Spotted Wing Drosophila / Brown Marmorated Stink Bug updates

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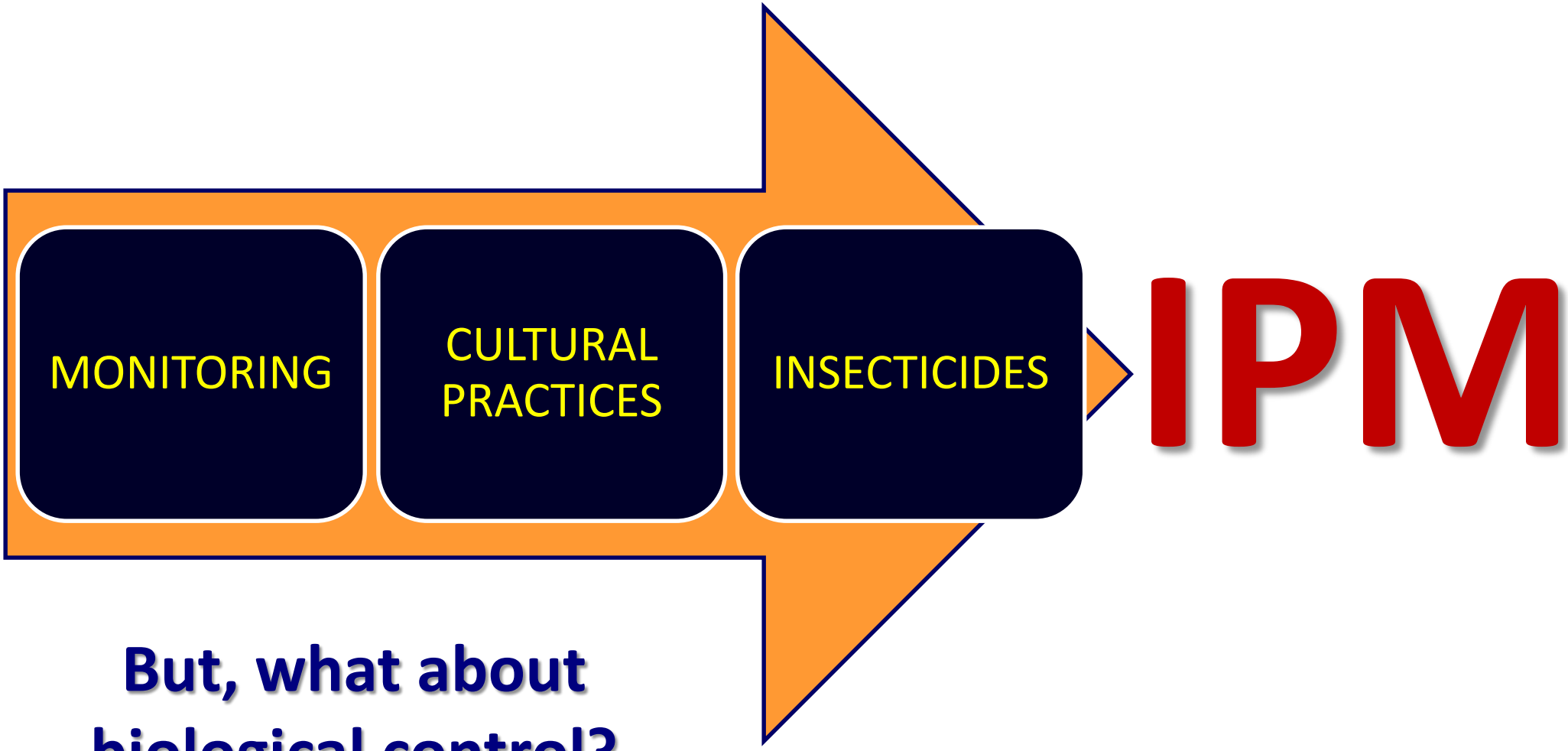
Spotted Wing Drosophila, Brown Marmorated Stink Bug, Japanese beetle, European Grapevine Moth, etc.



But, what about biological control?

Invasive *organisms become severe pests in new areas in part because they lack the insects and diseases that control them in their native environments.*

Spotted Wing Drosophila (SWD)

Significance

- ✓ Unlike other vinegar flies, SWD attacks sound ripening fruits
- ✓ Once eggs laid in fruit, no longer able to control with pesticides
- ✓ Short lifecycle and overlapping generations make spray timing difficult
- ✓ Requires sprays near harvest time
- ✓ Requires multiple sprays which can lead to pesticide resistance

SWD came to stay

1 female = 300 eggs
150 females = 45,000 eggs
22,500 females = almost 7 million eggs

In just 4 months!

Ovipositing female SWD. Source: E. Beers, Washington State Univ.

The “1-2-3” IPM Approach for SWD

Division of Plant Sciences

Integrated Pest & Crop Management

MU IPM Program

Taking an Environmentally Sensitive Approach to Pest Management

The "1-2-3" IPM Approach for Spotted Wing Drosophila Management

Published: May 19, 2014

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Published: May 19, 2014

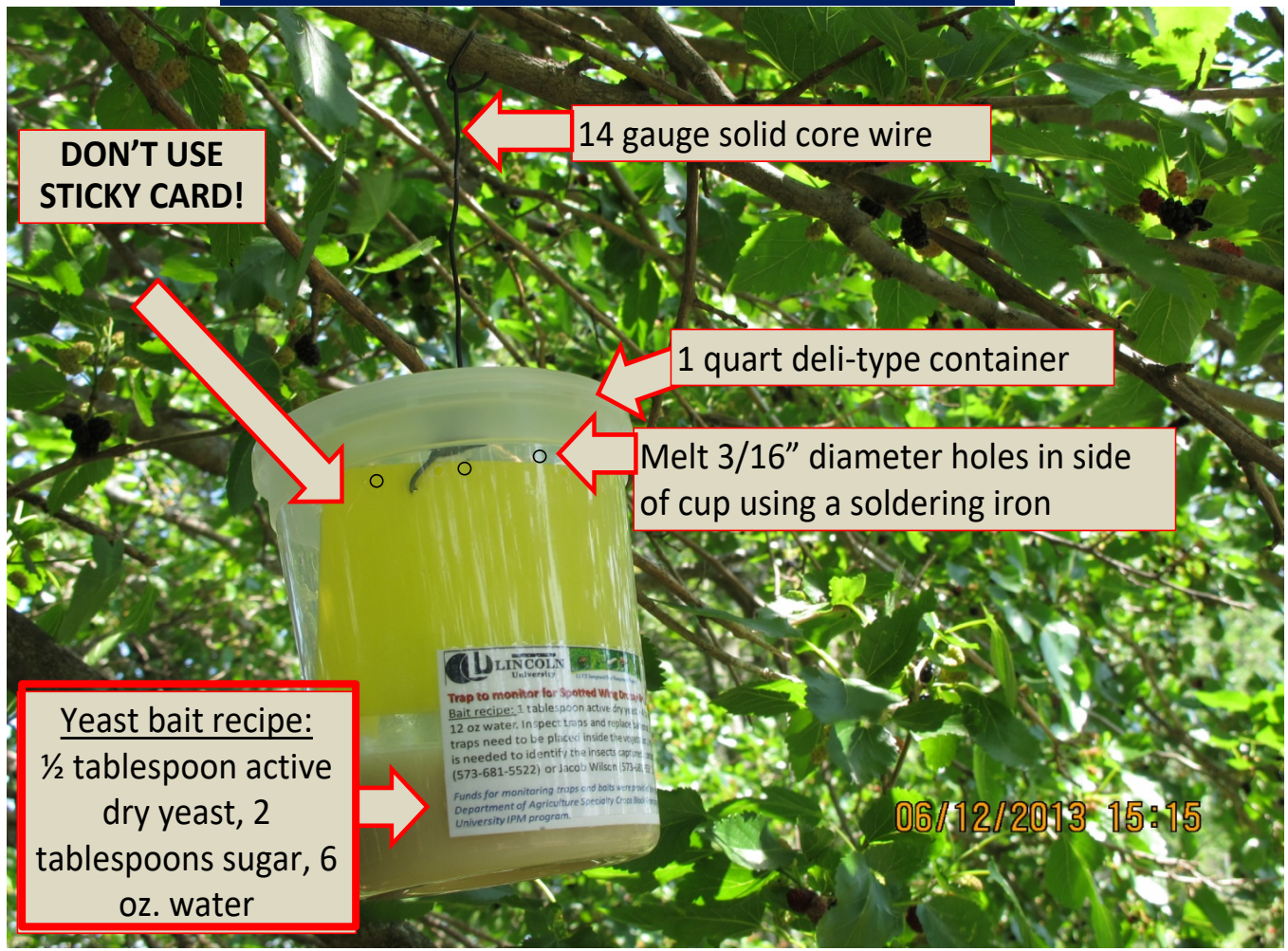
by Dr. Jaime Pinero and Patrick Byers

This document briefly discusses the most relevant Integrated Pest Management (IPM) practices that are recommended for Spotted Wing Drosophila Management (SWD) in berry crops. The “1-2-3” approach to SWD management is meant to provide easy-to-understand steps to manage SWD in small farms. The three main components being discussed here are monitoring, cultural practices, and timely application of insecticides.

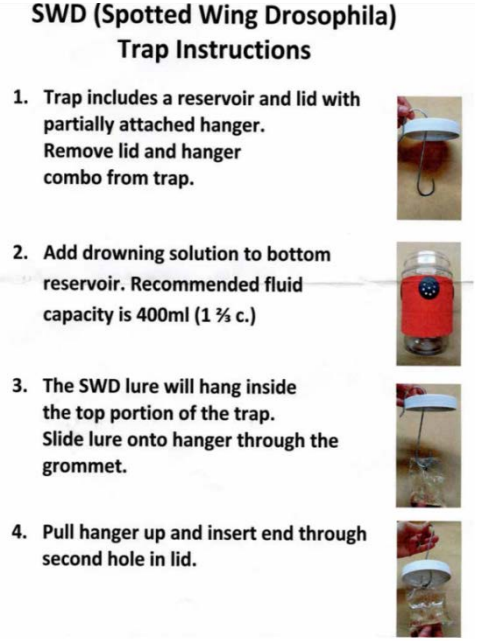
(1) Monitoring

- ✓Yeast / sugar bait: most effective at trapping SWD
- ✓Number of flies captured are not predicting potential for infestation

How to make a trap to monitor for SWD



- ✓ A good commercial-grower alternative for SWD monitoring is the SWD Pherocon lure (available at Great Lakes IPM)
  - More selective, but catches fewer SWD
- ✓ Other commercial lures are available (e.g., Scentry, AlphaScents)



SWD (Spotted Wing Drosophila) Trap Instructions

1. Trap includes a reservoir and lid with partially attached hanger. Remove lid and hanger combo from trap.
2. Add drowning solution to bottom reservoir. Recommended fluid capacity is 400ml (1 ⅔ c.)
3. The SWD lure will hang inside the top portion of the trap. Slide lure onto hanger through the grommet.
4. Pull hanger up and insert end through second hole in lid.

AlphaScents

NEW!

Trap and Lure for:
SPOTTED WING DROSOPHILA (SWD)
Drosophila suzukii • Diptera, *Drosophilidae* • DROSUZ

- Ready to use. No additional components required.
- No water or drowning solution required.
- Low cost trap.
- Low maintenance.
- Immediate and easy pest ID.
- Works in rain and under sprinklers.
- Easy to assemble and check.
- Use with *Alpha Scents* back folded yellow card or wing trap bottom.
- Lure lasts 30 days. Can be moved from saturated traps to fresh traps.

Lure is attached to the back side of a backfolding yellow sticky trap or wing trap bottom. Trap is back folded, stapled or locked with the punched out arrow, and the release paper is removed.

SWD are attracted by the lure and stick to the trap as shown. **Center photo is capture after only 2 hours. Right photo is capture after 24 hours in rain.**

Similar results using white color plastic delta trap liner or wing trap bottom.

SWD continue to land on lure throughout life of lure.

I put the trap out in my blueberries on 3/9 at 6:00 pm. On 3/10, at 9:00 a.m. there were two SWD on the card. At 6:00 pm, there were hundreds. That was when I took the attached picture. There was also a swarm of SWD around the brown lure. — evergreengrowers.com

alpha scents inc.
insect monitoring systems

TRÉCÉ NEW PRODUCT TECHNOLOGY
PHEROCON SWD
The NEW & IMPROVED Monitoring System for Spotted Wing Drosophila, *Drosophila suzukii*

(2) Cultural practices

Sanitation

- Growers in other regions of the country send pickers through fields with one container to collect good fruit and another container to collect over-ripe fruit.
- U-Pick operations: Consider giving a discount to customers for picking up non-marketable fruit

Canopy management

- For brambles, thin the plant row to 3-4 strong canes per square foot. This eliminates weaker shoots and **opens the canopy.**
- Consider a trellising system that similarly opens the canopy.
- **The above may make plantings less attractive to SWD and will improve insecticide spray coverage**

(3) Insecticides

Midwest Fruit Pest Management Guide 2018

Contents

FREE online at: https://ag.purdue.edu/hla/Hort/Documents/ID-465.pdf

Insecticidal options for SWD control

A= anthranilic diamide
O= Organophosphate
C= Carbamate
P= Pyrethroid

Most effective and safest options to minimize impact to non-targets

Blueberry

Material	Rate/Acre	Comments
Brigade 2EC (10WP)	6.4 fl. oz.	
Danitol 2.4EC	10.67-16 fl. oz.	
Delegate 25WG	3-6 oz.	a.i. Spinetoram
Entrust 2SC OMRI	4-6 fl. oz.	a.i. Spinosad
Entrust 80WP OMRI	1.25-2 oz.	
Exirel 0.83SE A	13.5-20.5 fl. oz.	
Imidan 70W	1.33 lbs.	
Lannate LV C	1.5-3 pts.	
Lannate SP C	0.5-1 lb.	
Malathion O	See label	Formulations and rates vary by state. Check labels for specific information.
Mustang Maxx 0.8EC P	4.0 fl. oz.	
Rimon 0.83EC *	20-30 fl. oz.	*Novaluron= Insect Growth Regulator

Blackberry/raspberry

Brigade WSB (10WP) P	5.3-16 oz.	
Danitol 2.4EC P	10.67-16 fl. oz.	
Delegate 25WG	3-6 oz.	
Entrust 2SC OMRI	4-6 fl. oz.	
Entrust 80WP OMRI	1.25-2 oz.	
Malathion	See label	Malathion formulations and rates vary by state. Check labels for specific information.
Mustang Maxx	4.0 fl. oz.	

Strawberry

Brigade WSB (10WP)	5.3-16 oz.
Danitol 2.4EC	16-21.33 fl. oz.
Entrust 80WP OMRI	1.25-2 oz.
Radiant 1SC	6-10 fl. oz.

Add sugar to tank mix to make insecticide sprays more effective

Add 2 pounds of sugar / 100 gallons water

(5 table spoons / gallon)

What else can I do to reduce insecticide use?

- Exclusion nets
- Behaviorally-based IPM (push-pull strategies, mass trapping)

Project Reports

Submit a Report

Search the Database

Project Search Tips

Management of the Spotted Wing Drosophila using High Tunnels

Project Number: FNC14-948
Year: 2014
Region: North Central
Type: Farmer/Rancher Project

Coordinator:
Erik Gundacker
Scenic Valley Farm
12529 Danbury Way
Rosemount , MN 55068
Phone: 563-650-3654
E-mail: gun@usinternet.com

SARE Grant $ 14850

Push-Pull Strategy

Behavioral manipulation of insect pests via the integration of stimuli that act to:

(1) Make the protected resource unattractive or unsuitable to the pests **(PUSH)** while

(2) Luring them toward an attractive source **(PULL)** from where the pests are subsequently removed or killed

REQUIREMENTS:

Lures, traps, and repellents (or deterrents)

IN MOST CASES, NON-TOXIC COMPONENTS

Research Article

SCI

Received: 9 March 2017 Revised: 25 May 2017 Accepted article published: 17 July 2017 Published online in Wiley Online Library: 12 September 2017

(wileyonlinelibrary.com) DOI 10.1002/ps.4666

Evaluating a push–pull strategy for management of *Drosophila suzukii* Matsumura in red raspberry

Anna K Wallingford,[a*] Dong H Cha[b] and Gregory M Loeb[a]

- Four treatments (control, push, pull, and push–pull)

Pull: Visually and chemically attractive mass trapping device (red sticky sphere traps baited with Scentry Spotted Wing Drosophila Lure)

Push: Aversive material (1-octen-3-ol)

- **Results**: 56.7% and 57.4% fewer eggs in raspberry fruit collected from **push** and **push–pull** treatments than from controls, respectively.
- 44.1% more eggs were observed in fruit collected from **pull** plots than controls.

Mass trapping

Need to identify fruit-based compounds that are attractive to adult SWD

PROJECT 8 - TITLE

Optimizing Monitoring and Mass Trapping Systems for Spotted Wing Drosophila

DURATION OF PROJECT

Start Date: 09/01/2017 **End Date:** 08/31/2019

Drs. Bruce Barrett (MU) and Jaime Pinero (LU), and Ph.D. student Grant Bolton

Use of Early Ripening Cultivars to Avoid Infestation and Mass Trapping to Manage *Drosophila suzukii* (Diptera: Drosophilidae) in *Vaccinium corymbosum* (Ericales: Ericaceae)

EMILY HAMPTON,[1] CARISSA KOSKI,[1] OLIVIA BARSOIAN,[1] HEATHER FAUBERT,[1] RICHARD S. COWLES,[2] AND STEVEN R. ALM[1,3]

Red cups baited with 110 ml of water, 4.5 ml of apple cider vinegar, 2.6 g of dry active yeast, and 38 g of whole wheat flour

One suggestion for mass trapping:

- 1/2 tablespoon of active dry yeast
- 2 tablespoons of table sugar
- 6 ounces of water

✓ **Dump some ripe berries inside each trap**

✓ **Replace bait once a week**

MALES	mean number
Sugar/yeast	2.9
Pherocon SWD	0.6
RATIO	**4.8**

FEMALES	mean number
Sugar/yeast	12.2
Pherocon SWD	0.6
RATIO	**20.3**

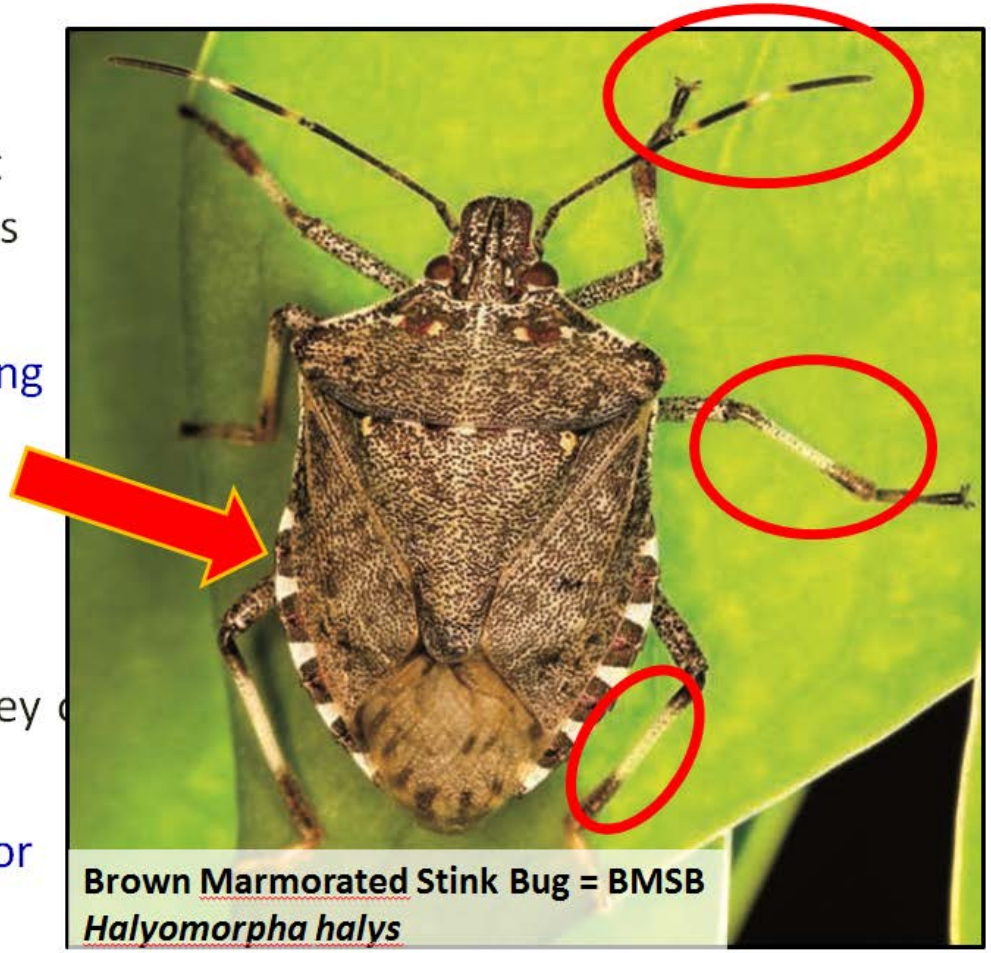
FEMALES	Total in 7 days
Sugar/yeast	34
Raspberry fruit	289
RATIO	**8.5**

Brown Marmorated Stink Bug (BMSB)

Identification

ADULTS:

- White stripes on antennae and faint white bands on legs
- Outer edges of the abdomen alternating white and dark markings ("marmorated")
- Underside is pale, sometimes with grey black markings
- Emit a pungent odor when disturbed



Researchers ilable at no cost.

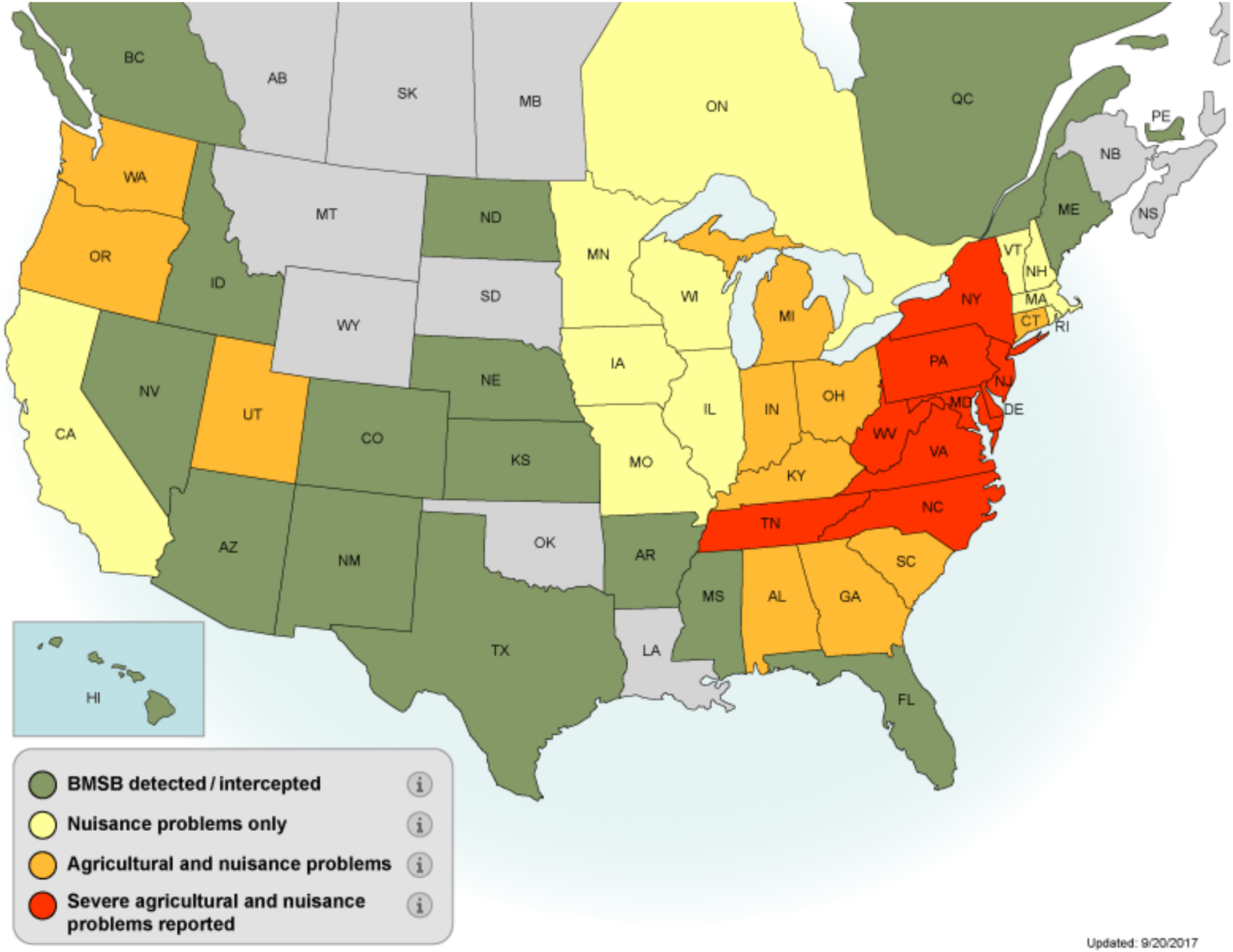
The kit includes one BMSB specimen in a bottle, stink bug ID guide, among other materials.

Click here to request your BMSB ID kit

http://www.stopbmsb.org

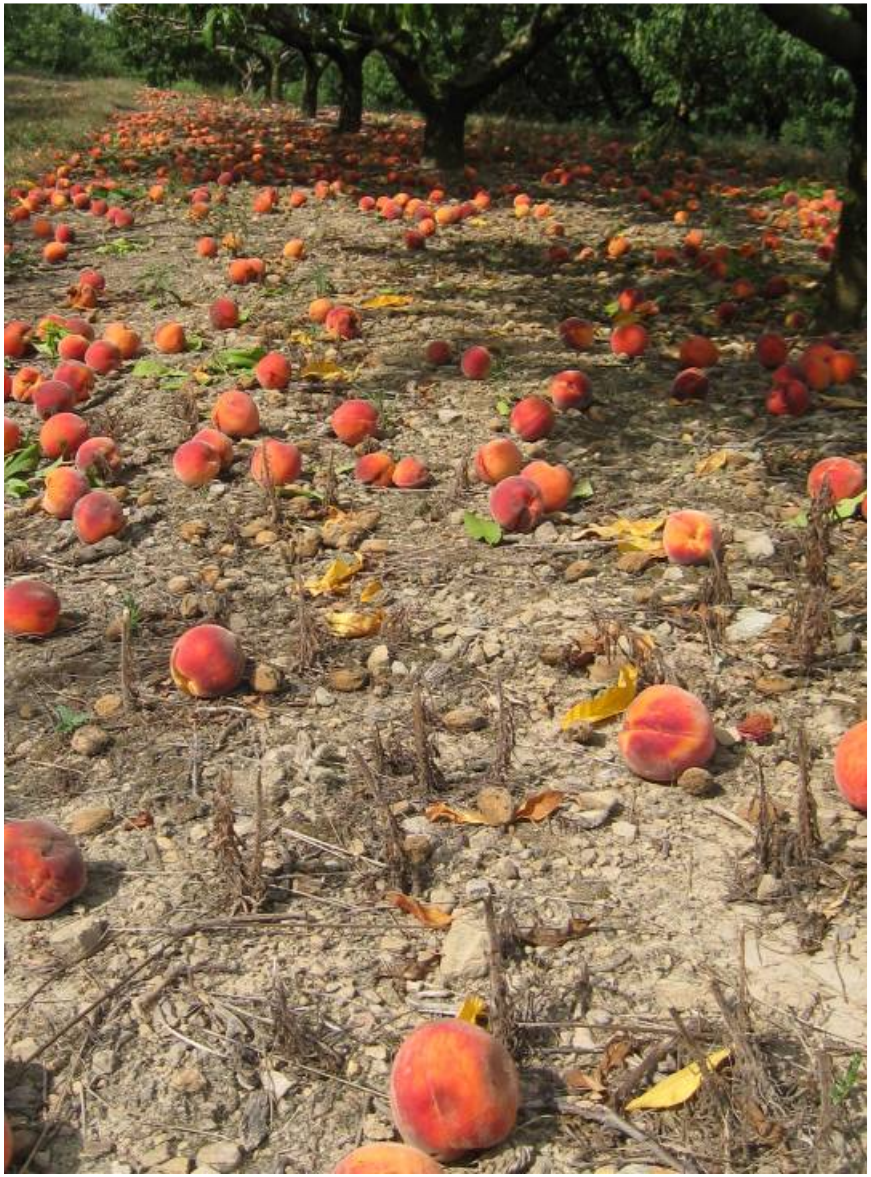
Pest identification is key to IPM

Distribution



Damage

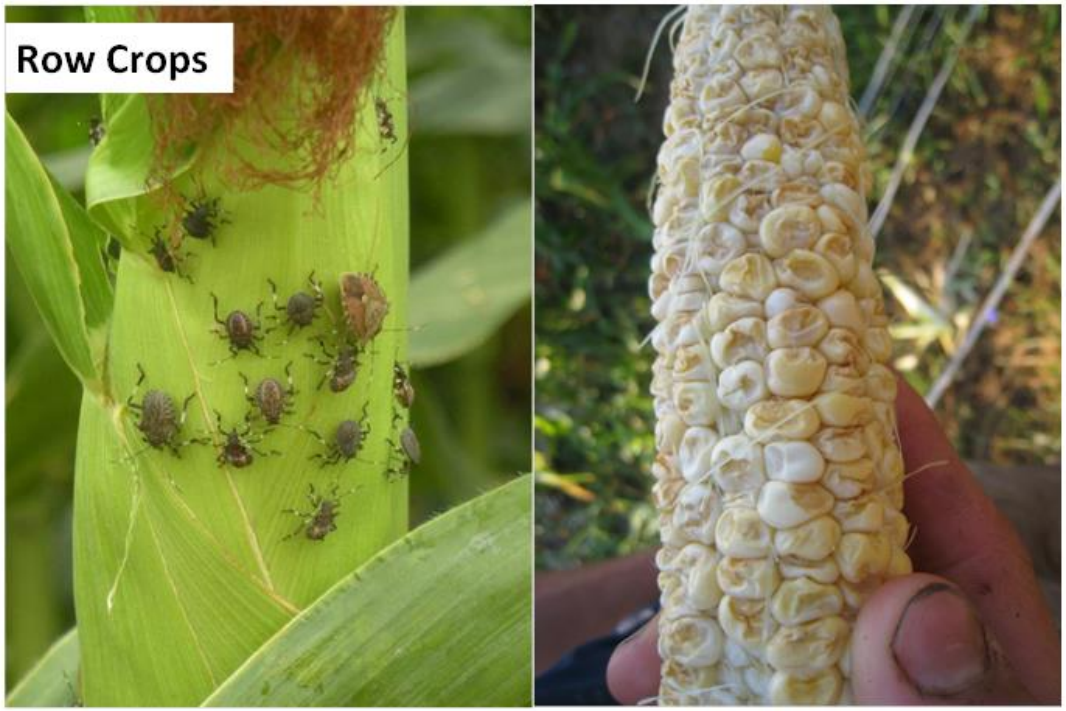
BMSB is strongly associated with tree fruit

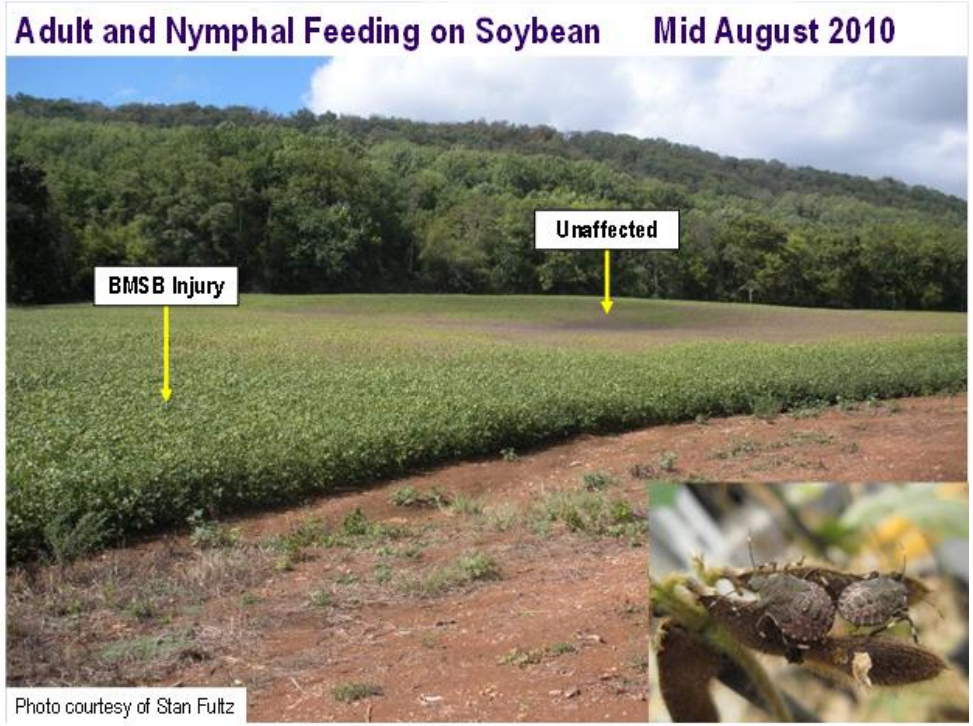


Damage

Damage to vegetables takes place later in the season

Damage


Row Crops


Adult and Nymphal Feeding on Soybean
Mid August 2010
Unaffected
BMSB Injury
Photo courtesy of Stan Fultz


Small Fruit and Grape


Hazelnuts
Photo courtesy of Peter Shearer

Integrated Pest Management

Integrated Pest Management
University of Missouri

Home Pest Monitoring IPCM MEG

Newsletter Newsletter

Monitoring and Integrated Pest Management of the invasive Brown Marmorated Stink Bug in fruits and vegetables

PUBLISHED: MARCH 17, 2017

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Monitoring:

- ✓ Black pyramid traps baited with a pheromone lure ("Stink Bug Xtra Combo - Broad Spectrum).
- ✓ Lure is reported to attract multiple stink bug species such as Brown, BMSB, Conchuela, Consperse, Dusky, Green (*Acrosternum*), Harlequin, and Red Shouldered stink bugs.

AgBio, Inc., 9915 Raleigh St.
Westminster, CO 80031
P: 303.469.9221
F: 303.469.9598
agbio@agbio-inc.com

AGBIO

Economic Thresholds:

- ➢ Apple: 10 BMSB accumulated in one pheromone-baited trap located within the orchard or at the orchard border.

Insecticides

FEWER OPTIONS THAN THOSE AVAILABLE FOR SWD GIVEN THAT BMSB IS MORE DIFFICULT TO KILL!

Actara, Brigade, Danitol, and Lannate have shown good efficacy in trials; however, multiple applications may be needed for re-infestations.

Blueberry

Pyrethroid	Danitol 2.4EC	10.67-16 fl. oz.	
Carbamate	Lannate LV	2-3 pts.	
Carbamate	Lannate SP	2/3-1 lb.	

Raspberry/blackberry

tarnished plant bug, stink bugs	Actara 25WB Neonicotinoid	3 oz.	
	Assail 30SG Neonicotinoid	4.5-5.3 oz.	
	Bifenture 2EC Pyrethroid	6.4 fl. oz.	Labeled for brown marmorated stink bug control.
	Pyganic 5%EC **OMRI**	4.5-18 fl. oz.	
	Sevin XLR Plus (4F) Carbamate	1.5-2 qts.	Other formulations may be available.

Organic (OMRI-listed) options

- ✓ **AZERA® and PyGanic®:** Not very effective but best OMRI-listed insecticides
- ✓ Always use the high label rate
- ✓ Tank mixing with Surround® (kaolin clay) can provide better prospect of control

Azera= Azadirachtin 1.20% (neem oil)
+ 1.40% Pyrethrin
High rate= $126 per Acre (48 oz)
1 oz Azera= $2.64
12 hr Re-entry Interval (REI)
Zero Pre-Harvest Interval (PHI)
Direct contact & 4-5 day deterrent
Dissipates after 1-2 days (rainy weather?)

PyGanic= 1.40% Pyrethrin
(chrysanthemum extract)
High rate= $60 per Acre (42 oz)
1 oz PyGanic= $1.44
12 hr Re-entry Interval (REI)
Zero Pre-Harvest Interval (PHI)
"Can be used on day of harvest"
Direct contact & 2 week deterrent

Management: Behaviorally-based approaches

Journal of Economic Entomology, 110(2), 2017, 543–545
doi: 10.1093/jee/tow321
Advance Access Publication Date: 6 March 2017
Research article

Horticultural Entomology

Deltamethrin-Incorporated Nets as an Integrated Pest Management Tool for the Invasive *Halyomorpha halys* (Hemiptera: Pentatomidae)

T. P. Kuhar,[1,2] B. D. Short,[3] G. Krawczyk,[4] and T. C. Leskey[3]

- **Attract-and-kill IPM strategy**
- *"Our experiments showed ZeroFly nets are quite toxic to H. halys, delivering a lethal dose of deltamethrin to bugs within several seconds or minutes of exposure depending on stage of the bug"*
- Potential for use of insecticide-treated netting placed on selected fruit trees in combination with pheromone

Attract-and-Kill: Trap Cropping

Entomologia Experimentalis et Applicata

Explore this journal >

Original Article

Measuring host plant selection and retention of *Halyomorpha halys* by a trap crop

Brett R. Blaauw, William R. Morrison III, Clarissa Mathews, Tracy C. Leskey, Anne L. Nielsen

First published: 15 April 2017 Full publication history

- Combining **pheromone lures**, pollenless **sunflowers** (earlier in the season) and **sorghum** (later in the season) can attract BMSB away from cash crops.
- BMSB need to be killed using insecticides

Thank You!

Questions?