Brown Marmorated Stink Bug and Spotted Wing Drosophila update

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1. Brown Marmorated Stink Bug

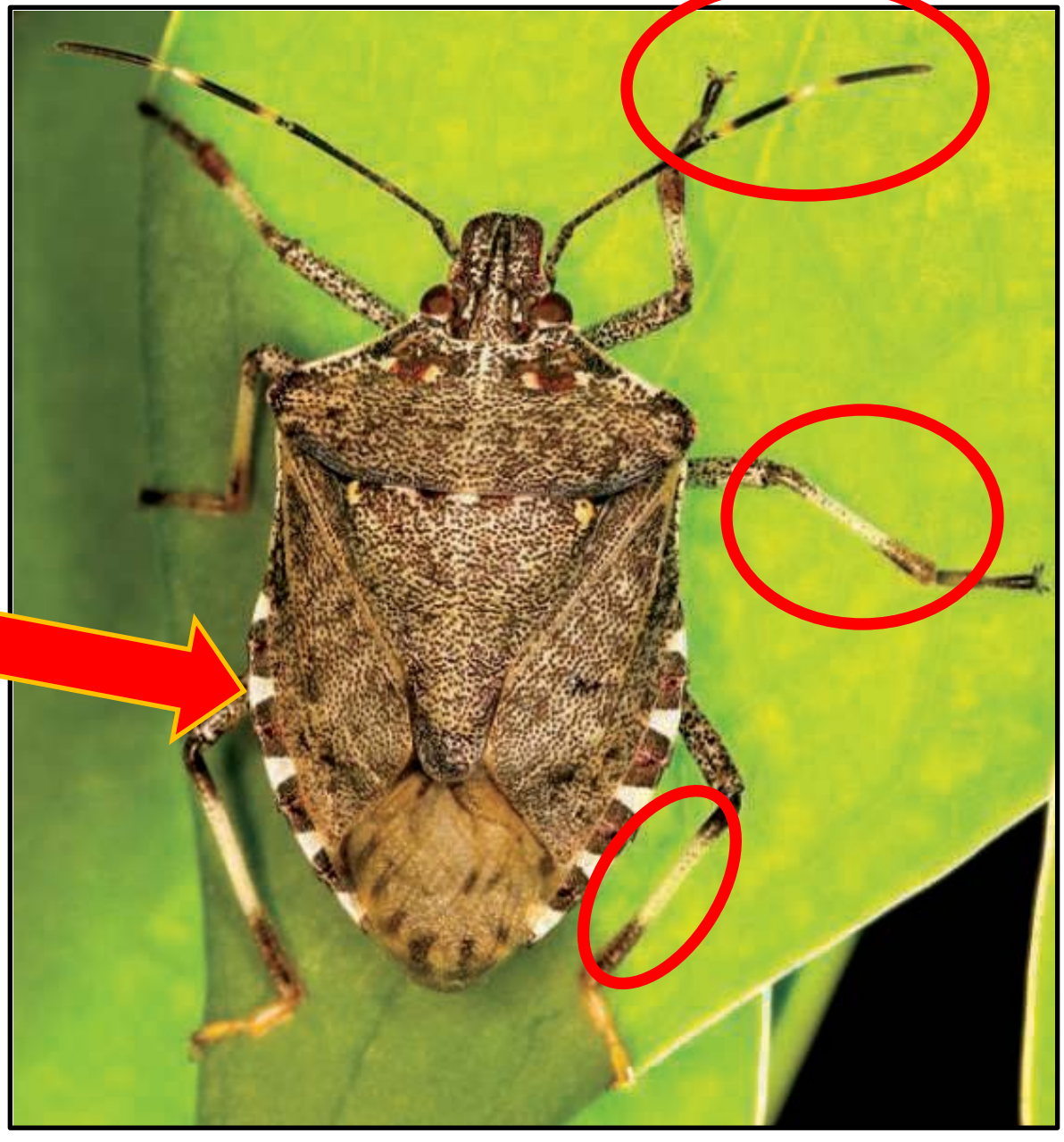
2. Spotted Wing Drosophila

IDENTIFICATION → DISTRIBUTION → DAMAGE → MONITORING → MANAGEMENT

Identification

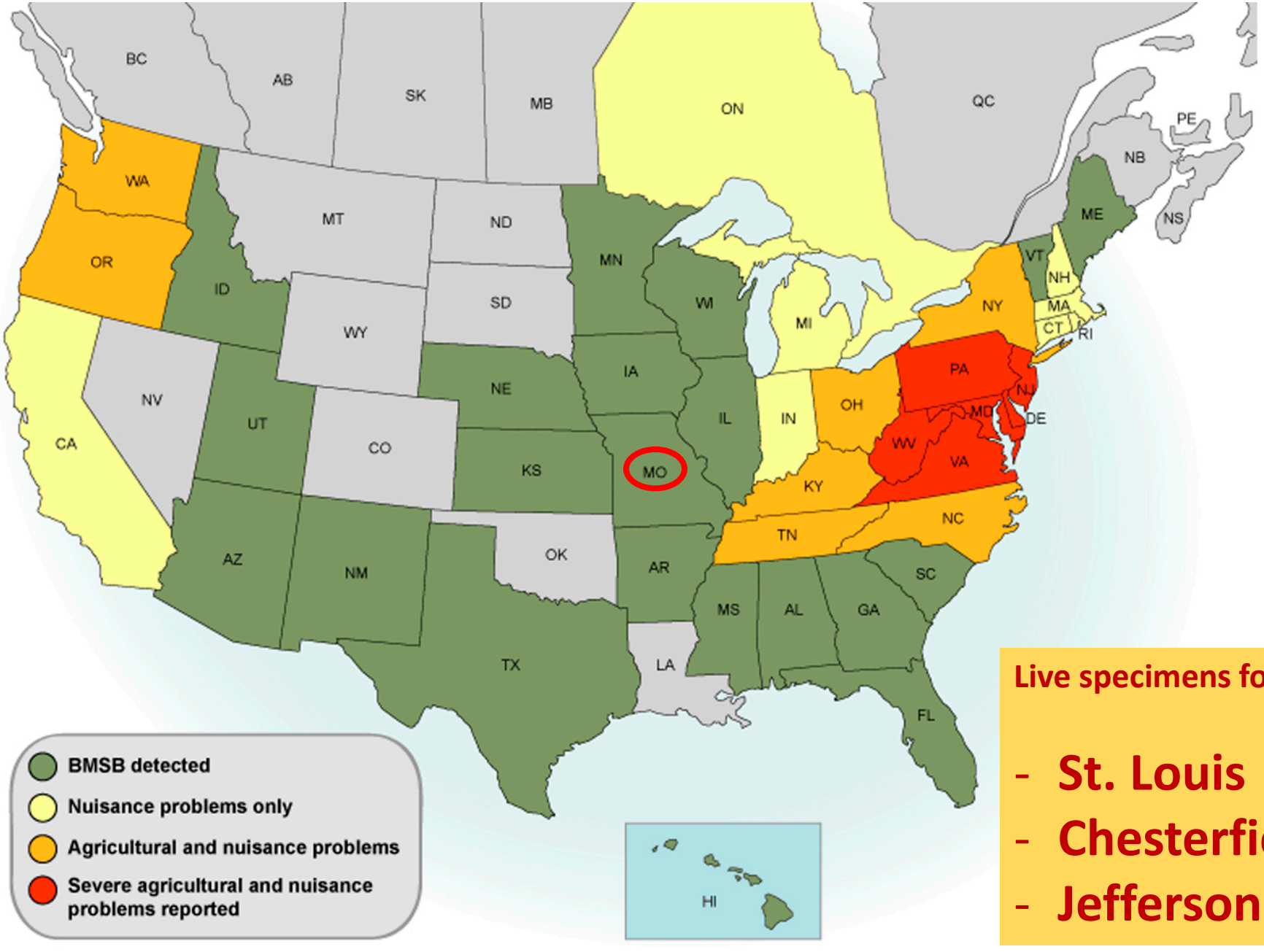
ADULTS:

- 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 or black markings
- Emit a pungent odor when disturbed



Brown Marmorated Stink Bug = BMSB
Halyomorpha halys

Distribution



Live specimens found in 2014 in:

- **St. Louis**
- **Chesterfield**
- **Jefferson City**

Source: Dr. Hannah Burrack, North Carolina State University

Damage

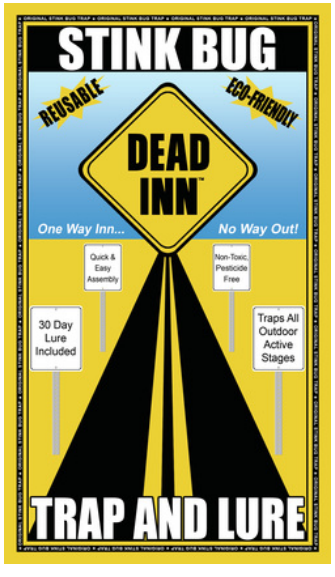
BMSB is strongly associated with tree fruit

Damage

Damage to vegetables takes place later in the season

Monitoring

In 2014 an improved lure was developed by USDA scientists. It combines a pheromone and a synergist.



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

2014 Monitoring system

Invasive Insect Pests Threatening Specialty Crops in Missouri: Monitoring, Organic Management, and Farmer's Education (2013-2014)

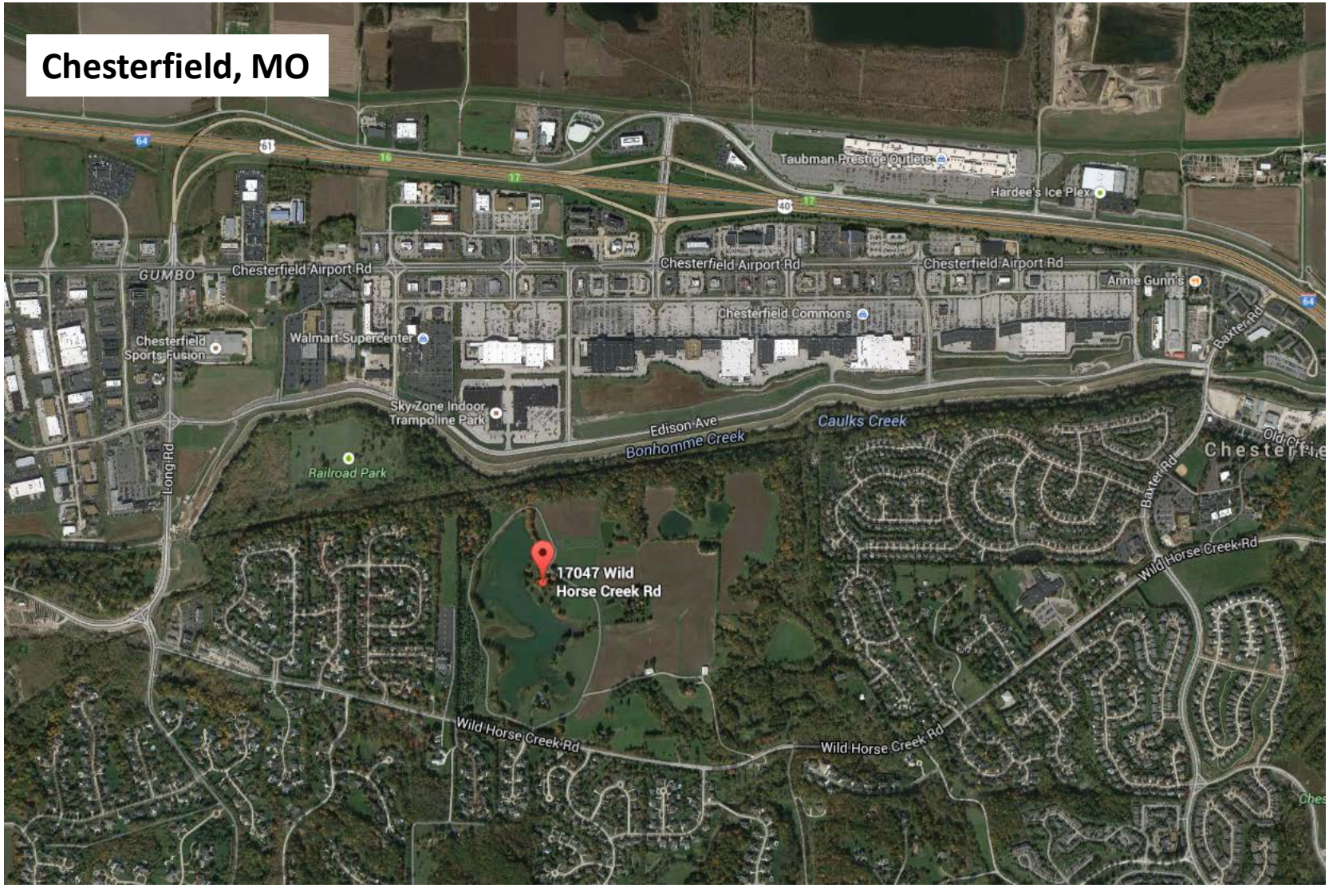
12-25-B-1471

- Net sweeps and trapping conducted at every site
- 5 locations in St. Louis Metro
- 4 locations in Central MO
- 3 locations in Southwest
- Several other locations across the state

No BMSB found in traps.

But, in September, 2014, one live BMSB captured with net sweep on a farm in Jefferson City (also in Chesterfield and St. Louis)

Live BMSB found in 2014



Live BMSB found in 2014

Management options

➢ ATTRACT-AND-KILL / TRAP CROPPING

An attract-and-kill strategy for BMSB would involve luring large numbers of the insects to a specific area, and then treating that area.

➢ BIOLOGICAL CONTROL

Researchers are seeking to identify the natural enemies of BMSB, including a group of tiny parasitic wasps that attack BMSB eggs and a naturally occurring fungus that targets stink bugs.

➢ CHEMICAL CONTROLS (ONLY OPTION AT THIS MOMENT)

Some insecticides effectively control BMSB. Growers can select materials based on their economic and environmental impacts.

Spotted Wing Drosophila
(Drosophila suzukii)

HIGH REPRODUCTIVE POTENTIAL, FAST DEVELOPMENT

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

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

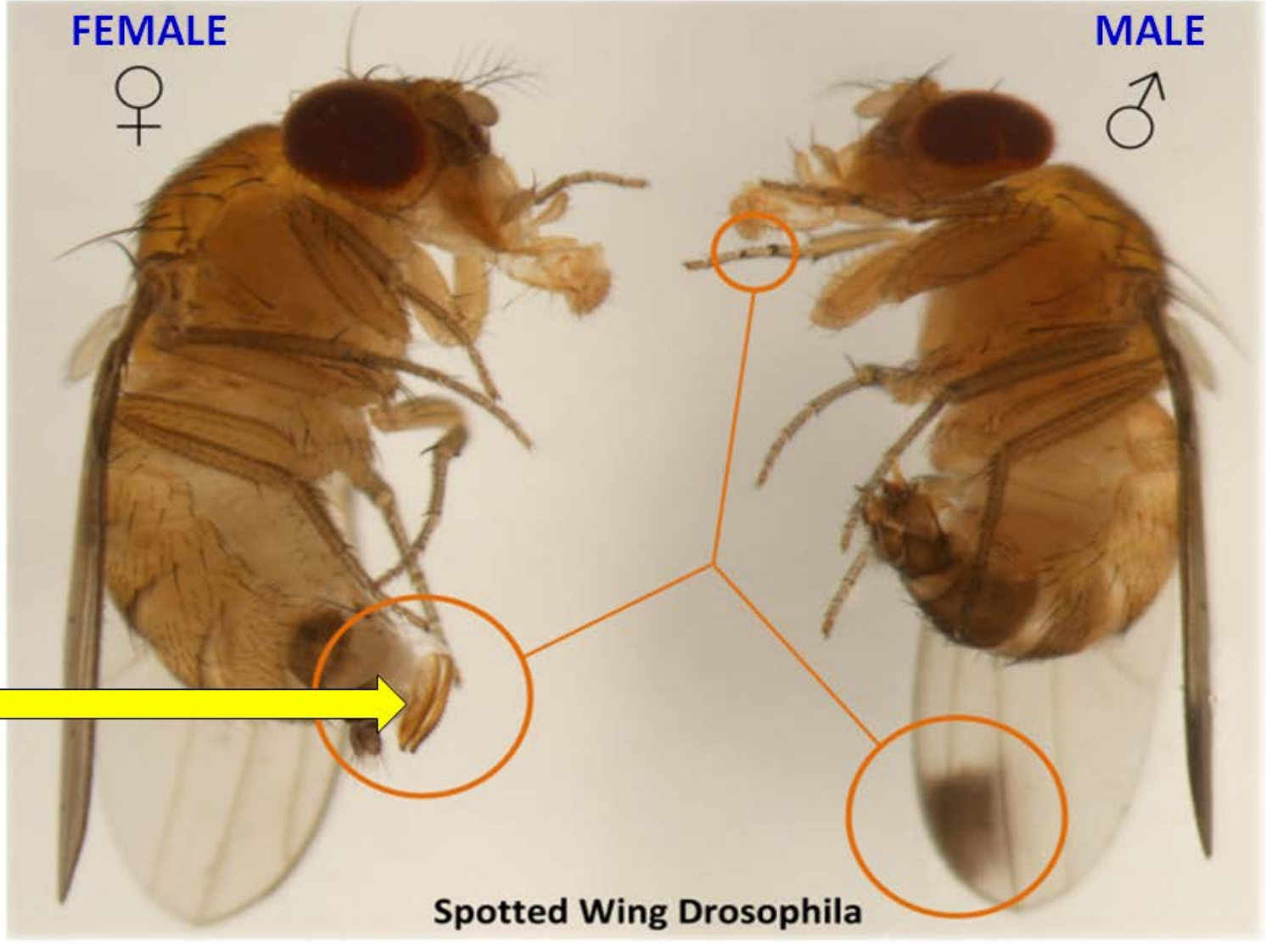
SWD Identification

Flies with no dots on wings could be:

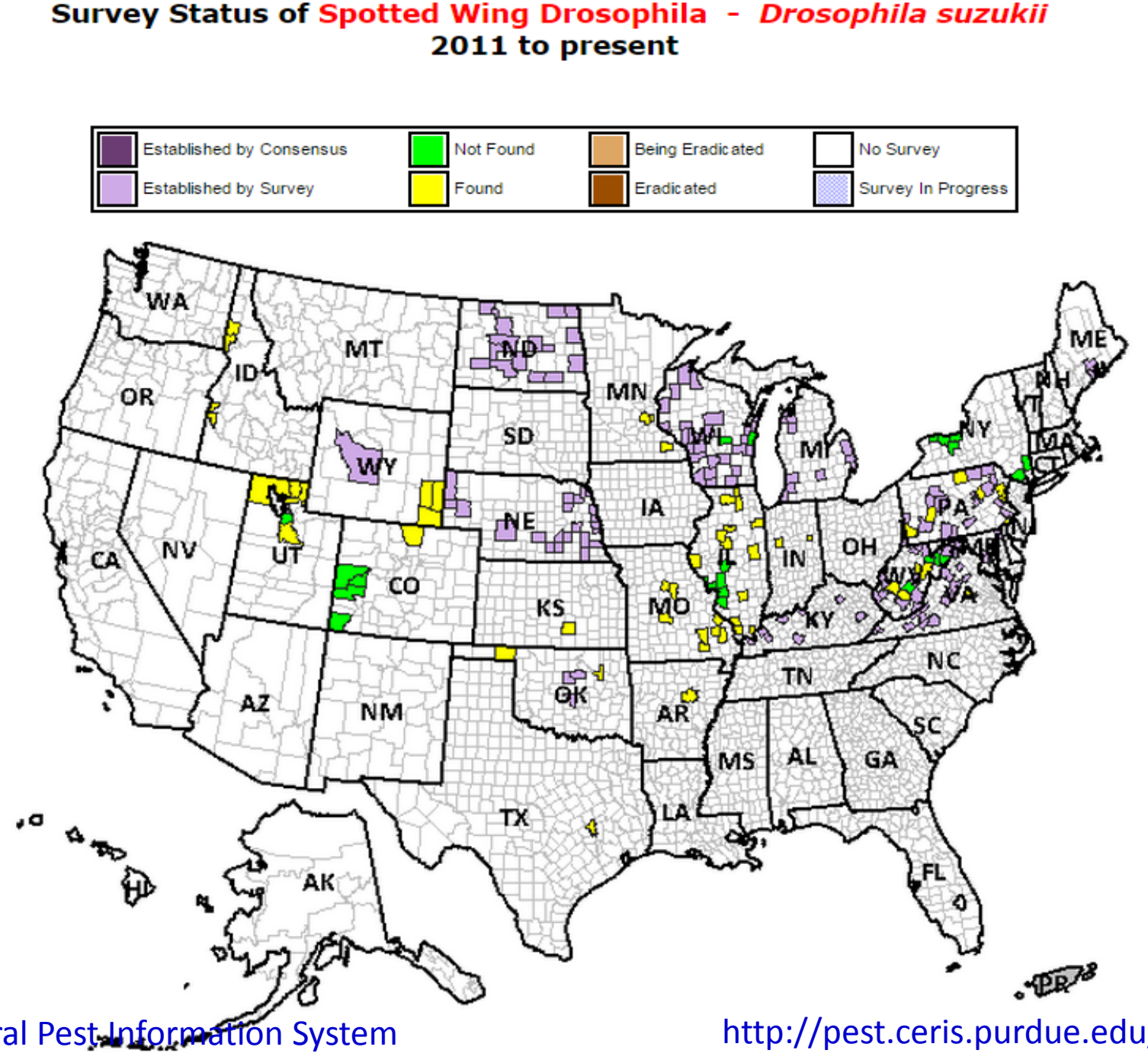
- SWD females
- Native Drosophila species

Need to detect presence of ovipositor

Serrated egg-laying structure (ovipositor)



Distribution



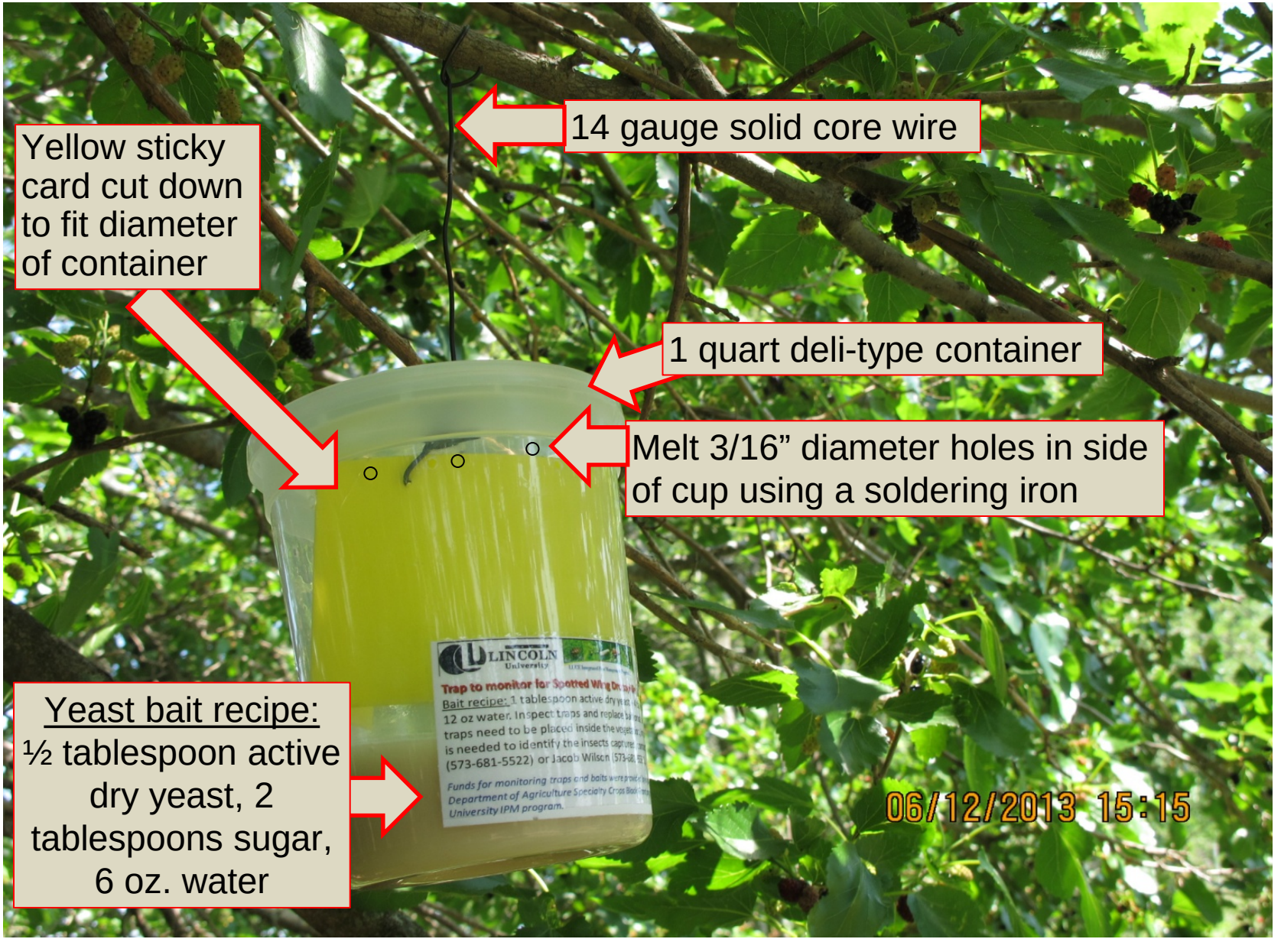
Pest Tracker
National Agricultural Pest Information System

http://pest.ceris.purdue.edu/pests.php

Damage

Monitoring

How to make a trap to monitor for SWD



Commercial lure are now available

LINCOLN University

Integrated Pest Management
Lincoln University Cooperative Extension

TRÉCÉ TECHNOLOGY

NEW PRODUCT

PHEROCON® SWD

DUAL-LURE

The NEW Monitoring System for Spotted Wing Drosophila, *Drosophila suzukii*

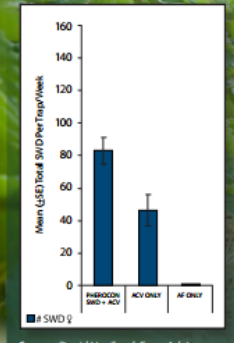
TRÉCÉ INCORPORATED
INSECT PHEROMONE & KAIROMONE SYSTEMS
Your Edge – And Ours – Is Knowledge.

PHEROCON® SWD

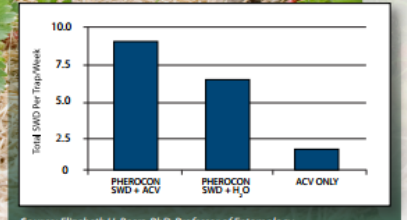
PHEROCON® SWD

MONITORING SYSTEM FOR SPOTTED WING DROSOPHILA

NEW PRODUCT TECHNOLOGY



Source: David Haviland, Farm Advisor, Cooperative Extension Kern County, CA. Drowning solutions = ACV: Apple Cider Vinegar, AF: Antifreeze



Source: Elizabeth H. Beers, PhD, Professor of Entomology, Washington State University
Drowning solutions = ACV: Apple Cider Vinegar, H20: Water

Guidelines For Use:

Lures

- **Suggested hanger:** plastic coated paperclip
- Hang dual lures on plastic coated paperclip opened to an "S" shape
- Position lures in top of trap

Trap Placement

Place traps in the field well in advance of fruit susceptibility.

Cherries, Peaches and Plums

- Install 3-4 traps per orchard (< 40 acres)
- Place traps 1-2 ft. off orchard floor on orchard edge in shade part of tree canopy
- Inspect traps weekly, count and remove flies

Blueberries, Strawberries, Canefruit and Other Susceptible Fruit

- Use 5-6 traps per 10 acres
- Generally, attach traps to stakes or posts near plants
- **For Blueberries -** place traps in shady area on, or near, canopy.
- **For Strawberries -** place traps in the shady canopies of the strawberry plants
- **For Canefruit -** place traps on corners, middle and edge of field in shady areas where possible

Key Features:

- Significantly higher capture vs. ACV
- Captures 2-2 ½ weeks earlier vs. natural baits
- Lower capture of non-target insects
- Controlled release lure
- Long lasting – 30 days

NOTE: When servicing PHEROCON SWD trap, pour residual liquid into container and REMOVE from area where traps are in use.

STORAGE RECOMMENDATIONS: One year in the refrigerator. DO NOT STORE IN FREEZER.

Contact your supplier, local extension agent or farm advisor for more details!

Visit our website or call toll-free:
1-866-785-1313

www.trece.com

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Are synthetic lures effective?

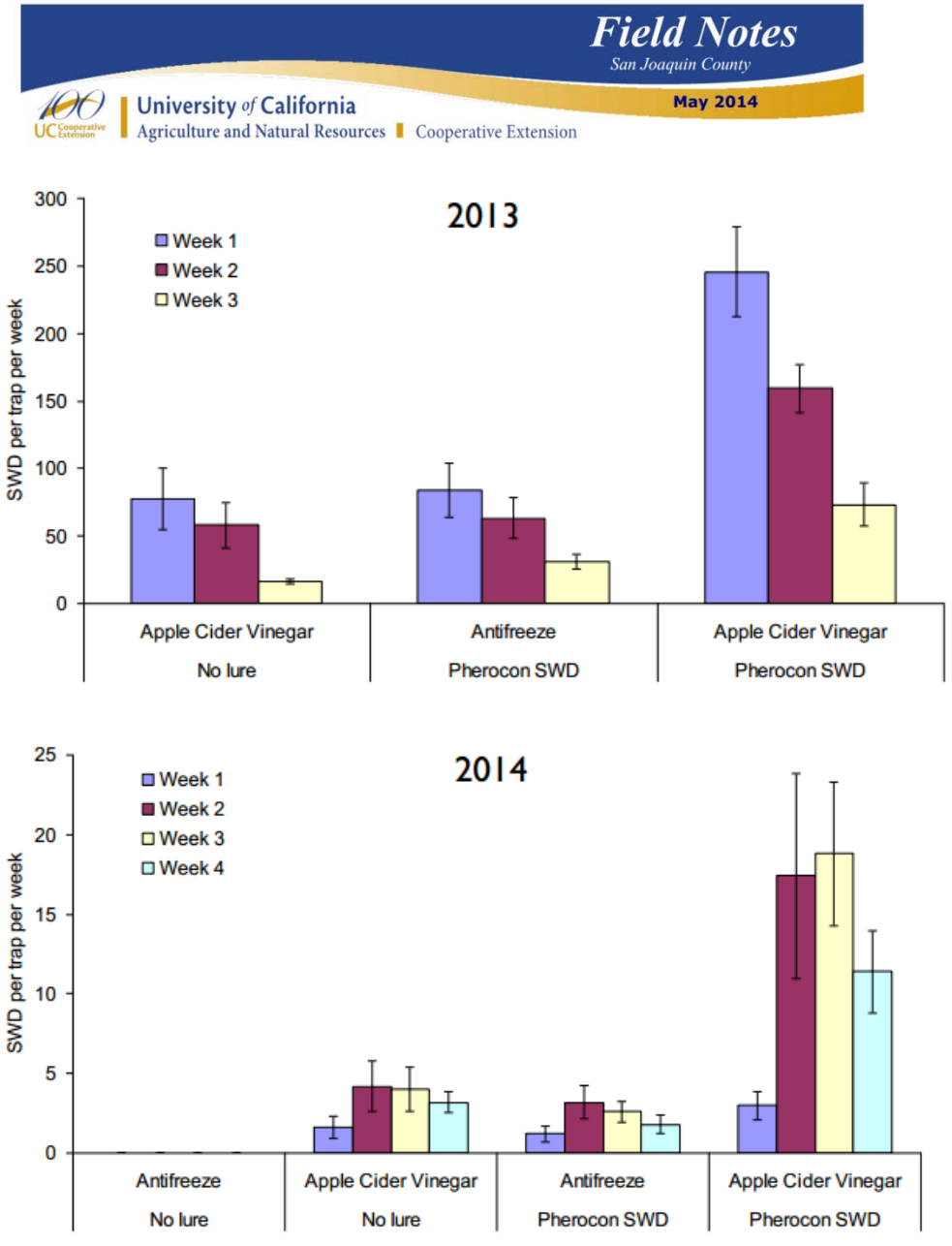


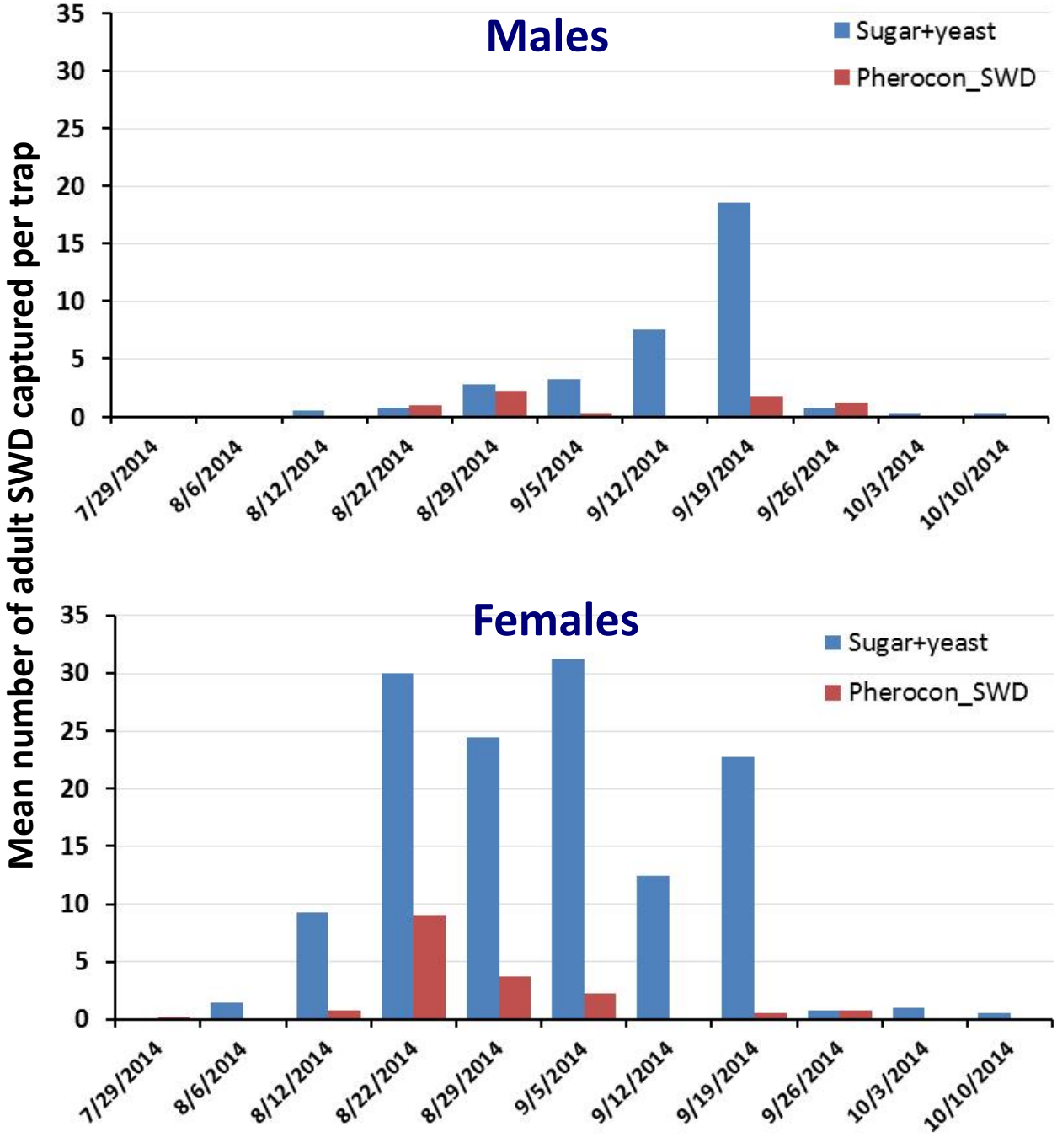
Fig. 1. Captures of SWD using apple cider vinegar, PHERO-CON® SWD, or both. Kern Co., CA, 2013-2014

Sugar / yeast versus Pherocon SWD

- ✓ Study conducted in a unsprayed elderberry plot at LU Carver farm
- ✓ Traps were deployed in pairs, about 10 ft apart on fruiting elderberry plants
- ✓ Traps were inspected once a week, all insects were taken to the lab and clean traps with new baits / lures were deployed

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**



Trap placement

Mid-May, on a Mulberry tree, at eye height, making sure the trap is not fully exposed to heat

2014 SWD monitoring system

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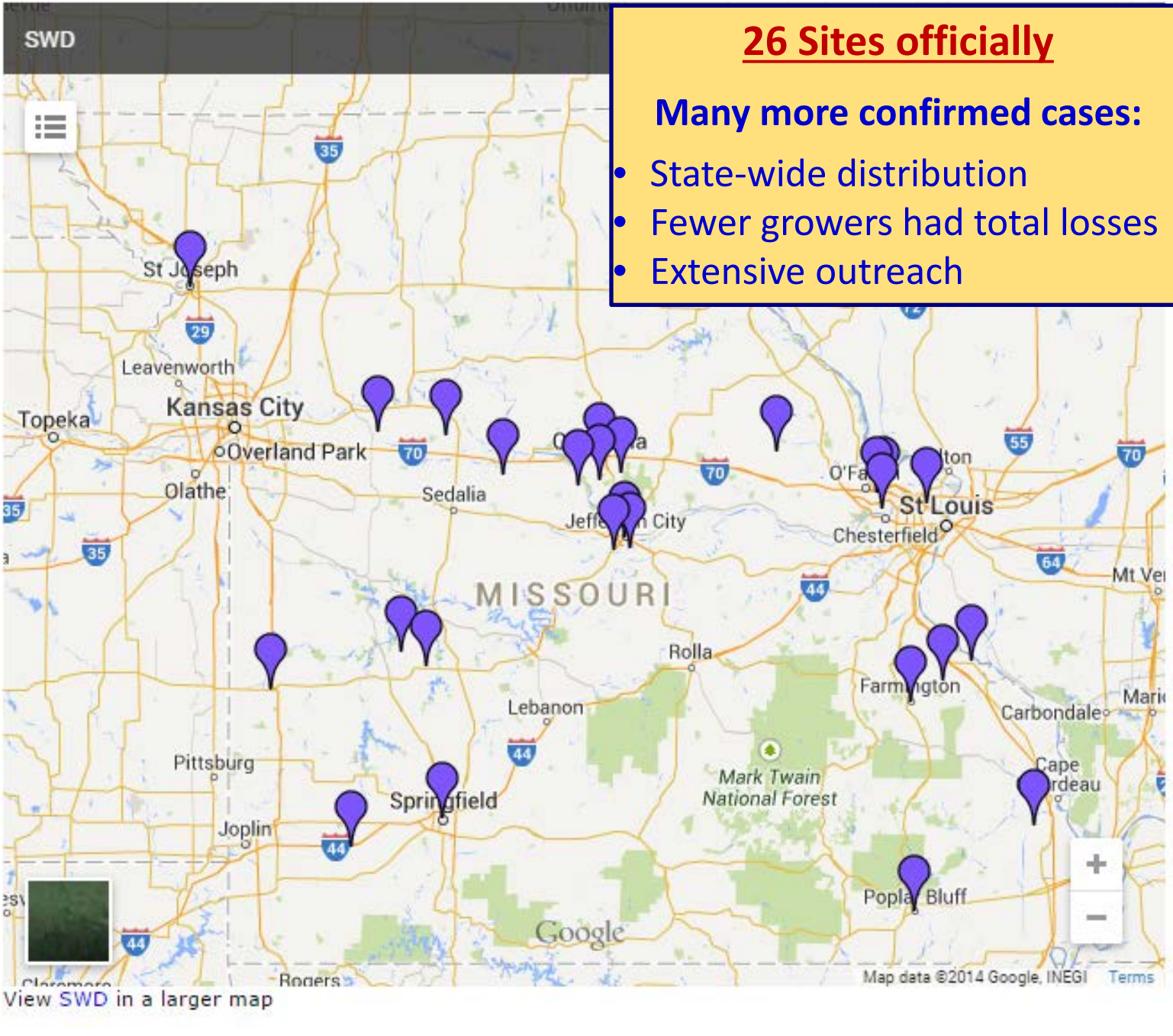
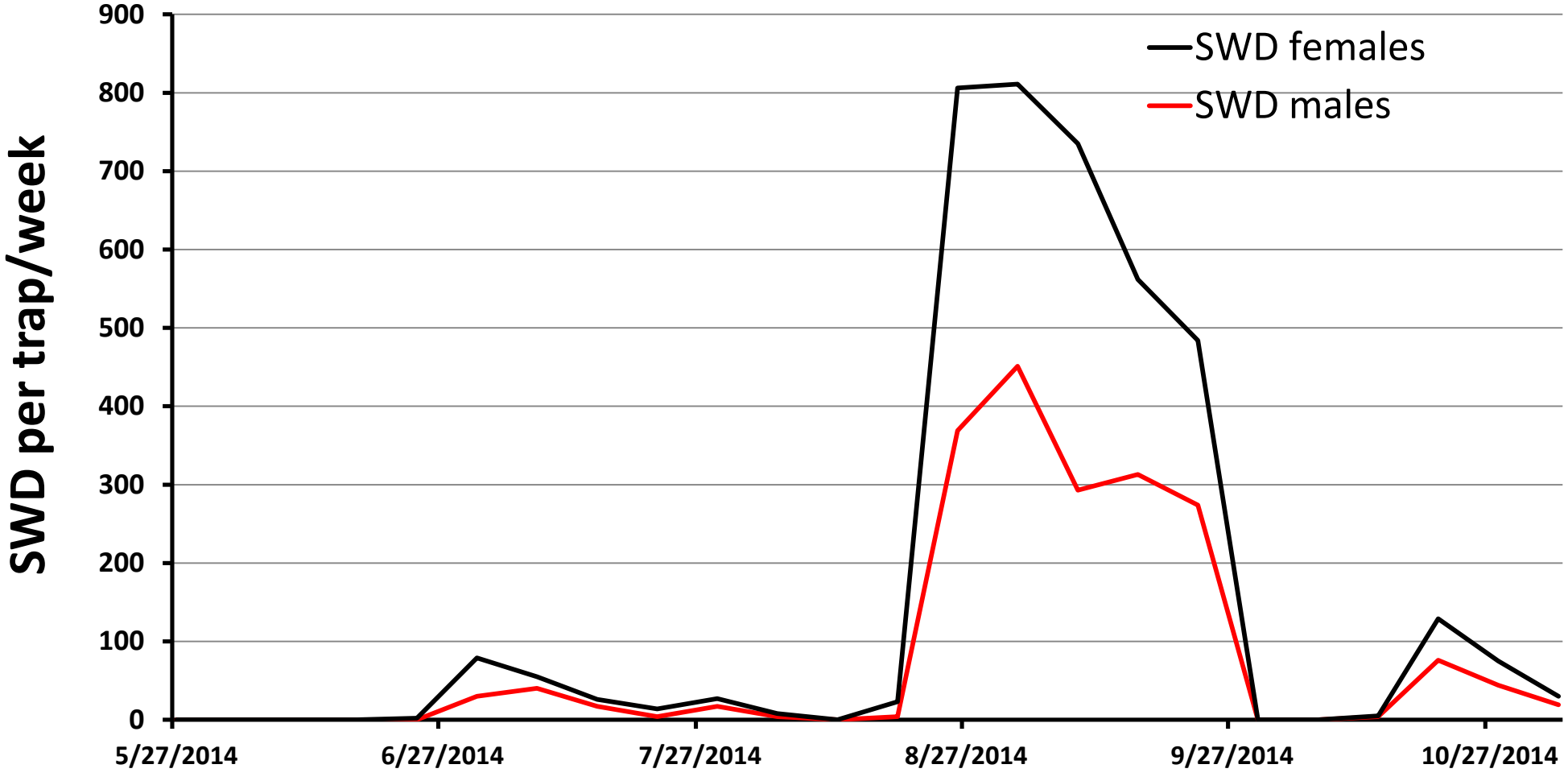


26 Sites officially

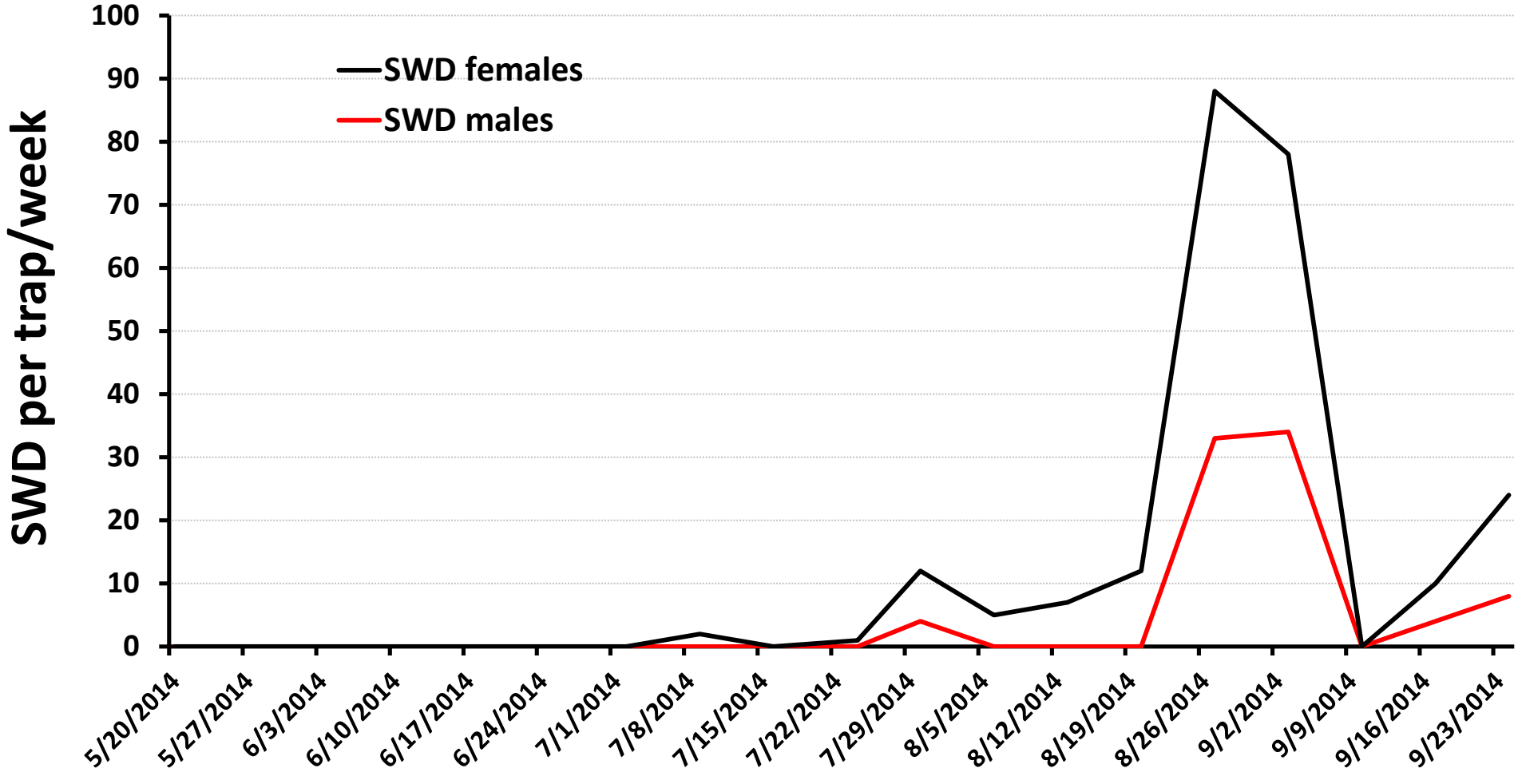
Many more confirmed cases:

- State-wide distribution
- Fewer growers had total losses
- Extensive outreach

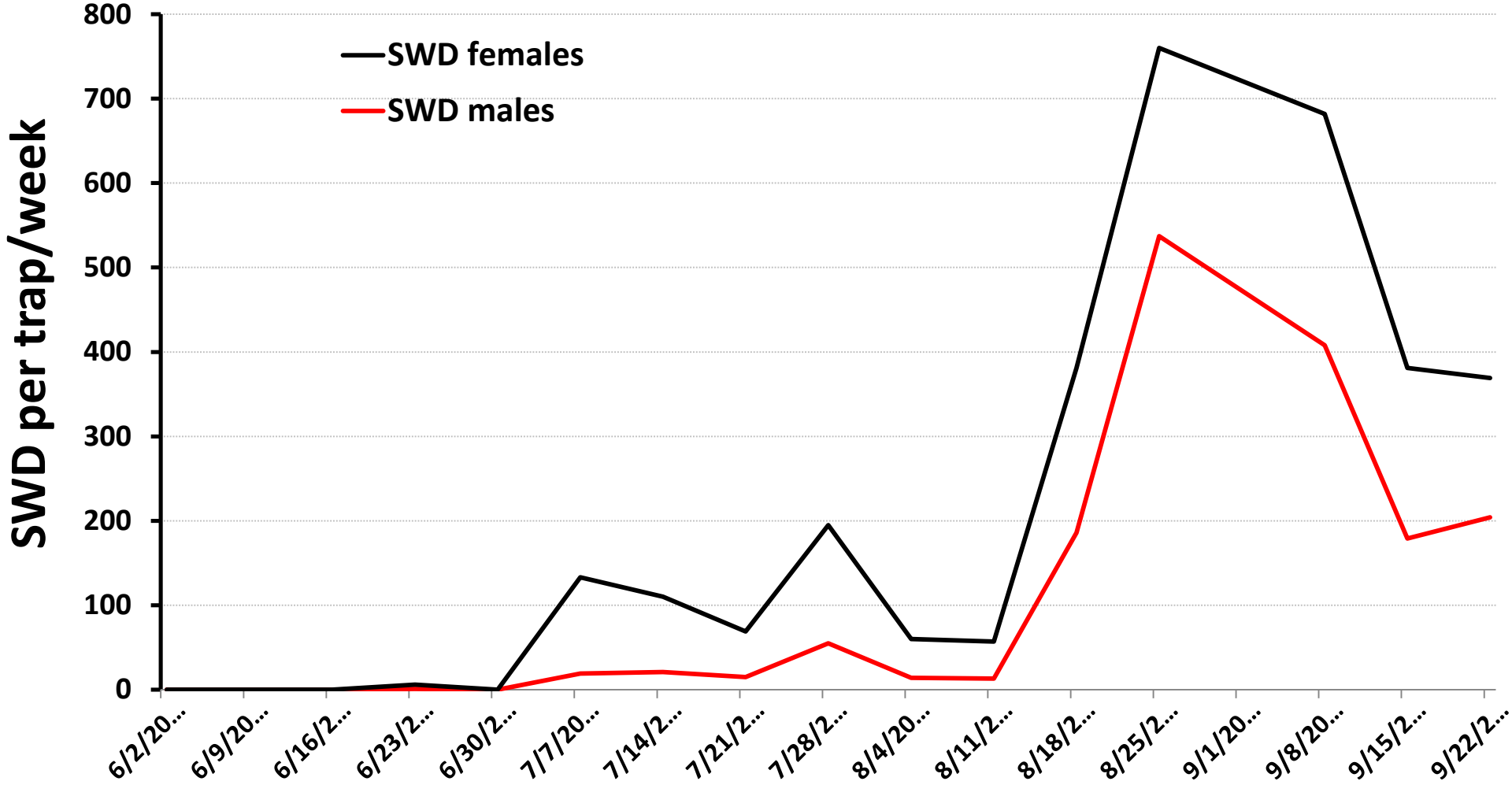
Seasonal SWD captures – St. Peters



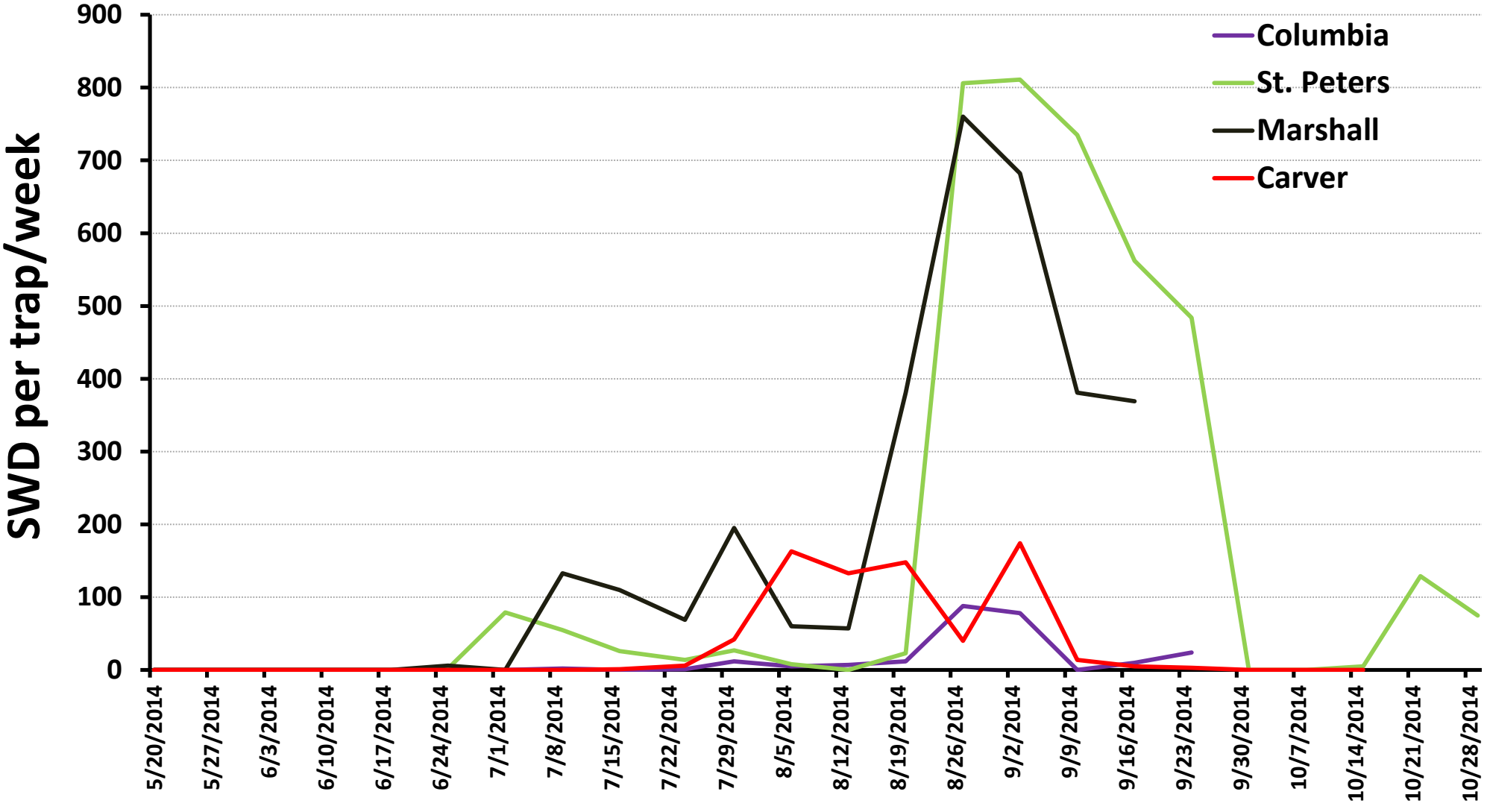
Seasonal SWD captures – Columbia



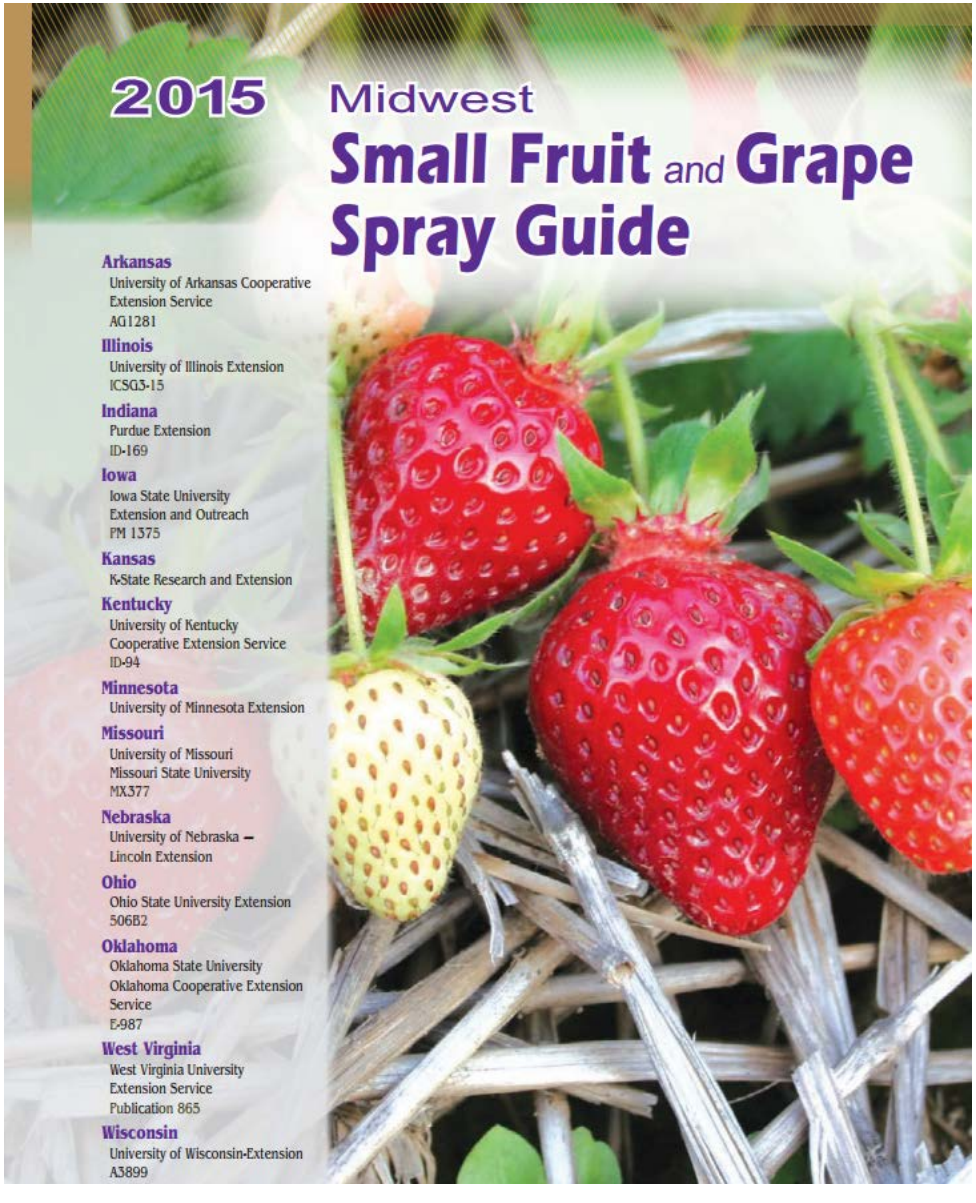
Seasonal SWD captures – Marshall



Seasonal SWD captures across 4 farms



Insecticidal options



2015 Midwest Small Fruit and Grape Spray Guide

Contents

Midwest Small Fruit Pest Management Handbook

The *Midwest Small Fruit Pest Management Handbook* is a companion publication to this spray guide that contains additional information on control strategies for small fruit diseases, insect pests, and weeds. Pesticide safety, sprayer calibration, plant nutrition, and weed identification are also covered. Copies of the publication (OSU Bul. 861) may be available from your state Extension office or from Ohio State University Extension Publications, 385 Kottman Hall, 2021 Coffey Rd., Columbus, OH 43210-1044, (614) 292-1607. It is also available from Ohioline: ohioline.osu.edu.

Legal Responsibilities for Pesticide Use

Pesticides suggested in this publication have been registered by the Pesticides Regulation Division of the Environmental Protection Agency. At the time this bulletin was published, these pesticides were registered for use as indicated on the individual product labels. These registrations can change at any time. In order to keep you informed of the latest updates on pesticide registrations, a Web version of this publication is updated regularly and can be viewed online at www.ag.purdue.edu/hla/Hort/Pages/sfg_sprayguide.aspx.

It is your responsibility as a pesticide user to read and follow all current label directions for the specific pesticide being used. The legal limitations on the use of these pesticides should be strictly observed to prevent excessive residues in or on harvested fruit. All growers should read product labels, follow directions carefully, and observe pre-harvest intervals and application rates. Some of the pesticides suggested in this publication are on the EPA Restricted Use List, and users must be certified private applicators to purchase and apply these materials.

The pesticide label is a legal document.

Check this publication online at www.ag.purdue.edu/hla/Hort/Pages/sfg_sprayguide.aspx for the most recent information concerning pesticide registrations.

Insecticidal options

GRAPE

RUP= Restricted-Use Pesticide

Table 3. Effectiveness of Pesticides for Control of Grape Insects and Mites

	Climbing cutworm	Eight spotted forester	Grape berry moth	Grape cane girdler, Grape cane gallmaker	Grape flea beetle	Grape phylloxera (foliar)	Grape root borer	Japanese beetle	Leafhoppers	Multicolored Asian lady beetle	Redbanded leafroller	Rose chafer	Spider mites	Spotted wing Drosophila, Fruitflies
Insecticides														
Actara		-	-	-	-		-	-	++	-	-	-	-	-
Admire	-	-	-	-	-	++	-	+	+++	++	-	+	-	+
Altacor	-	-	+++		-	-	-	-	-	-	+++	-	-	-
Applaud	-	-	-	-	-	-	-	-	++	-	-	-	-	-
Assail	-	-	-	-	-	++	-	++	+++	-	-	+++	-	+
Pyrethroid Baythroid, Renounce (RUP)	-	-	+++	++	++	++	-	+++	++	++	-	+++	-	+++
Belay	-	-	+	-	-	-	-	+	+++	+++	-	-	-	-
Belt	-	-	+++	-	-	-	-	-	-	-	+++	-	-	-
Pyrethroid Brigade (RUP)	-	-	++	-	++	++	-	++	++	-	-	++	-	+++
Danitol (RUP)	-	-	+++	-	-	+++	-	+++	++	-	-	-	++	+++
Spinosad – synthetic Delegate, Radiant	-	-	+++	-	-	-	-	-	-	-	+++	-	-	+++
Dibrom	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spinosad Entrust	-	-	++	-	-	-	-	-	-	-	++	-	-	++
Imidan	-	-	++	-	+	-	-	++	++	-	++	++	-	++
Intrepid	-	-	+++	-	-	-	-	-	-	-	++	-	-	-
Lorsban (RUP EC only)	-	-	-	-	-	-	++	-	-	-	-	-	-	-
Organophosphate Malathion	-	-	+	-	-	-	-	++	++	-	-	++	-	++
Pyrethroid Mustang Max	-	-	+++	++	++	++	-	+++	++	++	-	+++	-	+++

Insecticidal options

GRAPE

Drosophila (also known as fruit flies and vinegar flies), including spotted wing Drosophila	Baythroid XL (1EC)	2.4-3.2 fl oz	See Special Insect Pest Problems on page 63.
	Delegate 25WG	3-5 oz	
	Entrust 2SC organic	4-8 fl oz	
	Entrust 80 WP organic	1.25-2.5 oz	
	Imidan 70WP	1.3-2.1 lb	
	Malathion 8F	1.88 pt	
	Mustang Max 0.8EC	4.0 fl oz	

- **DELEGATE IS A REDUCED-RISK INSECTICIDE (LESS IMPACT ON BENEFICIALS)**
- Active ingredient in **DELEGATE** 25 WG is **Spinetoram**, a new chemical in the spinosyn class of insecticides. It is a semi-synthetic spinosyn discovered in modification studies of fermenting substances of *Saccharopolyspora spinosa (= spinosad)* by Dow AgroSciences LLC.
- Research done in several sates indicates that Danitol, Mustang Max, and **Delegate** performed equally well at reducing adult SWD activity and injury to blueberries.

Organic options other than Entrust

OMRI LISTED
For Organic Use

- Quick knock-down and kill
- Kills listed pests on contact or by ingestion
- Contains Pyrethrins, a botanical insecticide derived from chrysanthemums
- Kills a broad spectrum of listed insects including aphids, whiteflies, leafminers and caterpillars
- Kills larval, pupae and adult stages of listed insects

Insecticidal options

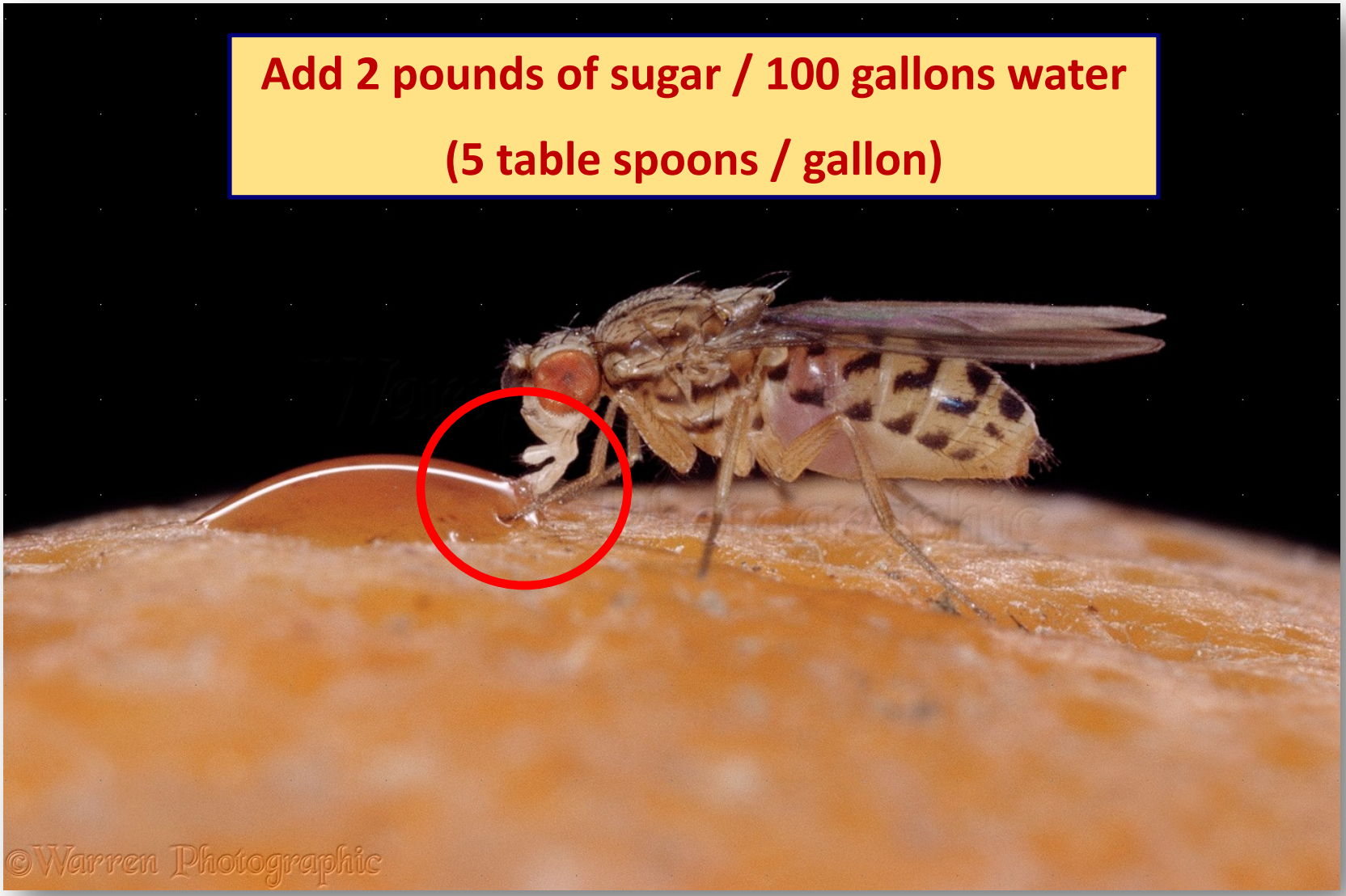
BLUEBERRY

Drosophila (also known as fruit flies and vinegar flies), including spotted wing Drosophila	Brigade WSB (10WP)	8-16 oz	See Special Insect Pest Problems on page 63.
	Danitol 2.4EC	10.7-16 fl oz	
	Delegate 25WG	3-6 oz	
	Entrust 2SC	4-6 fl oz	
	Exirel 0.83SE	13.5-20.5 fl. oz	
	Entrust 80WP	1.25-2 oz	
	Imidan 70W	1.33 lb	
	Lannate LV	1.5-3 pt	
	Lannate SP	0.5-1 lb	
	Malathion 8F	1.25 pt	
	Mustang Max 0.8EC	4.0 fl. oz	

- Active ingredient in **Exirel** (new insecticide) is Cyazypyr, from the chemical class of anthranilic diamides
- **Lannate** is a carbamate insecticide. Very acute toxicity if swallowed. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment, affects pollinators and other beneficial arthropods

How to make insecticide sprays against SWD more effective

- All fruit flies have **sponging**-lapping mouthparts, so they must feed on liquids
- Sugar is a phagostimulant (food component that induces sustained feeding)



Remember

- Read and follow inse
  They are the law!
- Select effective insec
  the crop and the pes
- Rotate insecticides a
  chemical classes

Effective IRM strateg

All effective insecticide
selection of resistance to
rotations of compounds
for insect and mite pest
group is minimised, and r

Example: MoA w

Se

Specimen Label

Dow AgroSciences™

Delegate® WG

Insecticide

®Trademark of Dow AgroSciences LLC

For control or suppression of lepidopterous larvae (worms, caterpillars), dipterous leafminers, thrips, and certain psyllids in banana and plantain, bushberries, caneberries, citrus, cranberry, dates, fig, grape, hops, pistachios, pome fruits, pomegranate, stone fruits, tree nuts, and tropical tree fruits.

Group	5	INSECTICIDE

Useful resources

Lincoln University

http://www.LU-IPM.net

MU Pest Monitoring Network

http://ipm.missouri.edu/pestmonitoring/

Michigan State University

http://www.ipm.msu.edu/invasive_species/spotted_wing_drosophila

Oregon State University

http://spottedwing.org

Cornell University

http://www.fruit.cornell.edu/spottedwing/

PennState University

http://extension.psu.edu/plants/vegetable-fruit