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)
  - Chloronated 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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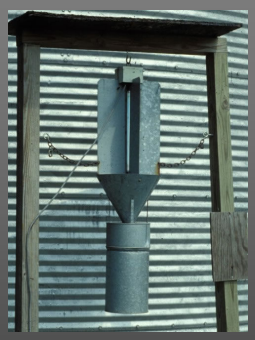
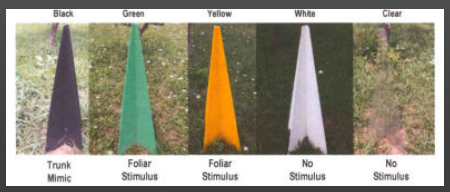
In orchards up to 80% recovery rates after treatment

Photo credit: Purdue University

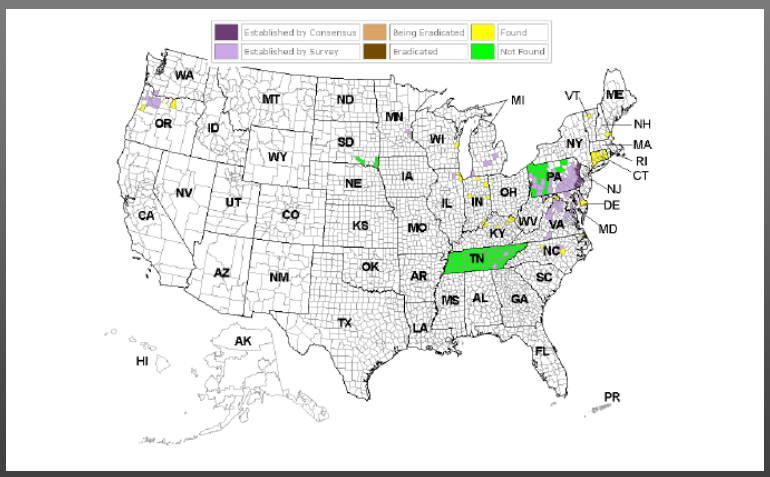
BMSB-Monitoring

- Black light traps
- Ground deployed black pyramid traps with baited with methyl (2*E*,4*E*, 6*Z*)-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=IQAQQKA

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

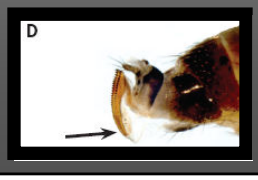


Photo credits: Michigan State University

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

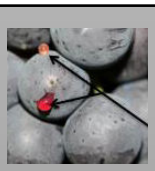
- Variety of fruits
  - Blueberries
  - Blackberries
  - Strawberries
  - Raspberries
  - Cherries
  - Apple
  - Peach
  - Plum
  - Grapes

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
- [1]Vineyards-place traps during veraision
- [2]Cherries-place traps well before fruit begins to ripen

[1]http://swd.hort.oregonstate.edu/files/webfm/editor/Wine_Grape_SWD_Bulletin_WSU.pdf

[2]http://www.ipm.ucdavis.edu/EXOTIC/drosophila.html

Photo credit: University of California, Davis

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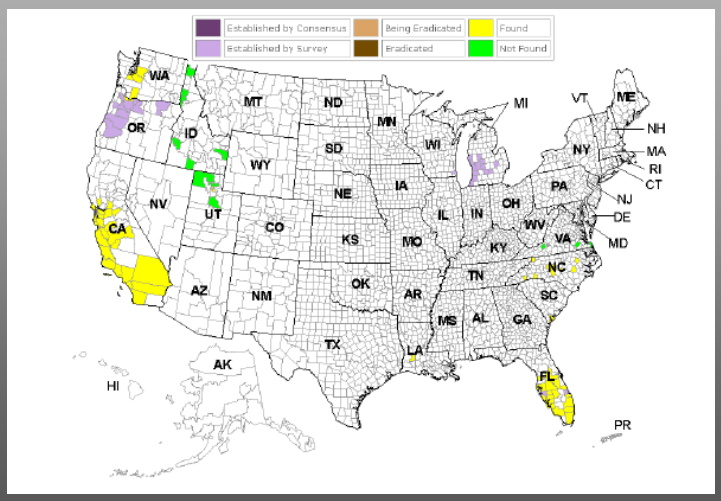

http://pest.ceris.purdue.edu/pdf/createpdf.php?code=IOAPAUA

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

WISCONSIN
UNIVERSITY OF WISCONSIN–MADISON

Sources

•BMSB

The challenges posed by the invasive Brown Marmorated Stink Bug, *Halyomorpha halys* (Stål), to U. S. agriculture
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http://anr.ext.wvu.edu/r/download/74527

How to identify the Brown Marmorated Stnk Bug
http://njaes.rutgers.edu/stinkbug/identify.asp

Brown Marmorated Stink Bug: Description, damage, monitoring and control considerations for Michigan's conditions
http://www.ipm.msu.edu/fruit/Fruit_and_Vegetable_Article_view/article/d/3247/Brown_Marmorated_Stink_Bug.aspx

•SWD

Washington State University, Orchard Pest Management
http://jenny.tfrec.wsu.edu/opm/displaySpecies.php?pn=165

Spotted Wing Drosophila What Washington State wine grape growers need to know
http://swd.hort.oregonstate.edu/files/webfm/editor/Wine_Grape_SWD_Bulletin_WSU.pdf

Current status of Spotted Wing Drosophila in table and wine grapes in the Willamette Valley, Oregon.
http://swd.hort.oregonstate.edu/files/webfm/editor/SWD_Update_Oct_12_2010.pdf

The importance of enhanced sanitationfor management of the spotted wing drosphila
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