of major small fruit pests and diseases may offer some assistance: **Labeled as noted in 2011 for All Small Fruit – Strawberries, Brambles: Blackberries, Raspberries, Blueberries, and Grapes.**  
**2011 Small Fruit Spray Guide Available for download at:**  
<http://annearundel.umd.edu/files/MultiSmallFruitSpraySheet2011.pdf>  
**See Attachment –Page 8**

# Total Crop Management for Greenhouse Production

with an emphasis on Integrated Pest Management and Nutrient Management



UNIVERSITY OF MARYLAND EXTENSION  
*Solutions in your community*

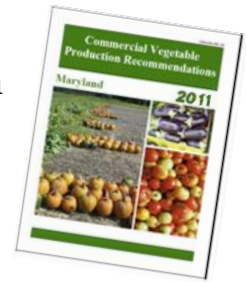
The New 2011 ***Total Crop Management for Greenhouse Production Manual with an emphasis on IPM and Nutrient Management*** is available online.

Obtain a copy at the **IPMNET** website: [www.IPMNET.umd.edu](http://www.IPMNET.umd.edu) and click on publications. The 295 page manual is downloadable as a PDF.

For information on how to obtain a printed copy contact [sgill@umd.edu](mailto:sgill@umd.edu)

This manual is a joint effort between specialist from the VPI, North Carolina State and the Karen Rane, Chuck Schuster, Andrew Ristvey and Stanton Gill. It should contain everything a greenhouse grower needs to operate using IPM and nutrient management BMP.

## Commercial Vegetable Production Recommendations Maryland EB 236



On-Line at:

<http://extension.umd.edu/agriculture/mdvegetables/files/2011%20COMPLETE%20MARYLAND%20BOOK%20.pdf>

Also available in a new very interactive format at the Delaware Extension site at:

<http://ag.udel.edu/extension/vegprogram/publications.htm#vegrecs>

## Vegetable & Fruit Headline News

A bi-weekly publication for the commercial vegetable and fruit industry available electronically in 2011 from April through September on the following dates: April 14 & 28; May 12 & 26; June 9 & 30; July 14 & 28; August 18; September 8

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**Article submission deadlines for 2010:** April 13 & 27; May 11 & 25; June 8 & 29; July 13 & 27; August 17; September 7

## Spray Program for Multi-Tree Fruit Orchards



Many local orchards are composed of multi-fruit combinations producing for fresh market apples, peaches, pears, plums, nectarines, and cherries. Aggressive fruit tree spray programs are required to achieve high quality fruit. These multi-fruit orchards create many spray management challenges for the achievement of good pest control in accordance to label guidelines.

Therefore, the following multi-fruit orchard spray program for the control of major tree fruit pests and diseases may offer some assistance: **Labeled as noted in 2011 for All Tree Fruit – Pomes: Apples & Pears Stones: Peaches, Plums, Nectarines, and Cherries.**

FUNGICIDES: [FRAC]	*RATE	NOTES
<b>Captan® 80WDG [M4]</b>	3-5.0 lbs	General Protectant (Not Labeled for Pears; Reduce Rates for Cherries)
<b>Dormant Oil [NC]</b>	4.0 gal	Apply Temp 35-85° F
<b>Kocide® DF [M1]</b>	6.0 lbs	Other Fixed Coppers (Stones: Dormant Spray Only)
<b>Rally® 40W [3]</b>	4.0 ozs	Powdery Mildew
<b>Sulfur 95W [M2]</b>	3.0 lbs	General Protectant
<b>Gem® 500 SC [11]</b>	3.0 ozs	Brown Rot & Peach Scab (Stones Only) or
<b>Adamant® 50WG [3/11]</b>	6.0 ozs	Brown Rot, Peach Scab & Powdery Mildew (Stones Except Plums)
<b>Pristine® [7/11] or</b>	14.5 ozs	Brown Rot, Powdery Mildew, Scab, Rusts & Fruit Spots (Limited to 4 Sprays/Season With Only 2 Consecutively)
<b>Indar® 2F [3]</b>	6.0 ozs	Powdery Mildew & Rusts
<b>Topsin-M® 70W [1]</b>	8.0 ozs	General Protectant
<b>Ziram 76DF [M3]</b>	5.0 lbs	Dormant Peach Leaf Curl (Captan Substitute for Pears)
<b>Agrimycin® 17 W</b>	24.0 ozs	Fireblight Control (Apples & Pears Only)

INSECTICIDES: [IRAC]	*RATE	NOTES
<b>Imidan® 70W [1A]</b>	2.0 lbs	Curculio, Scale & Fruit Moths
<b>Warrior® [3] or Tombstone® [3]</b>	4.0 ozs	Borers, Curculio & Fruit Moths
<b>Actara® [4A]</b>	2.0 ozs	Aphids & Curculio
<b>Lorsban® 4E [1B]</b>	4.5 ozs	Dormant & Trunk Borer
<b>Acramite® 50WS [25]</b>	1.5 qts	Mites Only
<b>Sevin® 50W [1A]</b>	1.0 lbs	Japanese Beetles, Hornets & Sap Beetles (Apple Thinning Agent)

\*Rate for 50-100gal Acre Concentrate Spray  
\*\*Be sure to follow all labels closely for PHI and REI!

### Multi-Fruit Spray Calendar\*

<b>March 15 - Dormant Spray</b>	Dormant Oil 4.0 gal (Scales & Mites) Kocide® DF 6.0 lbs Lorsban® 4E 1.5 qts (Mites)
<b>April 5 - Peach Bloom</b>	<b>Apple Tight Cluster</b> Captan® 80WDG 3.0 lbs
<b>April 15 - Peach Petal Fall</b>	<b>Apple Bloom</b> Captan® 50W 3.0 lbs Indar® 2F 6.0 ozs Agrimycin® 17 W 24.0 ozs (Fireblight Control Add for Apples & Pears Only)
<b>April 25 - Peach Shuck Split</b>	<b>Apple Petal Fall</b> Pristine® 14.5 ozs Warrior® 4.0 ozs (Curculio) Agrimycin® 17 W 24.0 ozs (Fireblight Control Add for Apples & Pears Only)
<b>May 5 - 1<sup>st</sup> Cover Spray</b>	Captan® 80WDG 4.0 lbs (Cedar Apple Rust - Higher Rates for Wetter Conditions) Indar® 2F 6.0 ozs (Powdery Mildew & Rusts) Actara® 4.5 ozs (Curculio & Aphids; PHI: 35- Days Pomes, 14-Days Stones)
<b>May 15 - 2<sup>nd</sup> Cover Spray</b>	Captan® 80WDG 3-4.0 lbs Rally® 40W 4.0 ozs (Peach Rusty Spot Only) Warrior® 4.0 ozs (Curculio; PHI 21-Days Pomes, 14-days Stones)

<b>June 1 - 3<sup>rd</sup> Cover Spray</b>	Captan® 80WDG 3-4.0 lbs Topsin-M® 70W 8.0 ozs (Apple Scab Resistance Likely) Imidan® 70W 2.0 lbs (Curculio, Scale & Fruit Moths; PHI: 7-Days Pomes, 14-Days Stones) Acramite® 50WS 1.0 lbs (For Mites if Required PHI: 7-Days Pomes, 3-Days Stones)
<b>June 15 - 4<sup>th</sup> Cover Spray</b>	Captan® 80WDG 3-4.0 lbs Sulfur 95W 3.0 lbs (0-day PHI; Stones Only) Tombstone® 2.0 ozs (Borers, Curculio & Fruit Moths - 7-day PHI)
<b>July 1 - 5<sup>th</sup> Cover Spray</b>	<b>Early Peach Harvest</b> Captan® 80WDG 3-4.0 lbs (0-day PHI; 1-day REI); or Pristine® 14.5 ozs (Early Stones 0-day PHI; Limited to 4 Sprays/Season With Only 2 Consecutively) Tombstone® 2.0 ozs (Borers, Curculio & Fruit Moths - 7-Day PHI)
<b>July 15 - 6<sup>th</sup> Cover Spray</b>	<b>Peach Harvests</b> Captan® 80WDG 3-4.0 lbs (0-day PHI; 1-day REI); or Pristine® 14.5 ozs (Stones 0-day PHI) Sevin® 50W 4.0 lbs (Japanese Beetle & Moths - 3-Day PHI for All Fruit)
<b>August 1 - 7<sup>th</sup> Cover Spray</b>	<b>Peach Harvests</b> Captan® 80WDG 4.0 lbs (0-day PHI; 1-day REI); or Pristine® 14.5 ozs (Early Pomes 0-day PHI) Sevin® 50W 4.0 lbs (Japanese Beetle & Hornets - 3-Day PHI for All Fruit)
<b>August 15 - 8<sup>th</sup> Cover Spray</b>	<b>Early Apple Harvests</b> <b>Late Peach Harvest</b> Captan® 80WDG 4.0 lbs (0-day PHI; 1-day REI); or Pristine® 14.5 ozs (Pomes 0-day PHI)
<b>September 1 - 9<sup>th</sup> Cover Spray</b>	<b>Apples and Pears Only</b> Captan® 80WDG 4.0 lbs (0-day PHI; 1-day REI); or Pristine® 14.5 ozs (Pomes 0-day PHI) Sevin® 50W 4.0 lbs (Japanese Beetle & Hornets - 3-Day PHI for All Fruit)
<b>September 15 - Trunk Bore Spray</b>	Lorsban® 4E 1.5 qts (Post Harvest for Borers)

HERBICIDES: [HRAC]	*RATE	NOTES
<b>Gramoxone® [22]</b>	1.0 qts	Burndown, Directed Spray
<b>Roundup® [9]</b>	1.0 qts	Burndown, Shielded & Directed Spray
<b>Devrinol® 50 DF [15]</b>	4.0 lbs	Spring/Summer 35-day PHI
<b>Princep® 4L [5]</b>	1.0 qts	Spring Dormant, Avoid High pH Soils
<b>Solicam® [12]</b>	2.5 lbs	Spring/Fall Dormant, 1-yr Established
<b>Goal® [14] or Galigan® [14]</b>	2.0 pts	After Harvest to Spring Bud Swell
<b>Aim® [14] or Shark® [14]</b>	2.0 ozs	Directed Spray to Weeds, 3-day PHI
<b>Matrix® [2]</b>	4.0 ozs	Late Spring, 1-yr Established
<b>Prowl® [3] or Surflan® [3]</b>	2.0 qts	Spring/ Summer, Prowl 60-day PHI
<b>Poast® [1]</b>	1.5 pts	Summer Grasses, Variable PHI
<b>Karmex® [7] or Diuron® [7]</b>	1.6 qts	Spring/Fall Dormant, 3-yr Established

\*Lowest Use Rate Recommended Initially

### Organic Approach Substitutions:

Conventional Product	Organic Certified Product
Captan® & Topsin-M®	Surround® (?) or Sulfur or Lime Sulfur
Rally®	Kaligreen (Powdery Mildew Eradicant)
Listed Insecticides	Neem® or Pyganic® or Entrust® (Stone Fruits Only)
Agrimycin®	Agrimycin® or Fixed Copper (Apples & Pears Except During Bloom)
Gramoxone® or Roundup®	Scythe®

\* Important Note: The calendar spray dates given are an average estimate for Anne Arundel and Prince George's County Orchards, and may vary by location in Southern Maryland. Be sure to adjust your spray schedule application dates accordingly. The above recommendations very closely reflect the current spray program utilized at the University of Maryland Research and Education Center, Upper Marlboro Facility for its research orchards. Remember to always "Read the Label"

R. David Myers  
Extension Agent, Agriculture  
Reviewed by Alan R. Biggs, Professors, Extension Pathologist, WVU



## Spray Program for Multi-Small Fruit Plantings



Many local farms are composed of multi-small fruit combinations producing for fresh market blackberries, raspberries, blueberries, strawberries and grapes. Aggressive fruit spray programs are required to achieve high quality fruit. These multi-small fruit plantings create many spray management challenges for the achievement of good pest control in accordance to label guidelines.

Therefore, the following multi-small fruit spray program for the control of major small fruit pests and diseases may offer some assistance: Labeled as noted in 2011 for All Small Fruit – Strawberries, Brambles: Blackberries, Raspberries, Blueberries, and Grapes.

FUNGICIDES: [FRAC]	*RATE	NOTES
Lime Sulfur [M2]	10.0 gals	Dormant Fall Sanitizer
JMS <sup>®</sup> Stylet Oil [NC]	1.0 gal	Apply Temp 35-85° F
Kocide <sup>®</sup> DF [M1]	2.0 lbs	Other Fixed Coppers
Captan <sup>®</sup> 50W [M4]	2.0 lbs	General Protectant
Ziram <sup>®</sup> 76DF [M3]	5.0 lbs	General Protectant
(Except for Strawberry use Thiram <sup>®</sup> )		
Sulfur 95W [M2]	3.0 lbs	General Protectant
(Grape variety sensitivity)		
Rally <sup>®</sup> 40W [3]	4.0 ozs	Powdery Mildew & Black Rot
(Except for blueberry use Tilt <sup>®</sup> )		
Pristine <sup>®</sup> [7/11]	14.5 ozs	Fruit Rots, Fruit Spots, Powdery & Downy Mildew & Cane Blight
Elevate <sup>®</sup> 50 WG [17]	1.5 lbs	Botrytis & Powdery Mildew
Switch <sup>®</sup> 62.5 WG [9/12]	11.0 ozs	Anthraco-nose, Mummy Berry, Phomopsis, Sour Rot & Botrytis
Phostrol <sup>®</sup> [33]	4.0 pts	Downy Mildew & Red Stele
INSECTICIDES: [IRAC]	*RATE	NOTES
Provado <sup>®</sup> Admire <sup>®</sup> [4A] or Actara <sup>®</sup> [4A]	4.0 ozs	Grubs, Aphids, Hoppers & Curculio
Brigade [3]	1.0 pts	Clipper Beetle, Plant Bug, Mites
(Except blueberry)		
Malathion [1B]	2.0pts	Scale, Fruit Moths & Whitefly
Sevin <sup>®</sup> 50W [1A]	4.0 lbs	Japanese Beetles, Hornets & Sap Beetles

\*Rate for 50-100gal Acre Concentrate Spray

\*\*Be sure to follow all labels closely for PHI and REI!

### Multi-Small Fruit Spray Calendar\*

March 5 -	<b>Spring Dormant Spray</b> JMS <sup>®</sup> Stylet Oil 1.0 gal (Scales & Mites)
April 10 -	<b>Early Strawberry Bloom</b> Captan <sup>®</sup> 50W 2.0 lbs Thiram <sup>®</sup> 75WDG 5.0 lbs (Strawberry Only)
April 15 -	<b>Strawberry Bloom/ Blueberry Early Bloom</b> Captan <sup>®</sup> 50W 2.0 lbs Ziram 76DF 5.0 lbs (Except Strawberry) Brigade 1.0 pts ((Clipper Beetle, 0-3-day PHI)
April 25 -	<b>Strawberry Full bloom/Blueberry Mid-Bloom/ Grape Bud Break</b> Captan <sup>®</sup> 50W 2.0 lbs Pristine <sup>®</sup> 14.5 ozs Brigade 1.0 pts (Clipper Beetle, 0-3-day PHI)
May 5 -	<b>Strawberry 1<sup>st</sup> Cover &amp; Early Harvest Spray/ Blueberry Full Bloom/Grape &amp; Bramble Shoot Growth</b> Captan <sup>®</sup> 50W 2.0 lbs (0-3 Day PHI & 4-Day REI) Elevate <sup>®</sup> 1.5 lbs (0-day PHI) Provado <sup>®</sup> 4.5 ozs (Curculio & Aphids; 7-Day PHI)
May 15 -	<b>Strawberry 2<sup>nd</sup> Cover &amp; Harvest Spray/ Blueberry 1<sup>st</sup> Cover/Grape Bloom Spray/Bramble Cane Development</b> Captan <sup>®</sup> 50W 2.0 lbs (0-3 Day PHI & 4-Day REI) Switch <sup>®</sup> 11.0 ozs (0-day PHI) Malathion <sup>®</sup> 2.0 pts (Curculio, Scale & Fruit Moths; 0-3-day PHI)
June 1 -	<b>Strawberry 3<sup>rd</sup> Cover &amp; Harvest Spray/Blueberry 2<sup>nd</sup> cover/Grape 1<sup>st</sup> Cover/Bramble Bloom</b> Captan <sup>®</sup> 50W 2.0 lbs (0-3 Day PHI & 4-Day REI) Pristine <sup>®</sup> 14.5 ozs (0-day PHI) Malathion <sup>®</sup> 2.0 pts(Curculio, Scale & Fruit Moths; 0-3-day PHI)

June 15 -	<b>Strawberry 4<sup>th</sup> Cover &amp; Harvest Spray/Blueberry 3<sup>rd</sup> Cover &amp; Early Harvest/ Bramble 1<sup>st</sup> Cover/ Grape 2<sup>nd</sup> Cover</b> Captan <sup>®</sup> 50W 2.0 lbs (0-3 Day PHI & 4-Day REI) Elevate <sup>®</sup> 1.5 lbs (0-day PHI) Sevin <sup>®</sup> 50W 4.0 lbs (sap beetle, 3-Day PHI)
July 1-	<b>Strawberry Renovation/Blueberry 4<sup>th</sup> Cover &amp; Harvest/ Bramble 2<sup>nd</sup> Cover &amp; Early Harvest/ Grape 3<sup>rd</sup> Cover</b> Captan <sup>®</sup> 50W 2.0 lbs (0-3 Day PHI & 4-Day REI) Pristine <sup>®</sup> 14.5 ozs (0-day PHI) Rally 40 W 4.0 ozs (Except Blueberry, 0-day PHI)) Brigade <sup>®</sup> 1.0 pts (0-3-day PHI)
July 15 -	<b>Strawberry Post Harvest/ Blueberry 5<sup>th</sup> Cover &amp; Harvest/ Bramble 3<sup>rd</sup> Cover &amp; Harvest/ Grape 3<sup>rd</sup> Cover &amp; Veraison</b> Captan <sup>®</sup> 50W 2.0 lbs (0-3 Day PHI & 4-Day REI) Switch <sup>®</sup> 11.0 ozs (0-day PHI) Sulfur 95W 3.0 lbs (0-day PHI) or Kocide DF 2.0 lbs (0-day PHI) Malathion 2.0 pts (0-3-day PHI)
August 1-	<b>Strawberry Post Harvest/ Blueberry 6<sup>th</sup> Cover &amp; Harvest/ Bramble 4<sup>th</sup> Cover &amp; Harvest/ Grape 4<sup>th</sup> Cover &amp; Early Harvest</b> Captan <sup>®</sup> 50W 2.0 lbs (0-3 Day PHI & 4-Day REI) Pristine <sup>®</sup> 14.5 ozs (0-day PHI) Sevin <sup>®</sup> 50W 4.0 lbs (Japanese Beetle, 3-Day PHI)
August 15 -	<b>Strawberry, Blueberry &amp; Bramble Post Harvest/ Grape 5<sup>th</sup> Cover &amp; Harvest</b> Captan <sup>®</sup> 50W 2.0 lbs (0-3 Day PHI & 4-Day REI) Elevate <sup>®</sup> 1.5 lbs (0-day PHI) Phostrol <sup>®</sup> 4.0 pts (0-day PHI) Sevin <sup>®</sup> 50W 4.0 lbs (Hornets – 3-Day PHI for All Fruit)
September 1 - October 30	<b>Strawberry Post Harvest/ Grape 6<sup>th</sup> Cover &amp; Harvest</b> Captan <sup>®</sup> 50W 2.0 lbs (0-3 Day PHI & 4-Day REI) Phostrol <sup>®</sup> 4.0 pts (0-day PHI) Sevin <sup>®</sup> 50W 4.0 lbs (Hornets – 3-Day PHI for All Fruit)
November 25	<b>Fall Dormant</b> Lime Sulfur 10.0 gals Kocide DF 2.0 lbs (0-day PHI)

HERBICIDES: [HRAC]	*RATE	NOTES
Gramoxone <sup>®</sup> [22]	1.0 qts	Burndown, Directed Spray
Roundup <sup>®</sup> [9]	1.0 qts	Burndown, Shielded & Directed Spray
Devrinol <sup>®</sup> 50 DF [15]	4.0 lbs	Spring/Summer 35-day PHI
Princep <sup>®</sup> 4L [5]	1.0 qts	Spring Dormant, Avoid High pH Soils
(Except strawberry)		
Solicam <sup>®</sup> [12]	2.5 lbs	Spring/Fall Dormant, 1-yr Established
(Except strawberry)		
Aim <sup>®</sup> [14] or Shark <sup>®</sup> [14]	2.0 ozs	Directed Spray to Weeds, 3-day PHI
Surflan <sup>®</sup> [3]	2.0 qts	Spring/ Summer, Once per Year
(Except strawberry)		
Poast <sup>®</sup> [1]	1.5 pts	Summer Grasses, Variable PHI
Sinbar <sup>®</sup> [5]	4.0 ozs	Fall Dormant, 1-yr Established

\*Lowest Use Rate Recommended Initially

#### Organic Approach Substitutions:

Conventional Product	Organic Certified Product
Captan <sup>®</sup>	Surround <sup>®</sup> & Sulfur
Rally <sup>®</sup>	Kaligreen (Powdery Mildew Eradicant)
Listed Insecticides	Neem <sup>®</sup> or Pyganic <sup>®</sup> or Entrust <sup>®</sup> or Dipel <sup>®</sup>
Gramoxone <sup>®</sup> or Roundup <sup>®</sup>	Scythe <sup>®</sup>

\* Important Note: The calendar spray dates given are an average estimate for Anne Arundel and Prince George's County small fruit production, and may vary by location in Southern Maryland. Be sure to adjust your spray schedule application dates accordingly. The above recommendations very closely reflect the current spray program utilized at the University of Maryland Research and Education Center, Upper Marlboro Facility for its research fruit plots. Remember to always "Read the Label!"

R. David Myers  
Extension Agent, Agriculture



## Effective Insecticides for Brown Marmorated Stink Bugs

Based on laboratory bioassay results and field screening trials as of February 7, 2011

Active ingredient	Efficacy on BMSB*	Chemical class**	Product name Company EPA Reg No	Federally registered on***												
				Pome fruit		Stone fruit			Vegetables				Field Crops			
				apple	pear	apricot	cherry	Peach nectarine	beans		pepper	sweet corn	tomato	field corn	soybean	wheat
					lima	snap										
acephate	G <sup>2</sup> 87 <sup>1</sup>	OP	Orthene AMVAC 59639-33	-- ****	--	--	--	--	LB 2-4 apps	LB 2-4 apps	P 2-4 apps	--	--	--	SB 1-3 apps	--
azinphos-methyl	71 <sup>1</sup>	OP	Guthion MANA 66222-162	SB 1 app	SB 1 app	--	P 1 app	--	--	--	--	--	--	--	--	--
bifenthrin	91 <sup>1</sup>	PYR	Brigade, Capture FMC 279- 3313,3114	--	SB 2-10 apps	--	--	--	SB 2-8 apps	SB 2-8 apps	SB 2-6 apps	SB 2-6 apps (not in coast- al count- ies)	SB 4 apps	SB 2-9 apps (not in coast- al count- ies)	SB 3-9 apps	--
bifenthrin + (zeta)cypermethrin		PYR	Hero FMC 279-3329	--	--	--	--	--	SB 3-6 apps	SB 3-6 apps	SB 3-6 apps	SB 3-6 apps (not in coast- al count- ies)	SB 4-9 apps	SB 4-10 apps (not in coast- al count- ies)	SB 4-7 apps	--
bifenthrin + imidacloprid		PYR + NEONIC	Brigadier FMC 279-3332	--	SB 5-17 apps	--	--	--	LB 3-4 apps	LB 3-4 apps	SB 2-5 apps	--	SB 3-6 apps	--	LB 3-4 apps	--
chlorpyrifos	89 <sup>1</sup>	OP	Lorsban DOW 62719-220	LB 1 app	P 1 app	--	P 3 apps	P 1 app	--	--	--	P 3 apps	--	P 3 apps	SB 3 apps	P 2 apps
			Chlorpyrifos MANA 66222-19	LB 1 app	P 1 app	--	P 3 apps	P 1 app	--	--	--	P 3 apps	--	P 3 apps	SB 3 apps	P 2 apps
chlorpyrifos + cyhalothrin		OP + PYR	Cobalt DOW 62719-575	P 1 app	P 1 app	--	P 3 apps	P 1 app	--	--	--	SB 3 apps	--	SB 3 apps	SB 3 apps	SB 2 apps

Active ingredient	Efficacy on BMSB*	Chemical class**	Product name Company EPA Reg No	Federally registered on***												
				Pome fruit		Stone fruit			Vegetables				Field Crops			
				apple	pear	apricot	cherry	Peach nectarine	beans		pepper	sweet corn	tomato	field corn	soybean	wheat
					lima	snap										
dimethoate	93 <sup>1</sup>	OP	Dimate Winfield 9779-273	--	P 1-4 apps	--	P 1-2 apps	--	LB 1-4 apps	LB 1-4 apps	P 5-6 apps	--	P 2-4 apps	P 1 app	P 2 apps	P 1-3 apps
dinotefuran (Korea recommend; EPA suggestion)	67 <sup>1</sup>	NEONIC	Venom Valent 59639-135 Scorpion Gowan 10163-317	--	--	--	--	--	--	--	SB 1-6 apps	--	SB 1-6 apps	--	--	--
				Dinotefuran is currently being processed and evaluated for a Section 18 registration for use on tree fruit in the mid-Atlantic region.												
endosulfan	90 <sup>1</sup>	Cyclodienone organochlorine	Thionex MANA 66222-63	TPB 2-3 apps Phase-out in FL 9/1/14; all others 3/13/15	SB 2 apps Phase-out 3/31/13	SB 2 apps Phase-out 11/10/10	P 2 apps Sweet phase-out 3/21/12; Tart phase-out 11/10/10	SB 2 apps Phase-out 3/21/12; Nectarine in CA phase-out 11/10/10	SB 2 apps Phase-out 11/10/10	--	P 2 apps Phase-out in FL 9/1/14; all others 3/31/15	P 1 app Phase-out in FL 9/1/14; all others 3/31/15	SB 4 apps Phase-out in FL 9/1/14; all others 3/31/15	--	--	--
fenpropathrin	67 <sup>1</sup>	PYR	Danitol Valent 59639-35	BMSB 2-4 apps	BM SB 2-4 apps	BMSB 2-4 apps	BMSB 2-4 apps	BMSB 2-4 apps	--	--	BMSB 4 apps	--	BMSB 4 apps	--	--	--
formetanate hydrochloride	63 <sup>1</sup>	CARB	Carzol Gowan 10163-265	P	P	--	--	SB	--	--	--	--	--	--	--	--
imidacloprid	G <sup>2</sup> 40 <sup>1</sup>	NEONIC	Admire Bayer 264-827	P 1 app	P 1 app	P 1 app	P 1 app	P 1 app	P 1 app	P 1 app	P 1 app	--	P 1 app	--	--	--
			Provado Bayer 264-763	P 5 apps	P 5 apps	SB 3 apps	SB 5 apps	SB 3 apps	P 3 apps	P 3 apps	P 3-6 apps	--	P 3-6 apps	--	--	--
kaolin	23 <sup>1</sup>	Particle film	Surround Tessengerl o 61842-18	SB No limit	SB No limit	P No limit	P No limit	P No limit	P No limit	P No limit	P No limit	P No limit	P No limit	P No limit	P No limit	P No limit

Active ingredient	Efficacy on BMSB*	Chemical class**	Product name Company EPA Reg No	Federally registered on***												
				Pome fruit		Stone fruit			Vegetables				Field Crops			
				apple	pear	apricot	cherry	Peach nectarine	beans		pepper	sweet corn	tomato	field corn	soybean	wheat
					lima	snap										
kaolin + thiamethoxam	67 <sup>1</sup>	Particle film	Surround + Actara	See respective labels												
malathion	92 <sup>1</sup>	OP	Malathion Loveland 34704-108	--	--	P 2 apps	P 4 apps	P 3 apps	LB 2 apps	LB 2 apps	P 2 apps	P 2 apps	P 4 apps	--	--	P 2 apps
methidathion	90 <sup>1</sup>	OP	Supracide Gowan 10163-236	P 1 app	P 1 app	P 1 app	P 1 app	P 1 app	--	--	--	--	--	--	--	--
methomyl	G <sup>2</sup> 90 <sup>1</sup>	CARB	Lannate DuPont 352-384	TPB 2(ee) for BMSB 5 apps	P 2(ee) for BMSB 2 apps	--	--	SB 2(ee) for BMSB 3-6 apps	LB 10 apps	LB 10 apps	P 2(ee) for BMSB 10 apps	P 2(ee) for BMSB 28 apps	P 2(ee) for BMSB 5 apps	P 2(ee) for BMSB 10 apps	P 2(ee) for BMSB 3 apps	P 2(ee) for BMSB 4 apps
permethrin	77 <sup>1</sup>	PYR	Ambush AMVAC 5481-549	TPB 2-6 apps	P 2-4 apps	--	TPB 6 apps	TPB 5 apps	--	--	P 8-16 apps	P 6-12 apps	P 6-24 apps	P 3-6 apps	P 2-8 apps	--
thiamethoxam	56 <sup>1</sup>	NEONIC	Actara, Centric Syngenta 100-938,1147	P 3-4 apps	P 3-4 apps	SB 2 apps	SB 2 apps	SB 2 apps	--	--	SB 2-3 apps	--	SB 2-3 apps	--	SB 2 apps (PPLS)	--
thiamethoxam + chlorantraniliprole		NEONIC	Voliam Flexi Syngenta 100-1319	P 2 apps	P 2 apps	SB 2 apps	SB 2 apps	SB 2 apps	--	--	SB 2-3 apps	--	SB 2-3 apps	--	--	--

\*Efficacy Sources: <sup>1</sup> Tracy Leskey, USDA/ARS, Kearneysville, WV; <sup>2</sup> Galen Dively, University of Maryland; Numbers are on 1-100 scale with higher numbers being more efficacious. Quality scores are E = Excellent, G = Good, F = Fair, and P = Poor.

\*\*Chemical class: CARB = carbamates, NEONIC = neonicotinoid, OP = organophosphate, and PYR = pyrethroid.

\*\*\*State registrations may vary - consult state or local authorities.

\*\*\*\*Pest abbreviations: BMSB = brown marmorated stink bug, SB = stink bugs, TPB = tarnished plant bugs, LB = lygus bugs, PB = plant bugs, P = other pests, apps = maximum number of applications on this crop, -- no registered use on this crop.

Table was prepared by Kent Smith, USDA-ARS, at 202-720-3186 or [kent.smith@ars.usda.gov](mailto:kent.smith@ars.usda.gov).