

# **New Invaders in Idaho: Japanese Beetle, Brown Marmorated Stink Bug, Elm Seed Bug and Spotted Wing Drosophila**



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Japanese Beetle





# Japanese Beetle (*Popillia japonica*)

- Scarab beetle native to Japan; found in NJ nursery in 1916.
- Polyphagous; feeds voraciously as both larva and adult.
- **JB grubs** feed on organic matter in the soil and on the roots of grasses, including turf grass.
- **JB adults** attack both foliage and fruit of more than 300 host plants.
  - Adults skeletonize the foliage.
  - Adults typically aggregate on preferred host plants.





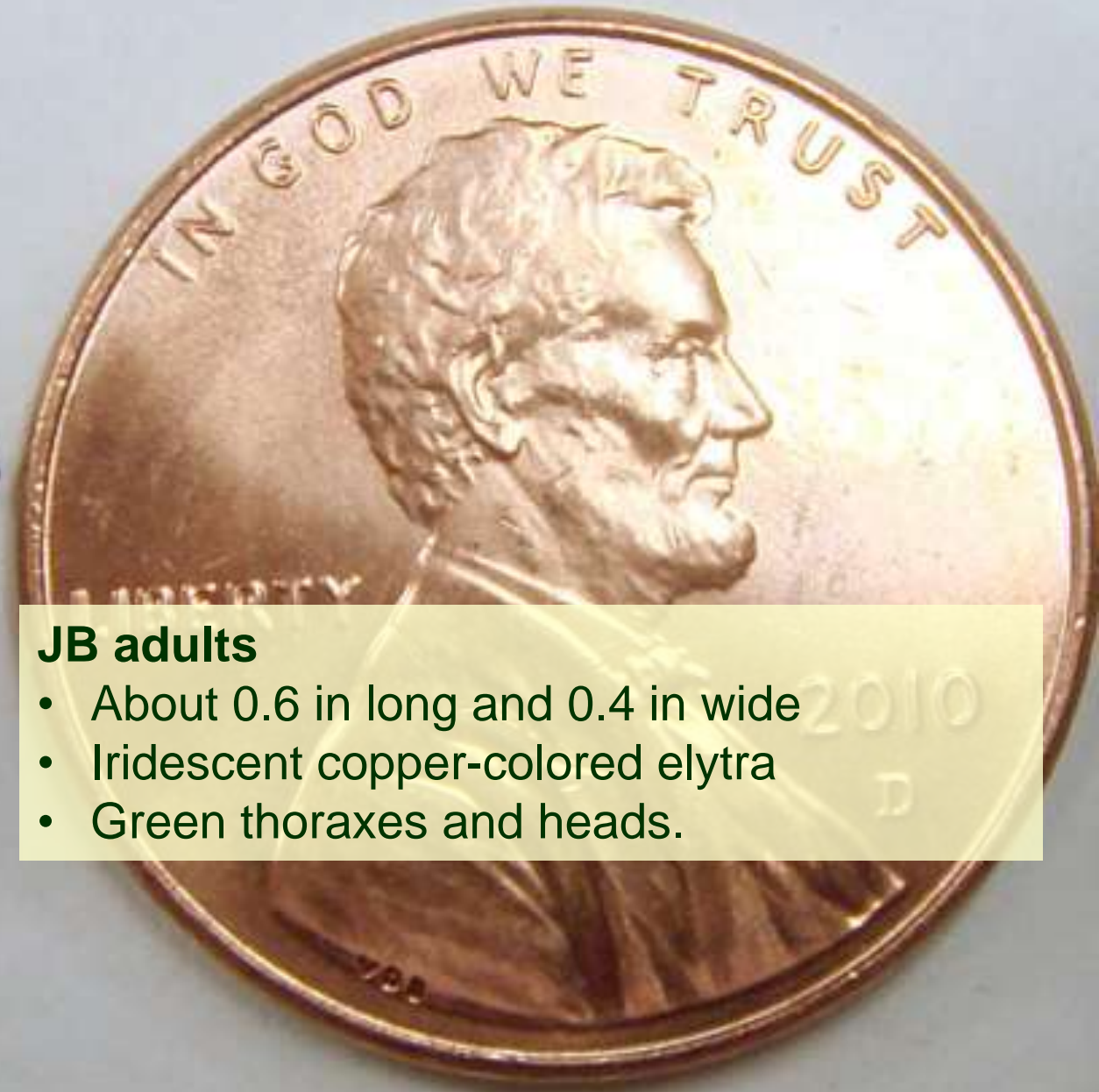


# JAPANESE BEETLE



## **JB adults**

- About 0.6 in long and 0.4 in wide
- Iridescent copper-colored elytra
- Green thoraxes and heads.



Adults emerge from late June throughout the summer.

They feed on foliage and mate during the day.

In spring, grubs migrate upward and resume feeding on plant roots. In early summer, grub pupates in arthen cell in ground.

Females excavate soil cavities several inches into the soil and lay egg masses.

Mature grubs overwinter in soil beneath frost line

Life cycle is generally one year (can be 2 years in northern areas).





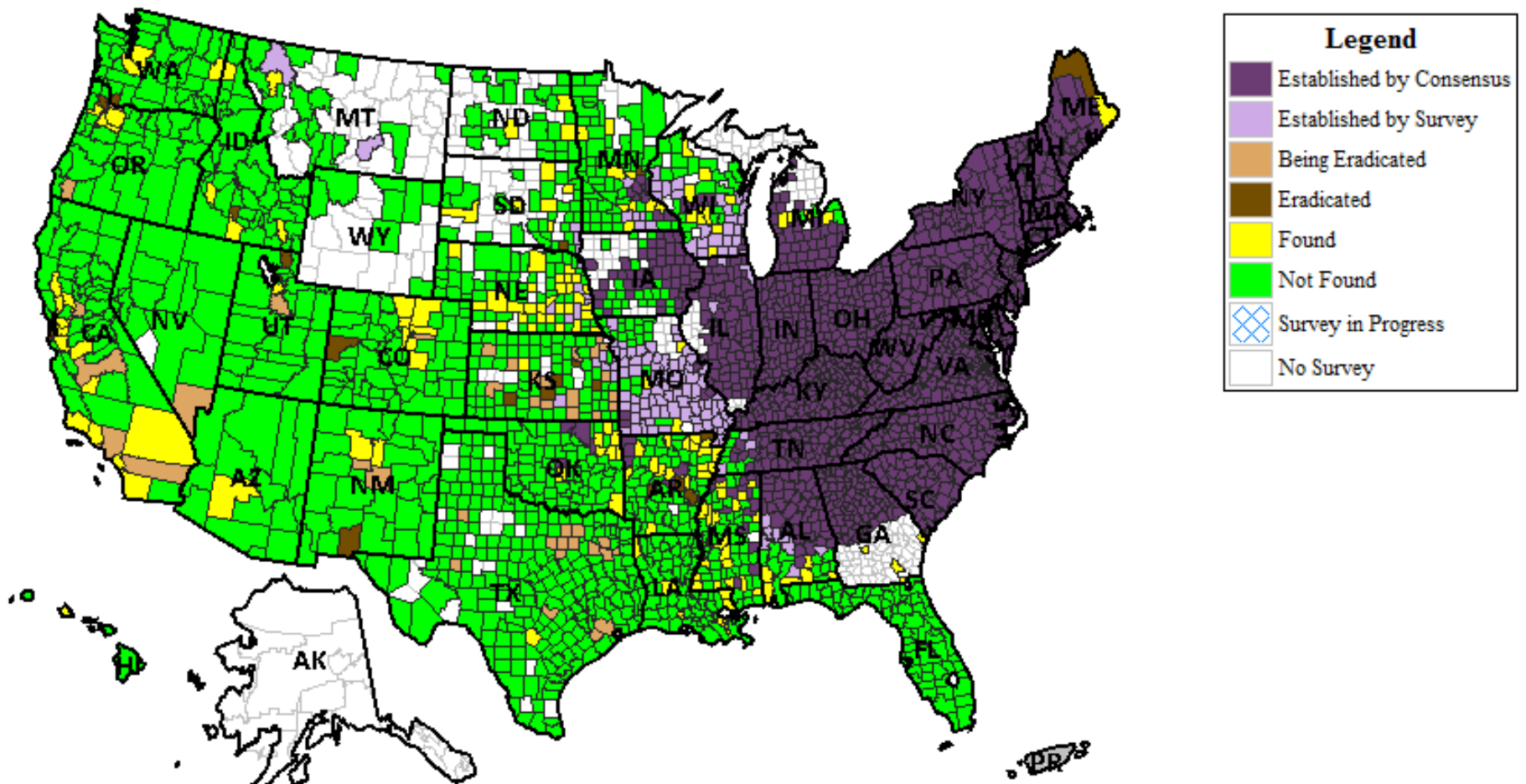
# Preferred hosts for Japanese Beetle

| <b>Plant</b>                       | <b>Common name</b>                                       | <b>Family</b> |
|------------------------------------|--|---------------|
| <i>Juglans nigra</i>               | <b>Black walnut tree</b>                                 | Juglandaceae  |
| <i>Abutilon hybridum</i>           | <b>Chinese lantern or parlour maple</b>                  | Malvaceae     |
| <i>Acer palmatum</i>               | <b>Japanese maple</b>                                    | Aceraceae     |
| <i>Acer platanoides</i>            | <b>Norway maple tree</b>                                 | Aceraceae     |
| <i>Alcea rosa</i>                  | <b>Hollyhock</b>   | Malvaceae     |
| <i>Arbutus unedo</i>               | <b>Strawberry Tree, Apple of Cain, or Cane Apple</b>     | Ericaceae     |
| <i>Bauhinia variegata</i>          | <b>Orchid tree</b>                                       | Fabaceae      |
| <i>Castanea dentata</i>            | <b>American chestnut tree</b>                            | Fagaceae      |
| <i>Larix occidentalis</i>          | <b>Western larch</b>                                     | Pinaceae      |
| <i>Malus domestica</i>             | <b>Apple tree</b>  | Rosaceae      |
| <i>Podocarpus macrophyllus</i>     | <b>Japanese yew, yew pine, southern yew</b>              | Podocarpaceae |
| <i>Populus nigra</i>               | <b>Black poplar tree</b>                                 | Salicaceae    |
| <i>Parthenocissus quinquefolia</i> | <b>Virginia creeper, five-leaved ivy, or five-finger</b> | Vitaceae      |

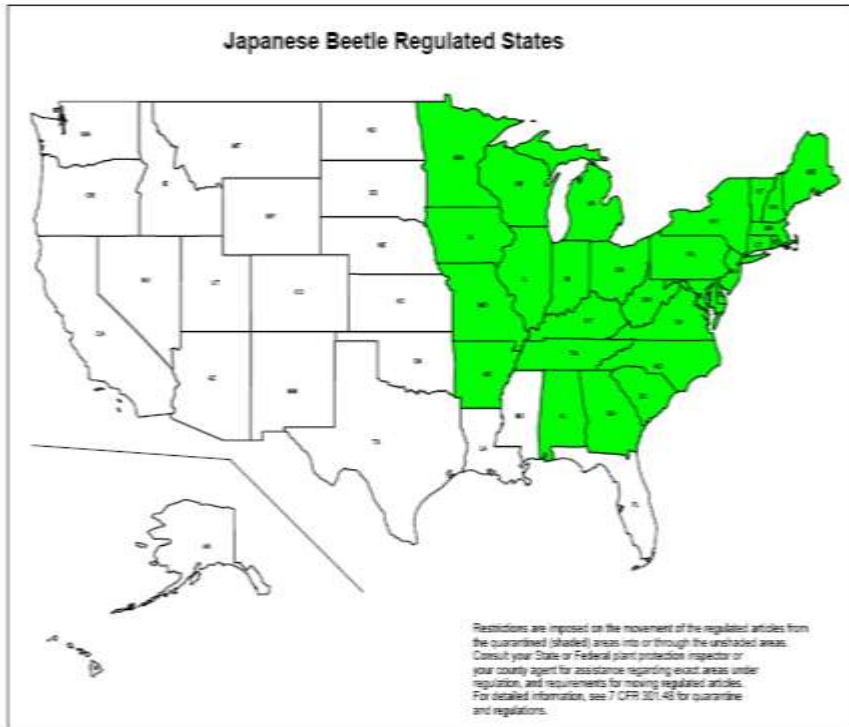
|                          |  |                                      |
|--------------------------|--|--------------------------------------|
| <i>Prunus domestica</i>  | <b>Plum tree</b>                             | Rosaceae                             |
| <i>Quercus palustris</i> | <b>Pin oak tree</b>                          | Fagaceae                             |
| <i>Rosa</i>              | <b>Wild rose</b>                             | Rosaceae                             |
| <i>Rubus</i>             | <b>Raspberries, blackberries, dewberries</b> | Rosaceae                             |
| <i>Sorbus americana</i>  | <b>Mountain ash tree</b>                     | Rosaceae                             |
| <i>Tilia</i>             | <b>Linden, basswood trees</b>                | Malvaceae<br>(formerly<br>Tiliaceae) |
| <i>Ulmus americana</i>   | <b>American elm tree</b>                     | Ulmaceae                             |
| <i>Vitis</i> spp.        | <b>Grapevine</b>                             | Vitaceae                             |
| <i>Zea mays</i>          | <b>Corn</b>                                  | Gramineae                            |
| <i>Zinnia elegans</i>    | <b>Zinnia</b>                                | Asteraceae                           |

JB is established throughout the eastern U.S. and parts of Canada. Intermittent populations occur in the western U.S.

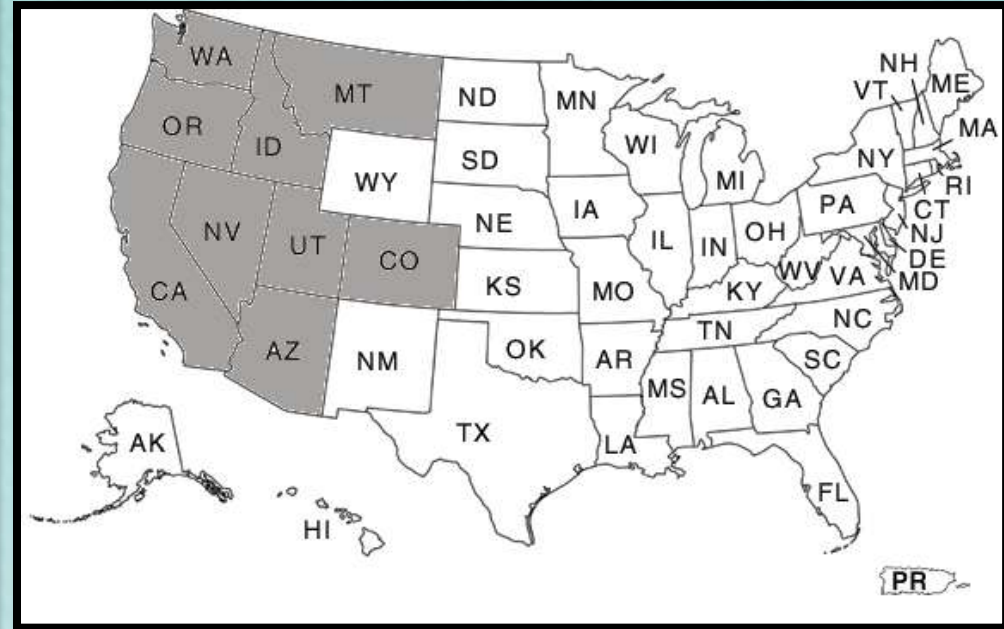
Survey Status of **Japanese Beetle** - *Popillia japonica*  
All years



## Regulated Eastern states



## Western states protected by the JB Quarantine



- To protect uninfested areas, **cooperative Federal/State regulatory programs** have been operating for many years to prevent artificial spread by aircraft.



# History of JB in Idaho

- ISDA began trapping in 1990.
- Routinely deploy 200-300 traps/year.
- Traps are concentrated at nurseries and other high risk areas.
- Although traps are set at ID airports, all UPS/Fedex/USPS flights from regulated states go through other states first.



Single specimens of JB were found in or near Idaho nurseries in:

- Ada County in 1992
- Gooding County in 1997
- Twin Falls County in 2011.



# 2012

**July 30, 2012**

Two detections in Boise from routine traps:

- One adult male at city park (rose garden) near downtown area.
- One adult male at retail nursery on west side of city.
- Finds were ~5.5 miles apart.



# Delimiting Summer 2012

- Started the first week of August.
- Three delimit blocks were set up in the Boise area.
- In each, 49 traps were set per square mile block.

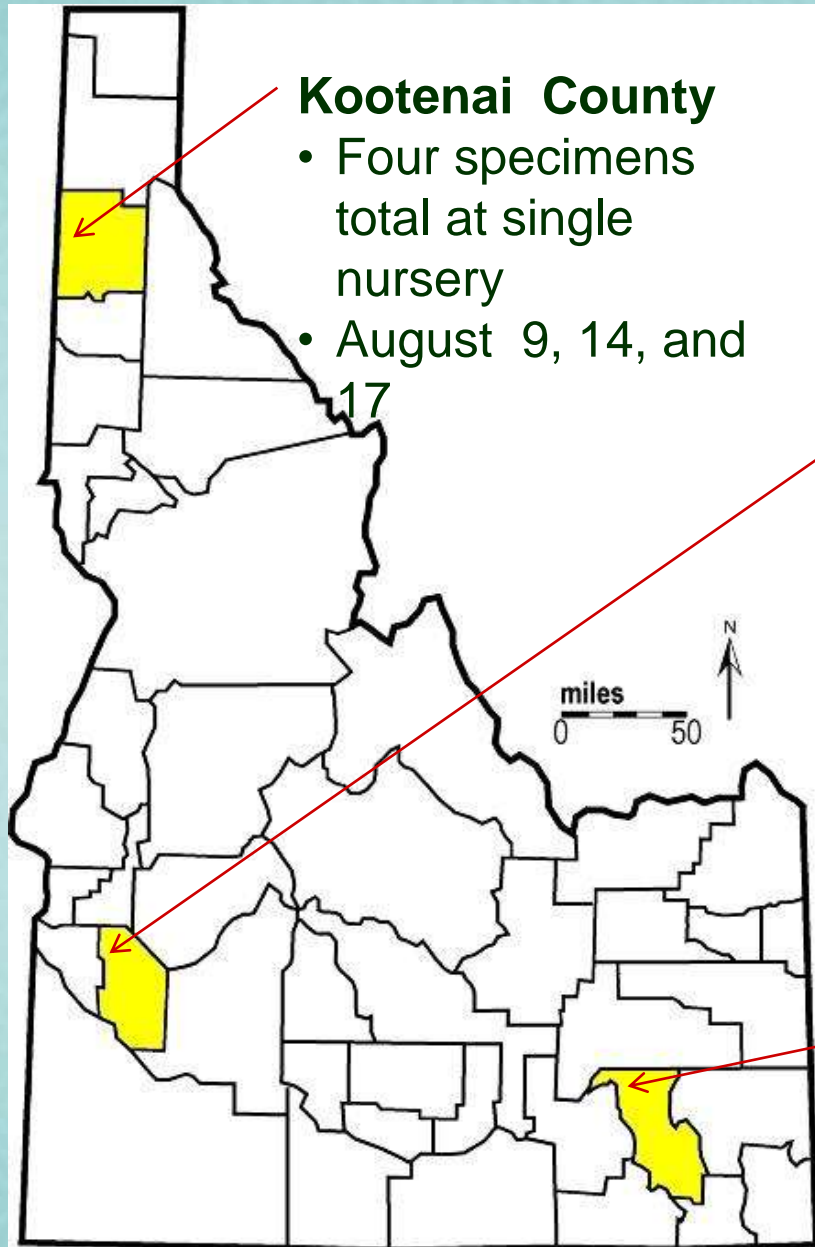


Ten additional traps were placed around the affected nursery in Kootenai County.



# 2012

## Finds of Japanese beetle in Idaho in 2012 by county.



### **Kootenai County**

- Four specimens total at single nursery
- August 9, 14, and 17

### **Ada County**

- 50 specimens total
  - 29 in residential neighborhoods
  - 15 in city parks
  - 6 at single nursery
- August 11 – September 12

### **Bannock County**

- One specimen total at single nursery
- August 24

# Treatment

## **Julia Davis Park- Rose Garden and Pioneer Cemetery**

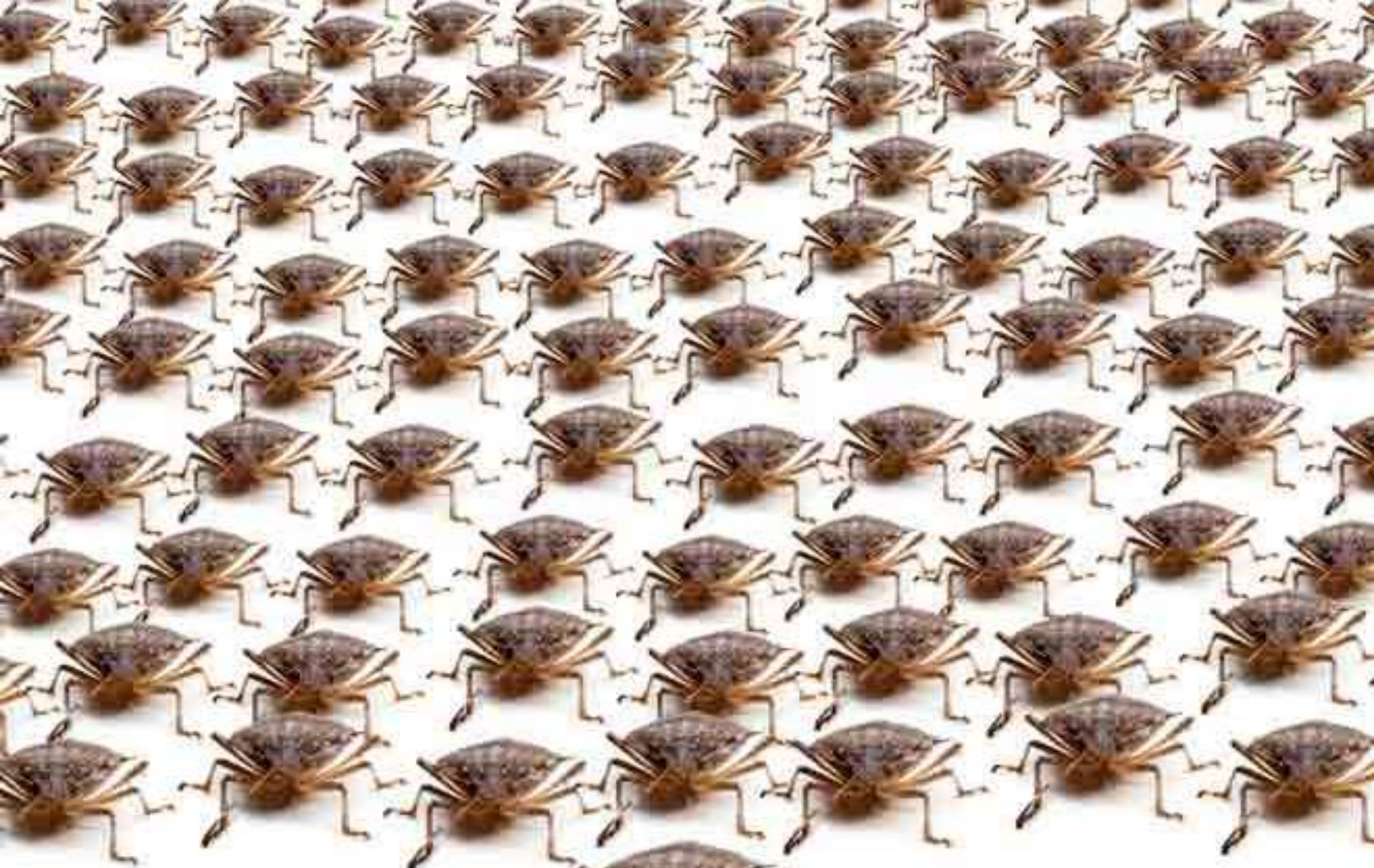
- Ground application of **imidacloprid** on August 10
  - Follow-up application on August 14
- Foliar application of **B-cyfluthrin (Tempo)** on all roses/host material on August 13.
  - Follow-up applications done every 2 weeks through September 24

## **Julia Davis Park- Paddle Boat area**

- Ground application of imidicloprid on August 30 for (Based on new find of female JB on 8/15)

*As of 9/6/12, Boise city foresters were considering treating other areas near positive finds.*





**Brown Marmorated Stink Bug**

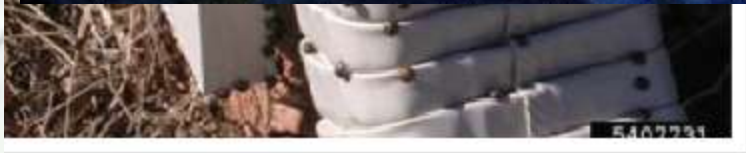
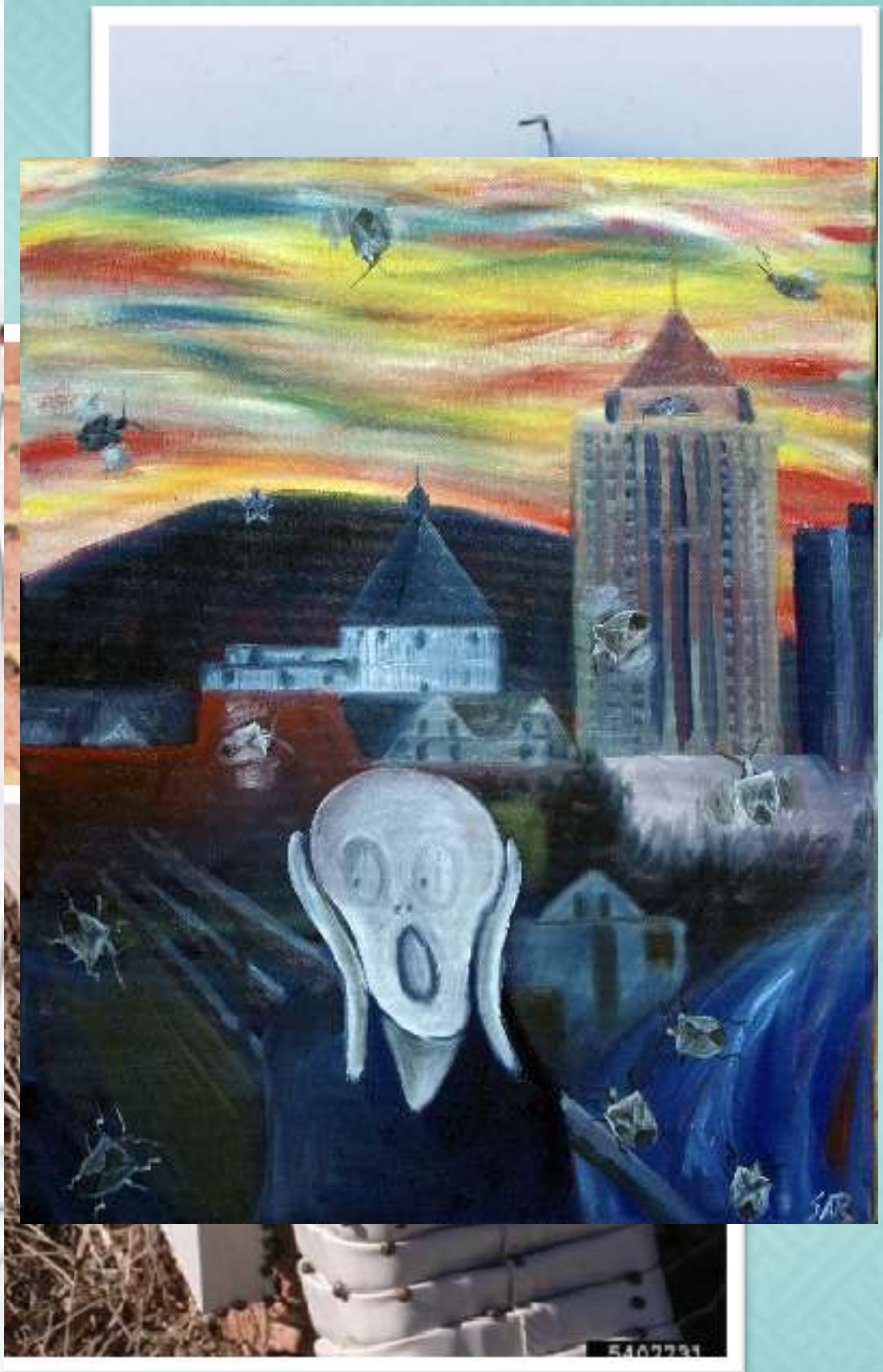


Brown Marmorated Stink Bug (*Halyomorpha halys*)

# Brown Marmorated Stink Bug (*Halyomorpha halys*)

- Accidentally introduced into eastern PA from Asia; first found in 1998 in Allentown (probably arrived several years earlier).
- In 2010, caused apple growers in the mid-Atlantic region to lose 18% of their crops.
- The fresh apple industry has reported \$37 million in damage in MD, PA, VA and WV.





## **2. Major agricultural pest**



BMSB is polyphagous, with a long list of host plants including many fruit and shade trees and other woody ornamentals as well as legumes and various vegetables. Some examples:

- Fruit trees (apple, cherry, peach, apricot, pear, Asian pear, mulberry, citrus fruits)
- Grapes
- Raspberries, blackberries, blueberries, caneberries, etc.
- Melons
- Soybeans
- Beans
- Corn
- Tomatoes
- Green peppers
- Catalpa
- Norway maple
- Many ornamental plants



**BMSB MAY ALSO ACT AS A VECTOR FOR DISEASES SUCH AS WITCHES' BROOM (AN MLO\*)**

\* Mycoplasma-like organism

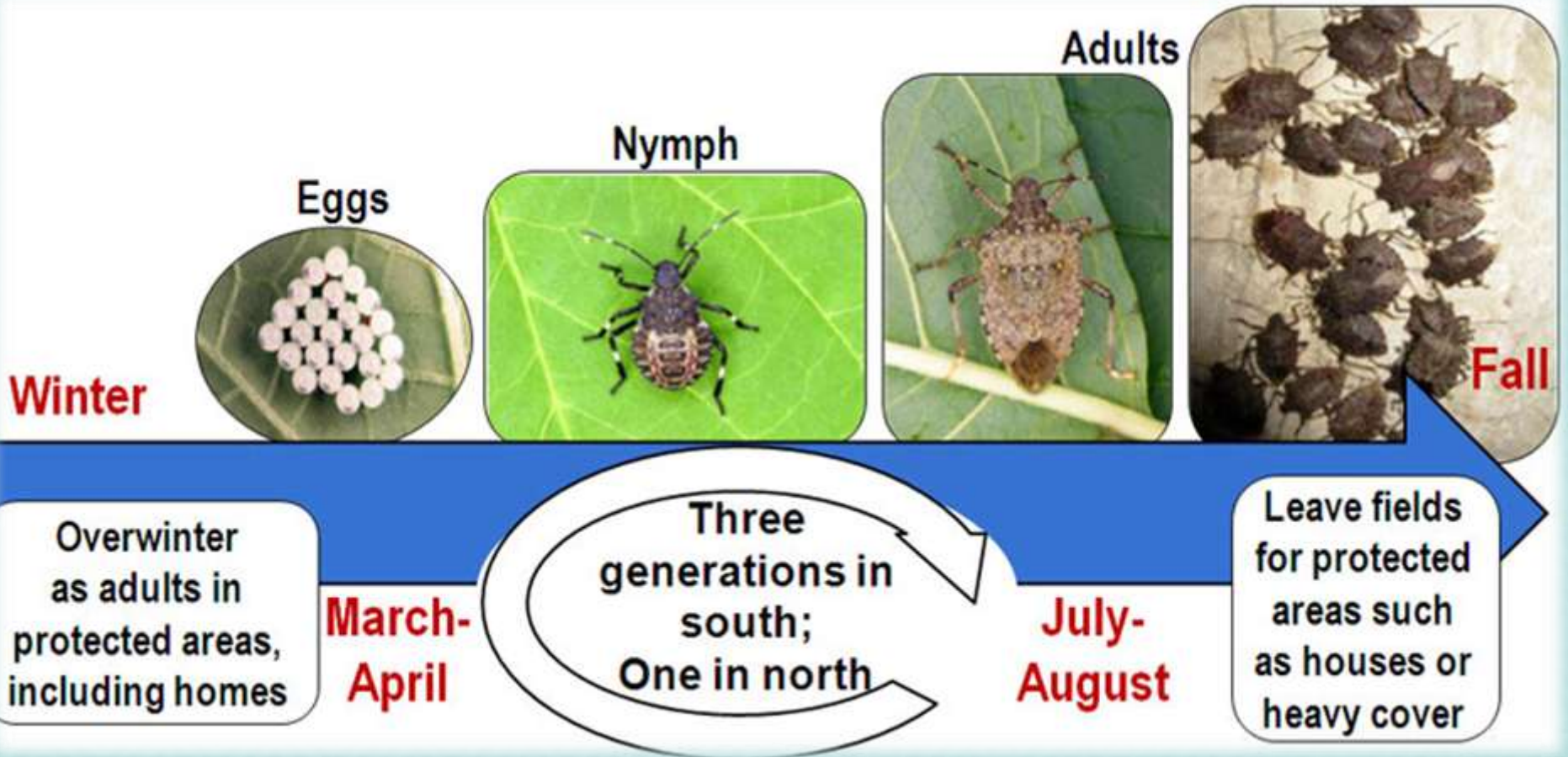
# Biological Characteristics and Potential Problems

- One generation per year.
- Feeding by adults concentrated in late May-early June and in August-September.
- Highly mobile adults.
- Very difficult to control: limited methods available.

- The young nymphs resemble the adult (see below) but are smaller, and the antennae are shorter. The nymphs are also more active than the adults and are more likely to be found on the underside of leaves.



# Life Cycle of BMSB



Eggs



Aggregation on crab apple leaf.



1<sup>st</sup> instar nymphs



4<sup>th</sup> instar nymph

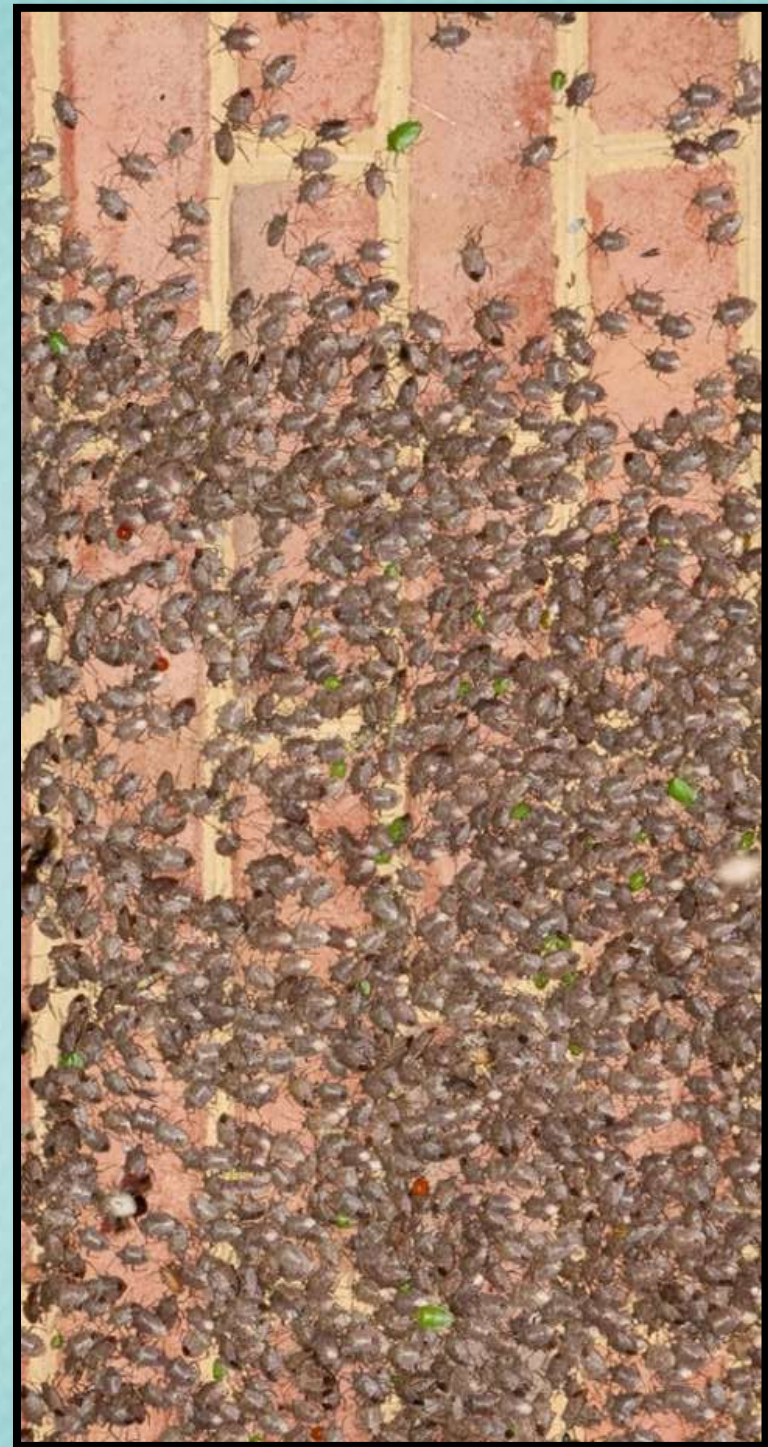
# Development



# Aggregation

When a BMSB finds a suitable site for overwintering, it releases an **aggregation pheromone**.

(The aggregation pheromone is not the same chemical that causes them to stink.)



# Control

## Insecticidal control

- **Pyrethroids** and **neonicotinoids**.
- Problem: disruptive to natural enemies, undermine IPM programs .
- Very hazardous to bees.

## Biological control

- Parasitic wasps, 3 species from Asia (*Trissolcus* spp.)
- (Impact on native pentatomids?)

## Cultural control

- Diversionary or trap crop with highly preferred host plants.
- Design a system minimal impact on pollinators





# BMSB



Rough Stink Bug

*Brochymena quadripustulata*



la Stink Bug

*oa ligata Say*

Native stink bugs are generally similar to the BMSB but have more pointed 'shoulders' and lack the antennal stripes.

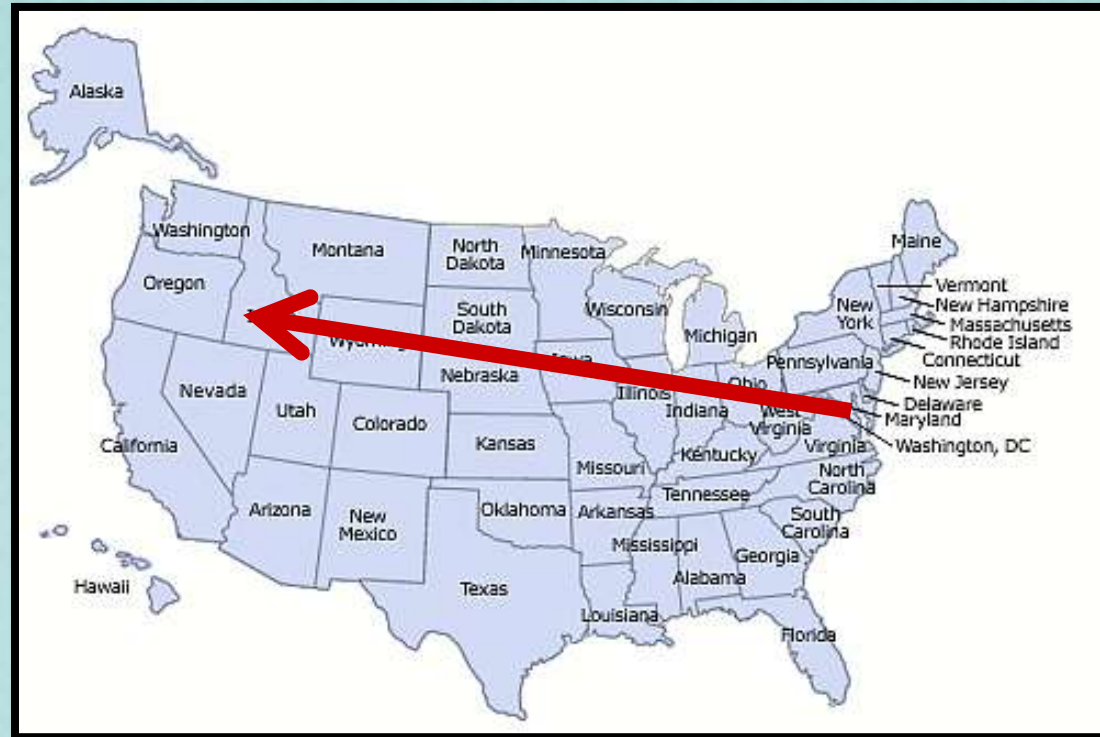
# Current Distribution of BMSB in the United States



- Severe Agricultural and Nuisance Problems Reported
- Nuisance Problems Only
- Detected

# BMSB in Idaho

- In February 2012, family from Maryland moved to Nampa, ID.
- On May 20, they contacted ISDA and reported finding several dozen live BMSB in yard furniture and several inside the house.
- Found more in early summer.
- Found more in October.



# Plans

- Public campaign for specimens.
- Industries alerted through PNW Pest Alert system.
- Surveys next year.
  - Black light survey around Nampa site.



**Elm Seed Bug**



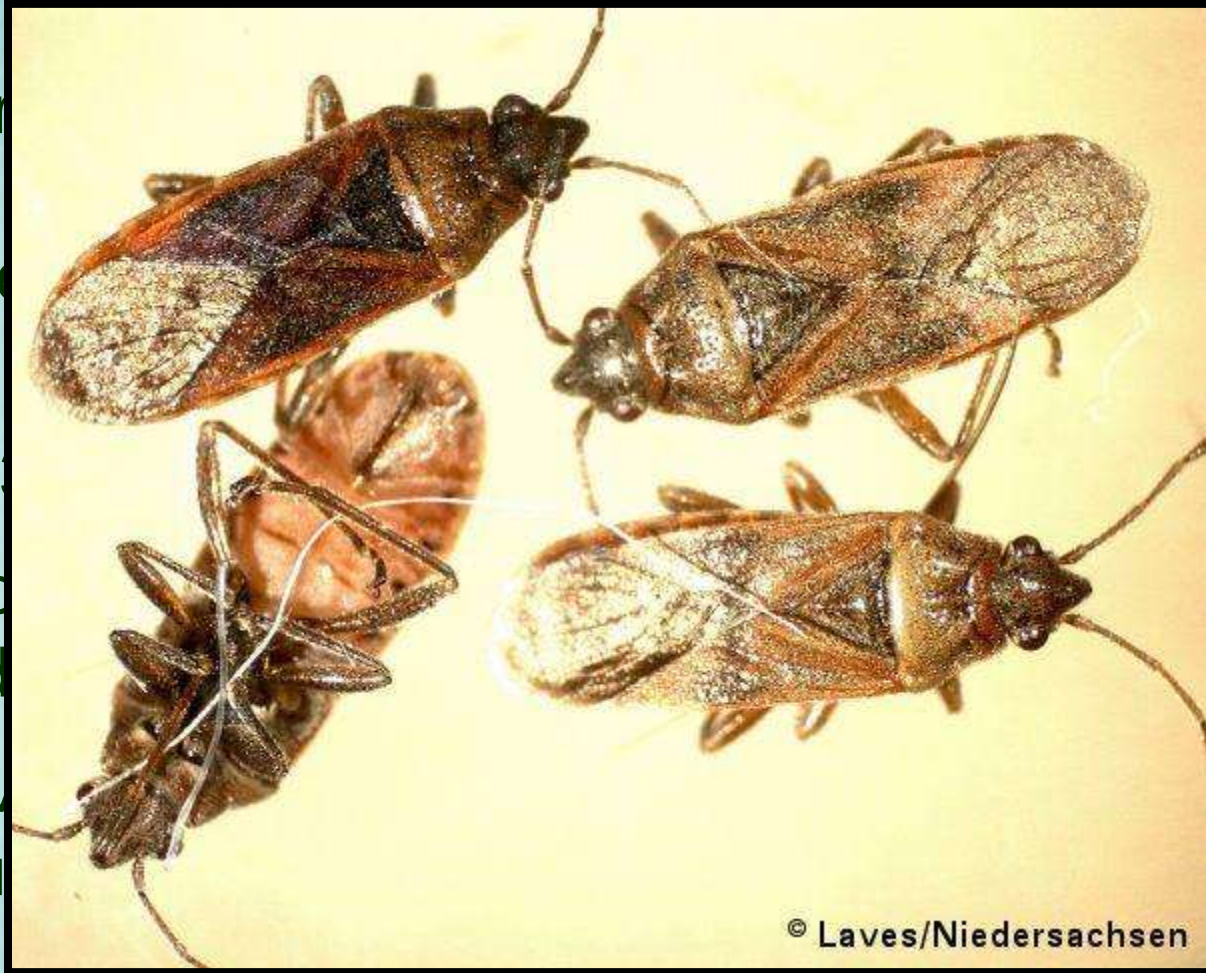
# Elm Seed Bug (*Arocatus melanocephalus*)

- In the same group as boxelder bugs, lygus seed bugs, stink bugs, bed bugs (true bugs).
- Originally from southern Europe.
- Idaho find was first in U.S.
- Feed on cells of elm trees (*Ulmus* spp.); occasionally on seeds of oak and linden trees.
- **NOT REGULATED BY STATE OR FEDS.**



# Identification

- Wings are brown and piercing under the back.
- About 1/4 inch long.
- Dark chocolate brown to rusty/red color.
- Distinctive dark brown color.



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PRAGUE<sup>SM</sup>  
Solutions Company



HUGE nuisance pest in July/August when congregate on and in homes and buildings. Although harmless, they emit odor when disturbed.





# Spotted Wing Drosophila

*(Drosophila suzukii)*



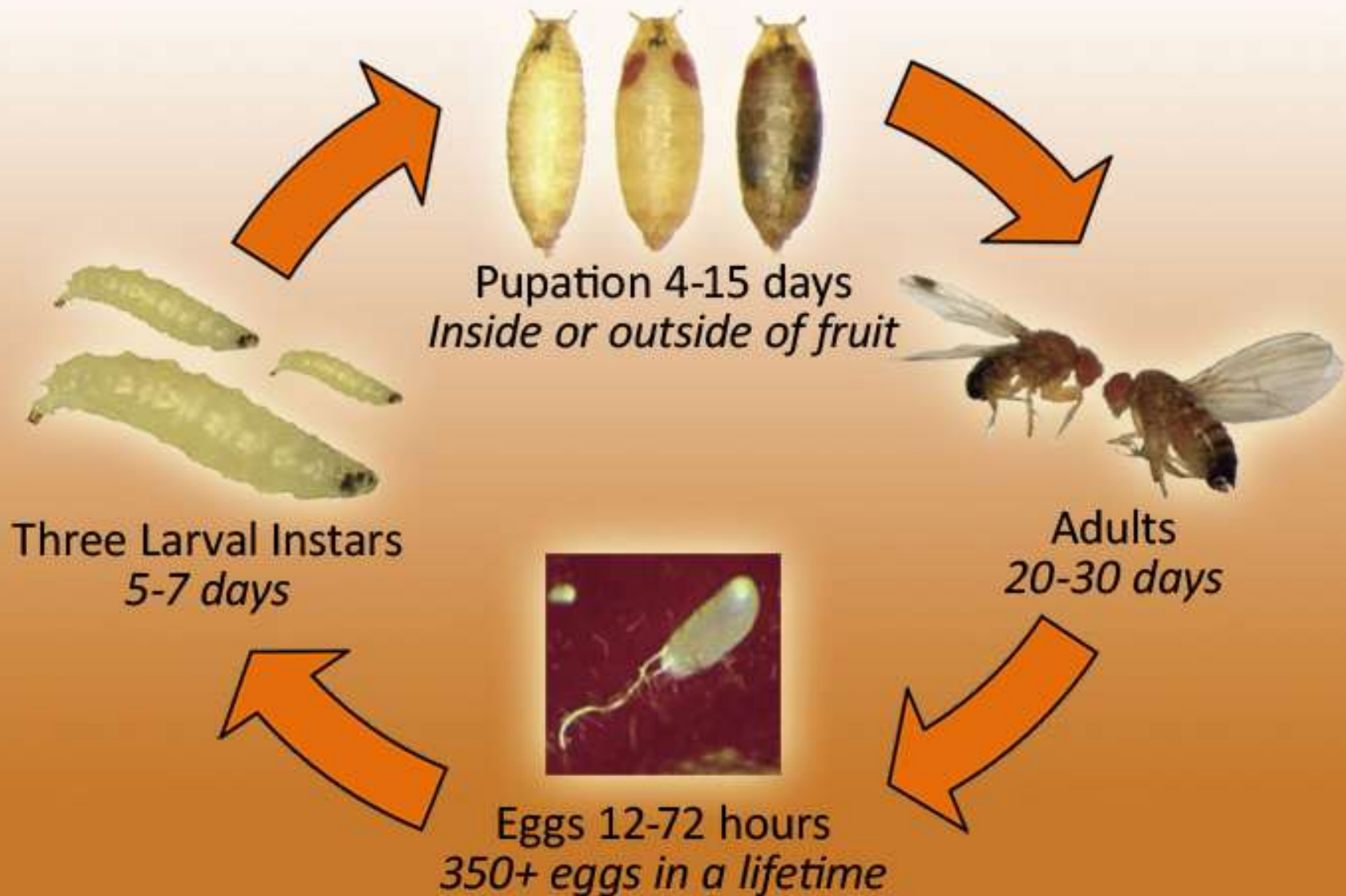
# Spotted Wing Drosophila (*Drosophila suzukii*)

- Native to SE Asia.
- Attacks multiple fresh fruits with thin skins (cherries, peaches, plums, blackberries, raspberries, blueberries, grapes, strawberries, etc.).
- Fast becoming a problem in the Pacific Northwest.
- Prefer overripe, fallen and decaying fruit but will attack sound fruit.
- Found on bing cherry tree near Moscow, ID in August 2012; later in Nez Pierce and Canyon counties.



# Life Cycle of the Spotted Wing Drosophila

*Drosophila suzukii* (Matsumura)





## Identification:

- Adults: 1/8 inch long.
- Red eyes; clear wings.
- Males: spots on end of each wing.
- Females : Saw like ovipositors.



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