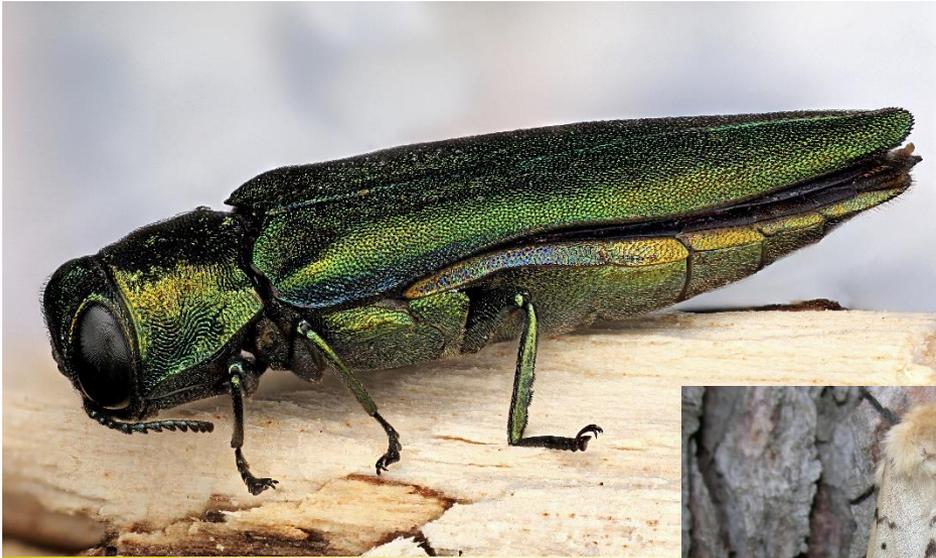


# Developing a First Detector Network for Utah



Lori Spears  
Cooperative Ag Pest Survey Coordinator  
Utah State University

Utah's First Detector Program is a response to the need to address the growing threat of invasive species



# The goal is to create a group of well-trained, committed volunteer leaders

- Assist federal and state partners with screening potential pest sightings
- Increase public awareness about the threats of invasive pests to Utah's agricultural and natural resources
- Help coordinate local volunteer efforts



# Project Objectives

1. Develop a Utah First Detector Network (UFDN) website
2. Produce invasive pest outreach materials
3. Provide a First Detector workshop to existing Master Gardeners

Future activities may include First Detector newsletters summarizing local and/or national news, volunteer surveys, online interactive modules, hands-on workshops, and youth education activities.



# First Detector Guide to **Invasive Insects**

Biology, Identification, & Monitoring

EXTENSION   
UtahStateUniversity



<b>9:00-9:15</b>	<b>Welcome and Opening Remarks</b>
9:15-9:45	Utah First Detectors: Roles and Responsibilities
9:45-10:15	Partner Agencies and their Roles
10:15-10:30	Break
10:30-11:15	Brown Marmorated Stink Bug
11:15-12:00	Japanese Beetle and Gypsy Moth
12:00-1:00	Lunch with opportunity for open discussion
1:00-2:30	Emerald Ash Borer and Asian Longhorned Beetle
2:30-2:45	Break
2:45-3:30	Hands-on Exercises (e.g., bark peeling)
3:30-4:00	Evaluations and Wrap Up

# Minnesota's Forest Pest First Detector Program

- Since 2008, over 970 participants have been trained.
- The program worked as intended in identifying the first find of EAB, and several other pests, in Minnesota.
- \$80,000 USD in public value annually.
- This successful program is being replicated in several other states.





**Brown Marmorated  
Stink Bug**

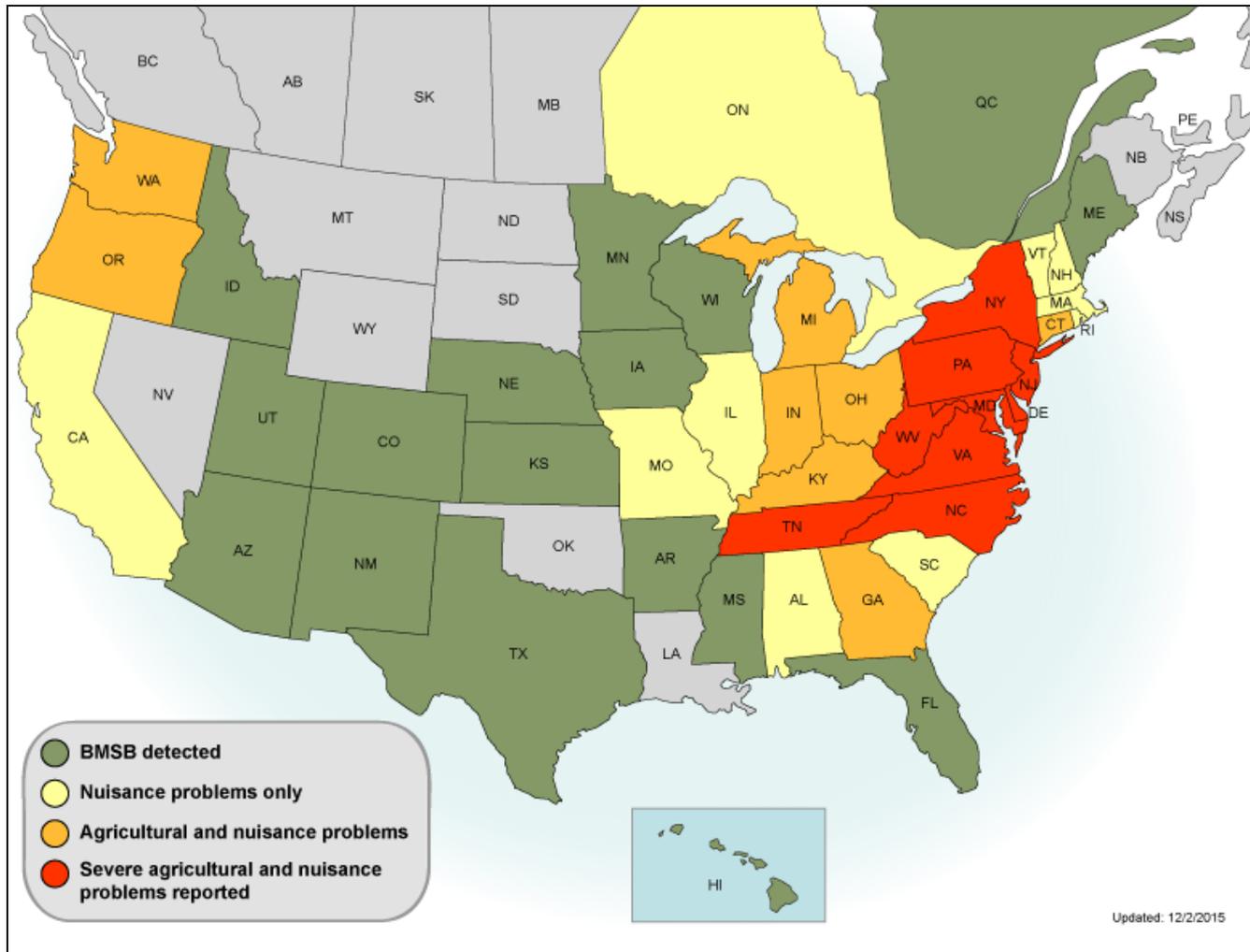
# Brown Marmorated Stink Bug

*Halyomorpha halys*

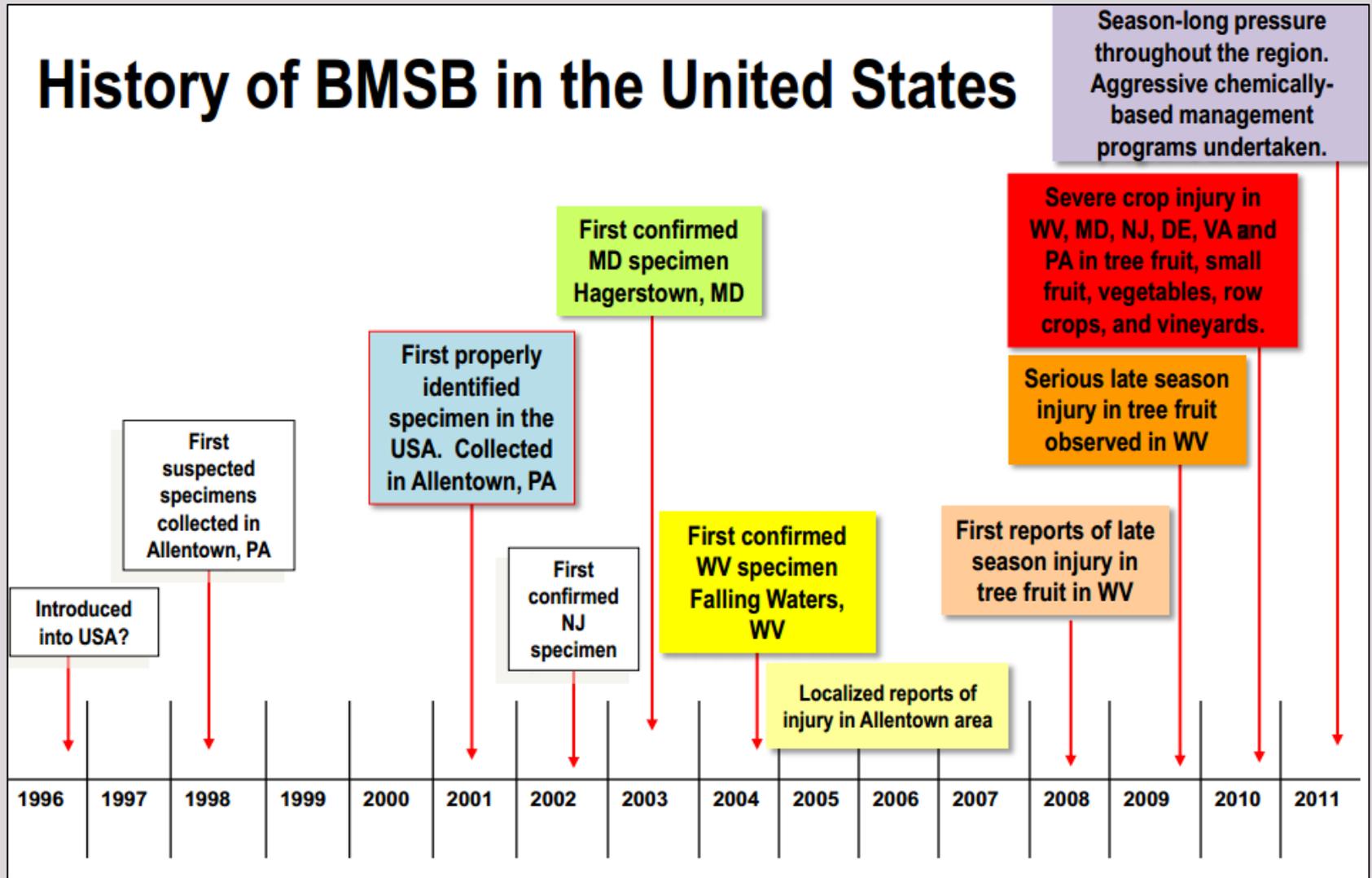
- A highly invasive crop pest
  - First detected in PA in late 1990s
  - Has since spread to 42 states
  - Introduced to Utah in 2012
- Nuisance in urban landscapes
- Potential to damage many crops



# Current Distribution



# History of BMSB in the United States





# BMSB Feeding

- Piercing-sucking mouthparts
  - Physical damage
  - Secondary infections
- Feed on vegetative and reproductive plant structures – even some woody tissue
- Attacks 100+ plant species



# BMSB Damage

## (Tree Fruits)

- Early season feeding causes **misshapen** fruit
- Late season feeding causes depressions on the fruit surface and “**corking**” just below the fruit surface
- Internal damage can be present even when external damage is not detectable



# BMSB Damage

## (Vegetables)



Fig. 5. Severe infestations of brown marmorated stink bug can result in total loss of fruiting vegetable crops.



Fig. 6. Brown marmorated stink bug feeding scars on tomato fruit.



Fig. 7. Spongy area left by stink bug feeding on bell pepper.

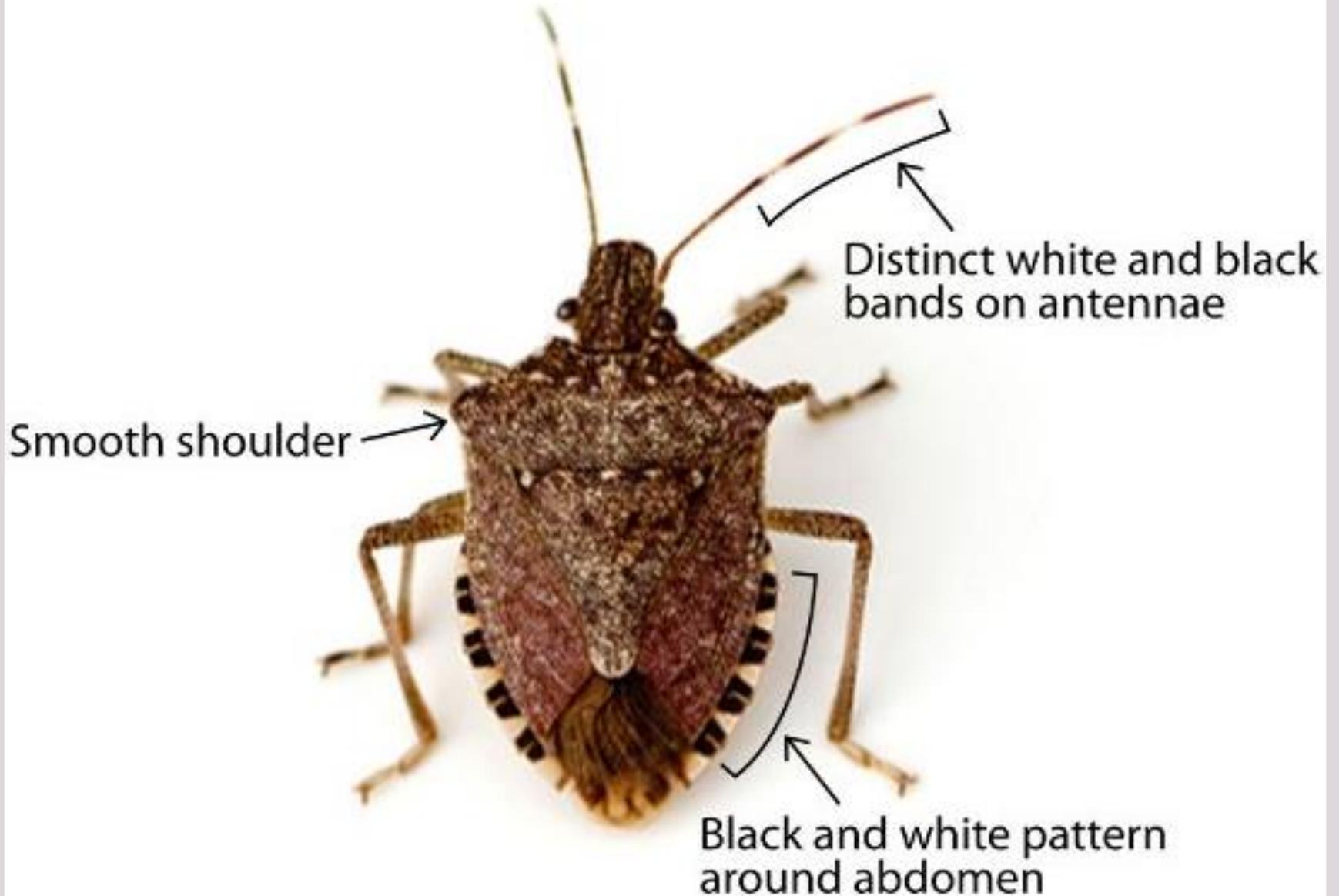


Fig. 8. Brown marmorated stink bug feeding scars on bell pepper.





# Brown Marmorated Stink Bug (*Halyomorpha halys*)



Blunt face



Points visible on long face



**Brown Marmorated**

***Brochymena* sp.**

***Chlorochroa* sp.**

**Conspere**

# Life History and Biology

- Eggs laid under leaves in clusters
- 1<sup>st</sup> instars feed on egg mass
- 2<sup>nd</sup> instars disperse from host plant
- Developmental period from egg to adult lasts ~50 days



28 eggs



“red ring”



1<sup>st</sup> instars



2<sup>nd</sup> instars

# Life History and Biology

Nymphs (5 stages)

Winged adults



2

3

4

5



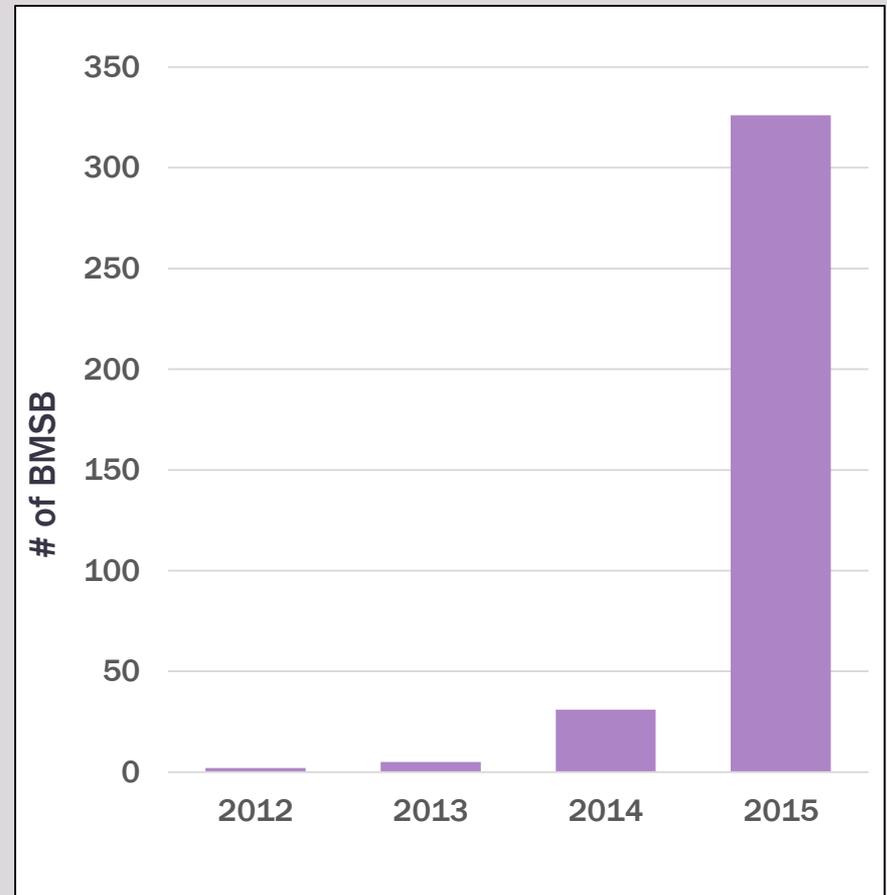
male

female

**All except stage 1 are damaging**

# BMSB is here and most likely will be an important and **serious threat** to Utah's agriculture

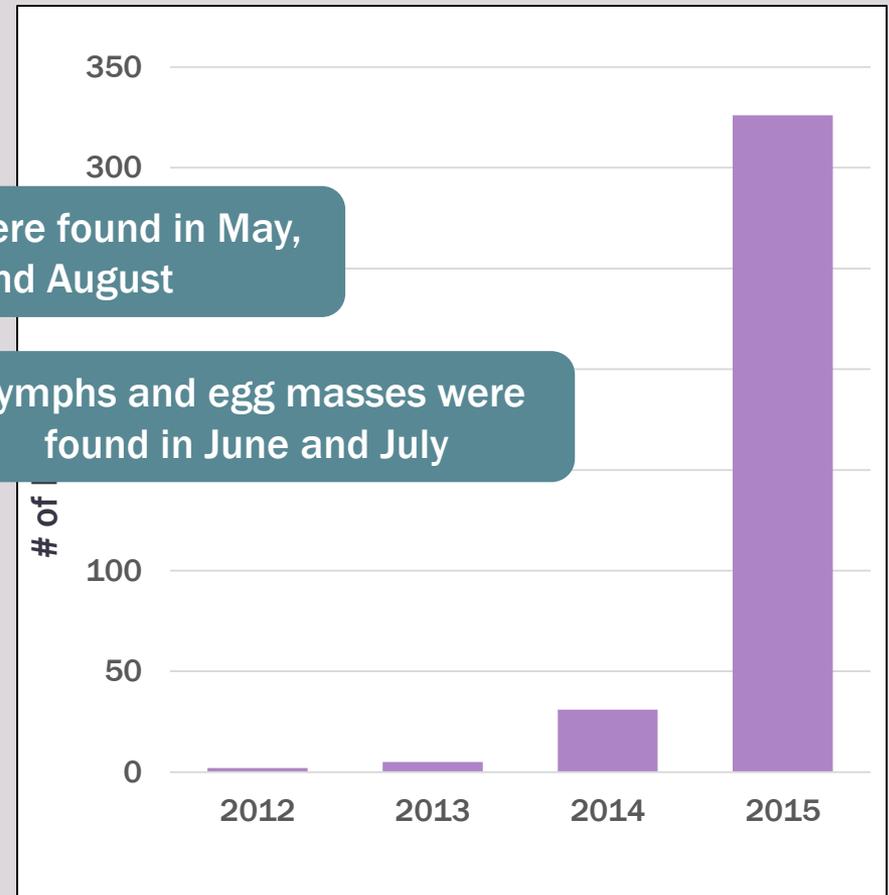
- New county detections
  - Salt Lake (2012)
  - Utah (2013)
  - Davis (2015)
  - Weber (2015)
  - Cache (2016)
- Massing adults and breeding populations\*



It is unclear how BMSB captures relate to density or damage potential

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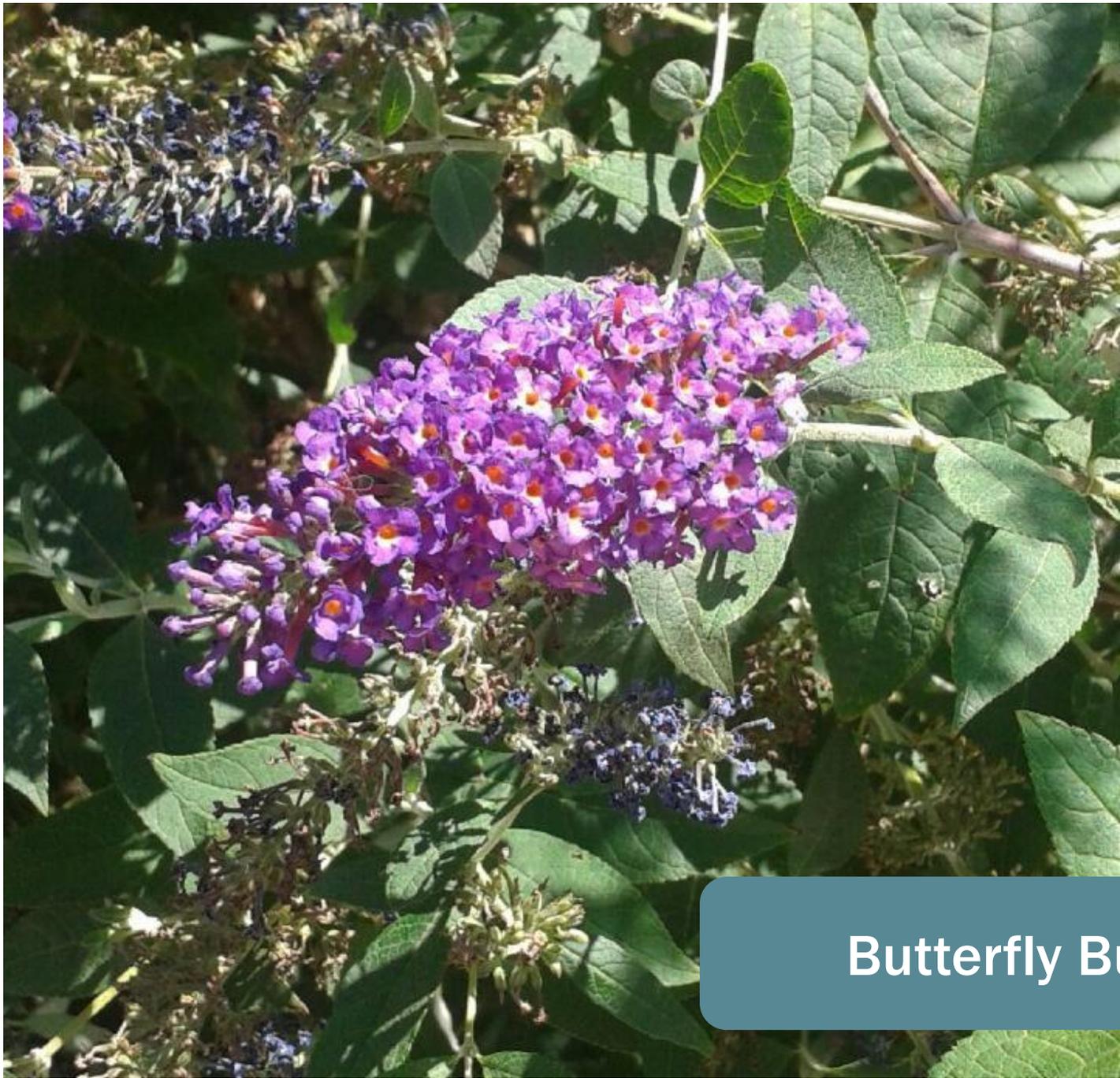
Honeysuckle



**Downy Japanese Maple**



**Siberian Peashrub**



**Butterfly Bush**



Catalpa



HOME » WHERE IS BMSB? » Host Plants

## Host Plants of the Brown Marmorated Stink Bug in the U.S.

[Print this page](#)

A publication of the Brown Marmorated Stink Bug IPM Working Group in conjunction with the Northeastern IPM Center

### Contributing authors (in alphabetical order):

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Brown marmorated stink bug adults feeding through the bark of an elm tree (*Ulmus* sp.) (photo: M. Raupp)

Since its initial discovery in eastern Pennsylvania in the mid-1990s, the invasive brown marmorated stink bug (BMSB, *Halyomorpha halys* [Heteroptera: Pentatomidae]) has become a conspicuous insect in residential areas and farms in the mid-Atlantic U.S. As part of several ongoing research projects, entomologists have been observing which plants this insect typically uses for food and reproduction in its new environment. BMSB is a tree-loving bug but has a very broad host plant range. We have observed it on hundreds of plant species in Delaware, Maryland, New Jersey, North Carolina, Oregon, Pennsylvania, Virginia, and West Virginia.

In the spring, BMSB adults emerge from overwintering sites and become active during warm sunny days. During this time, adult bugs can be found on virtually any plant that exposes them to the sun. Trees, shrubs, and ornamental plants that are near BMSB overwintering shelters often serve as the best places to observe early bug activity. Tall plants and trees tend to have more bugs on them than plants lower to the ground. As adult bug activity increases throughout the month of May and as mating, egg laying, and nymphal development occurs throughout the summer, BMSB can be found on a wide range of plant species (Table 1). Plants bearing reproductive structures, such as fruiting bodies, buds, and pods, tend to have more bugs than plants without these parts. Furthermore, BMSB prefers certain species of plants more than others, often at particular times during the growing season. These plants, listed in boldface in Table 1, may provide the most suitable habitat and/or nutrition for BMSB. The list of host plants for this bug will undoubtedly grow as the pest spreads to new regions.

**Table 1.** Plants hosting BMSB adults and immature stages in the United States. Plant species in bold represent those with the highest densities of bugs in a given habitat.

Habitat*	Genus	Species	Common Name	Image
Orn.	<i>Abelia</i>	<i>× grandiflora</i>	glossy abelia	
Agric.	<i>Abelmoschus</i>	<i>esculentus</i>	okra	
Orn.	<i>Acer</i>	<i>buergerianum</i>	trident maple	
Orn.	<i>Acer</i>	<i>circinatum</i>	vine maple	
Orn.	<i>Acer</i>	<i>japonicum</i>	Amur (Japanese Downy) maple	
Orn.	<i>Acer</i>	<i>macrophyllum</i>	bigleaf maple	
Orn.	<i>Acer</i>	<i>× tegmentosum</i>	Manchurian snakebark maple	





**Sunflower**



**Tree of Heaven**

# BMSB: A Serious Threat to IPM

- Can be difficult to manage
  - Movement between habitats
  - Cryptic, difficult to sample
  - Poor response to insecticides
  - Can reinvade fields following treatment



# Assess the status of biological control of BMSB in northern Utah from native natural enemies and *T. japonicus*

- *Trissolcus japonicus*
  - > 50% egg parasitism in China
  - Low levels of parasitism in the U.S. (~4%)
  - Found in Maryland, Virginia and Washington
- Fungal pathogens
- Other natural enemies



# Acknowledgments

**USDA-ARS-NIFA SCRI Planning Grant  
2014-51181-22514**



United States Department of Agriculture  
National Institute of Food and Agriculture



Utah Department of  
**Agriculture**  
and Food



**EXTENSION**  
UtahStateUniversity



ANY  
QUESTIONS  
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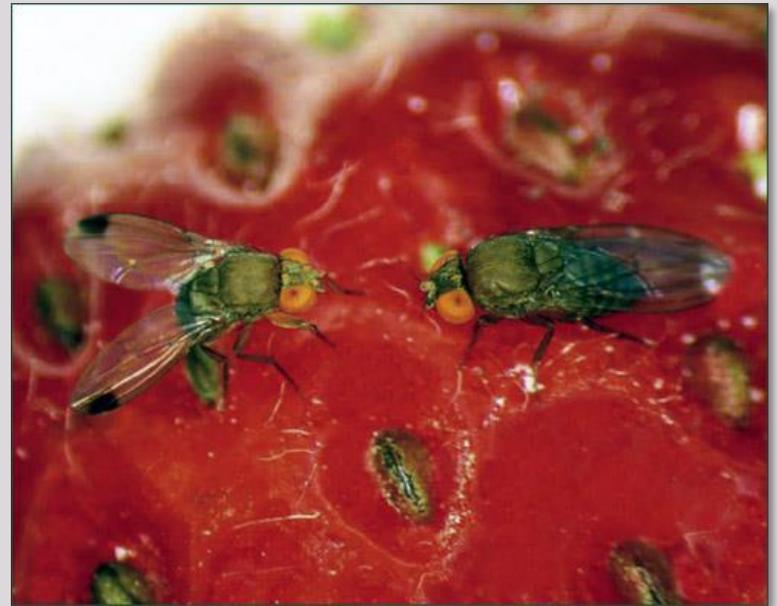


Spotted Wing Drosophila

# Spotted Wing Drosophila

(*Drosophila suzukii*)

- Native to southeast Asia
  - First detected in CA in 2008
  - Introduced to Utah in 2010
- Most *Drosophila* spp. attack overripe and rotting fruit
- SWD preferentially infests ripening and ripe fruit



## All Years

Year	Total # of SWD	1 <sup>st</sup> trap capture	County
2010	73	Aug 18	Davis
2011	61	Sep 8	Davis
2012	16	Sep 17	Davis
2013	23	Sep 25	Davis
2014	3582	Jun 2 / Aug 12	6 counties
2015	6917**	Jul 20	6 counties



African Fig Fly

# African Fig Fly

*(Zaprionus indianus)*

- Native to Africa, the Middle East, and Eurasia
  - Found in Central America
  - First detected in Florida in 2005
  - Detected in Utah in 2015
- Can be distinguished by their “prominent racing stripes”
- Lays eggs in overripe or previously damaged fruit

