

## Emerging Insect Fruit Pests

Peninsular ARS Fruit School  
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## Brown Marmorated Stink Bug (BMSB) *Halyomorpha halys*

### Identifying Characteristics

- 17 mm (5/8 inch) long
- Mottled brownish grey
- White stripe on antennae
- Black and white banding on protruding abdomen



Adult Male



Adult Female

Photo credit: Rutgers University

## BMSB-Biology and Ecology

- Eggs
  - Light green in color
  - 28 egg clusters
  - Leaf undersides
- Nymphs
  - Five instars
  - Brightly colored bodied
  - Reddish eyes
  - Abdomen striped yellowish-red with black
  - Legs and antennae white and black banding



Photo credits: Rutgers University

## BMSB-Biology and Ecology

- Overwinter as adults
- 212 to 466 eggs/female
- Egg to adult
  - 538 DD ( base 50)
  - 148 additional DD pre-ovipositional period.
  - Biofix *Prunus tomentosa* in full leaf (Allentown PA)
- One generation/year
- Aggregation over winter



Photo credits: Rutgers University

## BMSB-Host Range

- Potential 300 hosts
  - Tree fruits
    - Apple, plum, peach, cherry
  - Small fruits
    - Raspberries, blueberries, grapes
  - Vegetables
  - Shade trees
  - Leguminous crops
  - Field/Sweet corn



## BMSB-Damage

- Apples – damage can resemble bitter pit
- Grapes – fruit damage and wine taint similar to MALB
- Cherries – direct damage to fruit
- Small fruits – direct damage to fruits



# BMSB Management

- Some native natural enemies
  - Egg/adult parasitoids
  - Parasitism rate ~5%
- Biological control
  - Egg parasitoids (50-80% parasitism)
- Chemical
  - Bifenthrin (pyrethroid)
  - Carbamate (methomyl)
  - Chlorinated hydrocarbon (endosulfan)
  - Organophosphate (chlorpyrifos)



# BMSB-Management

- Reduced Risk and OP-replacement pesticides
  - Not effective on BMSB
- Pyrethroids
  - Negative impact on beneficial NA
  - Knockdown/Recovery of BMSB



Photo credit: Purdue University

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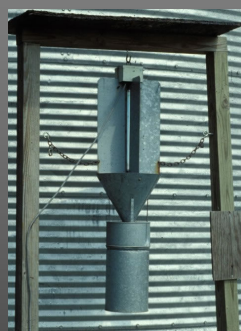


In orchards up to 80% recovery rates after treatment

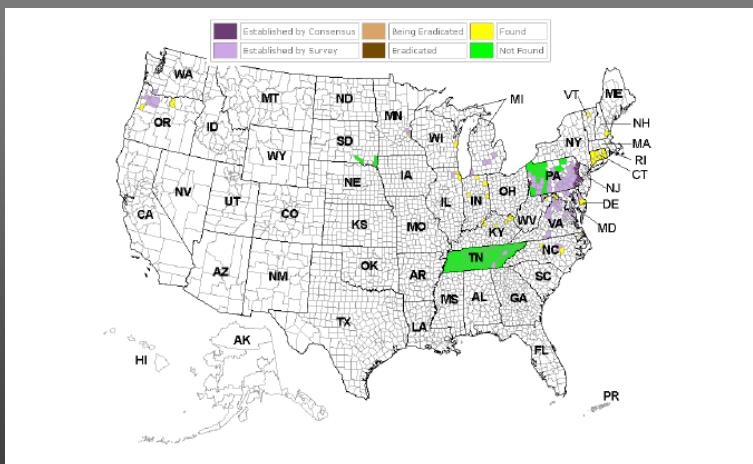
Photo credit: Purdue University

## BMSB-Monitoring

- Black light traps
- Ground deployed black pyramid traps with baited with methyl (2E,4E, 6Z)-decatrienoate
  - Nymphs respond season long to lures
  - Adults respond to lure only in late August



# BMSB-Where Is It Now!



<http://pest.ceris.purdue.edu/pdf/createpdf.php?code=IQAQKKA>

## Spotted Wing Drosophila (SWD) *Drosophila suzukii*

### Identifying Characteristics

#### Males and Females

- 2-3 mm length
- Rounded abdomens
- Males
  - dark spot on wings
- Females
  - Serrated ovipositor



Male SWD

Female SWD



Photo credits:  
Michigan State  
University

## SWD-Biology and Ecology

- Life cycle-little known for mid-western states
- Single life cycle 8-14 days
- Adults life span 3-9 weeks
- Females lay 1 to 3 eggs/fruit
- Single female potential 300 eggs/lifetime
- Potential for multiple generations/season
- SWD thrive at cooler temperatures (<86° F)
- SWD prefer shaded areas
- Overwintering potential - unknown



SWD larvae in fruit. Photo credit: University of California IPM program

## SWD-Host Range

- Variety of fruits
  - Blueberries
  - Blackberries
  - Strawberries
  - Raspberries
  - Cherries
  - Apple
  - Peach
  - Plum
  - Grapes



## SWD-Damage

- External damage by SWD female oviposition
- Larval feeding in fruit causes sunken appearance
- As larvae grow, chew breathing holes in fruit
- Secondary organisms (fungi and bacteria) may enter damaged fruit
- Food quality issue



Photo credit: E. Beers,  
Washington State University

## SWD-Management

- Sanitation
  - Remove rotten, over ripe or cull fruit from field
- Timely Harvest
- Chemical- target adults
  - Malathion (organophosphate)
  - Delegate, Entrust, Success (Spinosyns)
  - Assail, Provado, Actara (Neonicotinyls)



Photo Credit: Mark Bolda UCCE

## SWD-Monitoring Traps

- Clear plastic 16-32 oz with lids.
- Drill 3/16-inch holes near top of container



Photo credit: Michigan State University

## SWD-Monitoring Traps

- Clear plastic 16-32 oz with lids.
- Drill 3/16-inch holes near top of container  
(leave 1/3 of area without holes)
- Hang yellow sticky card from lid
- Bait trap with 1-inch of real apple cider vinegar



Photo credit: Michigan State University

# SWD-Monitoring/Trapping

- Trap Position
  - Shaded area (canopy)
- Replace vinegar weekly  
(do not pour used vinegar on ground)
- Record counts
- <sup>1</sup>Vineyards-place traps during veraison
- <sup>2</sup>Cherries-place traps well before fruit begins to ripen

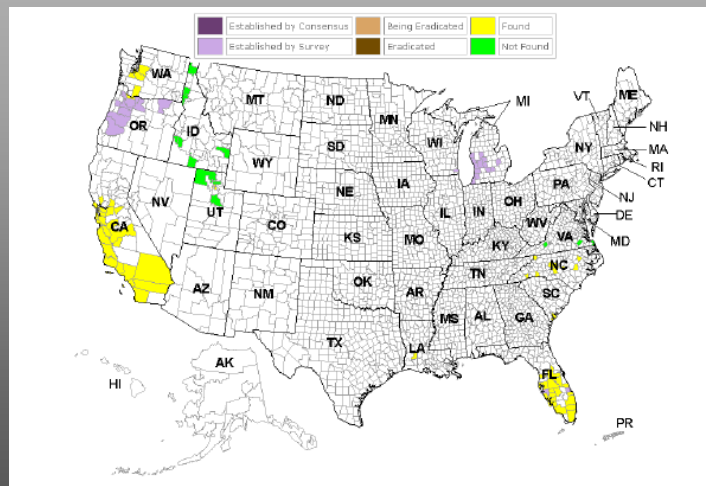


<sup>1</sup>[http://swd.hort.oregonstate.edu/files/webfm/editor/Wine\\_Grape\\_SWD\\_Bulletin\\_WSU.pdf](http://swd.hort.oregonstate.edu/files/webfm/editor/Wine_Grape_SWD_Bulletin_WSU.pdf)

<sup>2</sup><http://www.ipm.ucdavis.edu/EXOTIC/drosophila.html>

Photo credit: University of California, Davis

# SWD-Where Is It Now!



<http://pest.ceris.purdue.edu/pdf/createpdf.php?code=IOAPUA>

## SWD-Where Is It Now!

- Asia and Europe 1900's
- California 2008
  - In 2009 30, to 40% loss of cherry crop
- Washington, Oregon Pacific Northwest, Canada, N and S Carolina, Michigan 2010
- Michigan 2010
  - 13 counties SWD
  - Blueberries, raspberry, grape, cherry
  - Highest activity in late season into November

## Insect Diagnostic Lab UW-Madison Department of Entomology

- Submitting Insect Samples
- Crushed, damaged specimens are very difficult to identify. Use mailing tubes, padded envelopes or sturdy boxes to prevent damage when shipping. DO NOT PUT SPECIMENS ON TAPE. Use cotton, or tissue paper for cushioning. Tape vial or film canister tops before shipping. Many specimens are damaged in transit if not cared for.
- Hard bodied insects such as beetles and true bugs can be placed in a small clean vial. Put cotton or tissue paper inside the mailing tube with the specimen and increase its chances of arriving intact.
- Soft-bodied insects such as aphids, caterpillars and other worms are best preserved in alcohol. Freezing or placing in very hot water can kill specimens. Seventy percent ethanol is best but rubbing alcohol, or clear cocktail alcohol like gin or vodka works in a pinch.
- Adult moths and mosquitoes have scales on the wings that are needed for identification. They need to be kept dry. Do not crush. Place carefully in a vial or tub. Cushion during transit.
- Mail to:  
Insect Diagnostic Lab  
240 Russell Labs  
1630 Linden Drive  
Madison, WI 53706



