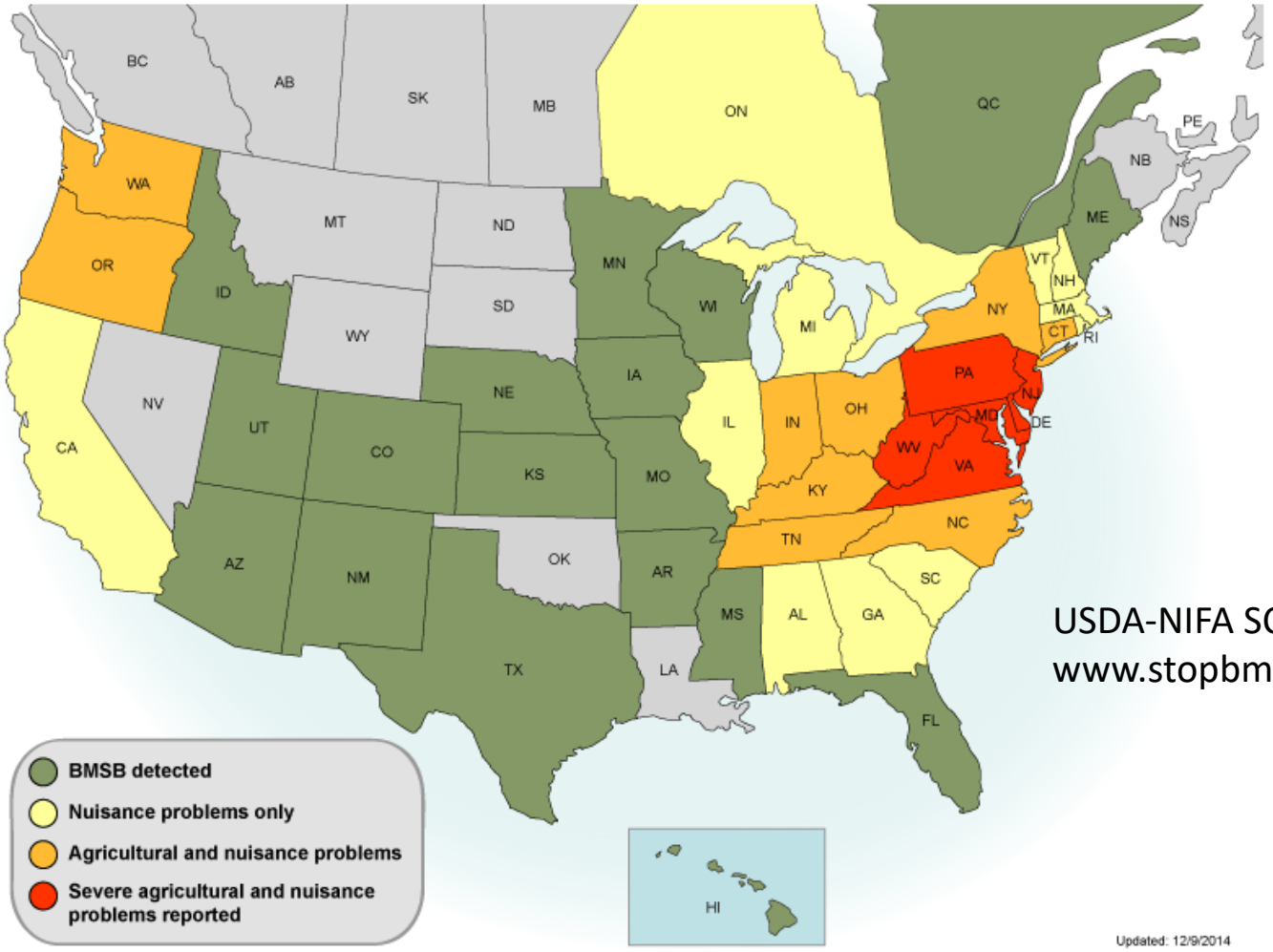
Minnesota Department of Agriculture

Invasive Plant Pests of Orchards: How the MDA Monitors and How You Can Help

Brown Marmorated Stink Bug

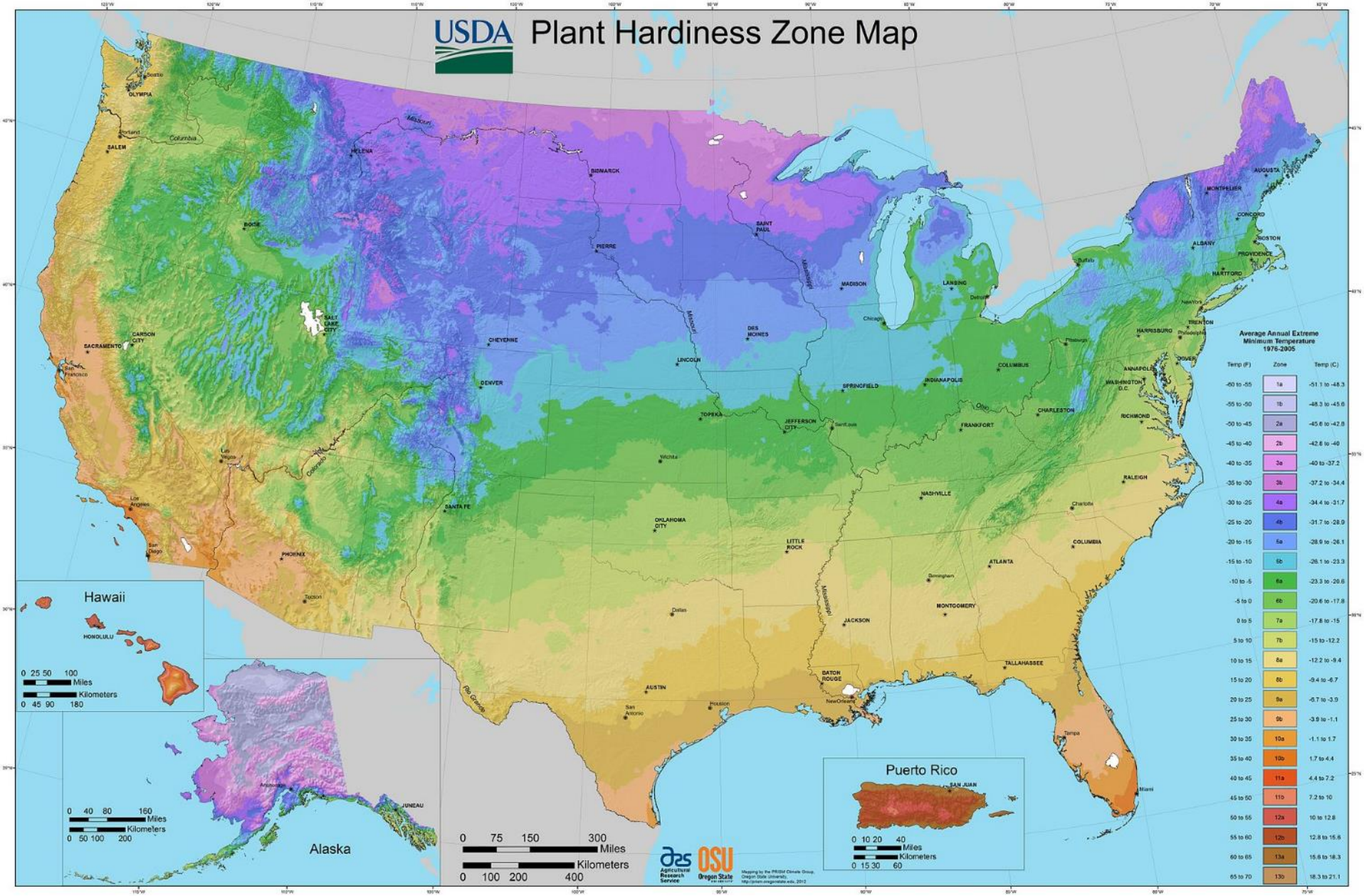
Distribution

First arrived in PA in mid-1990's

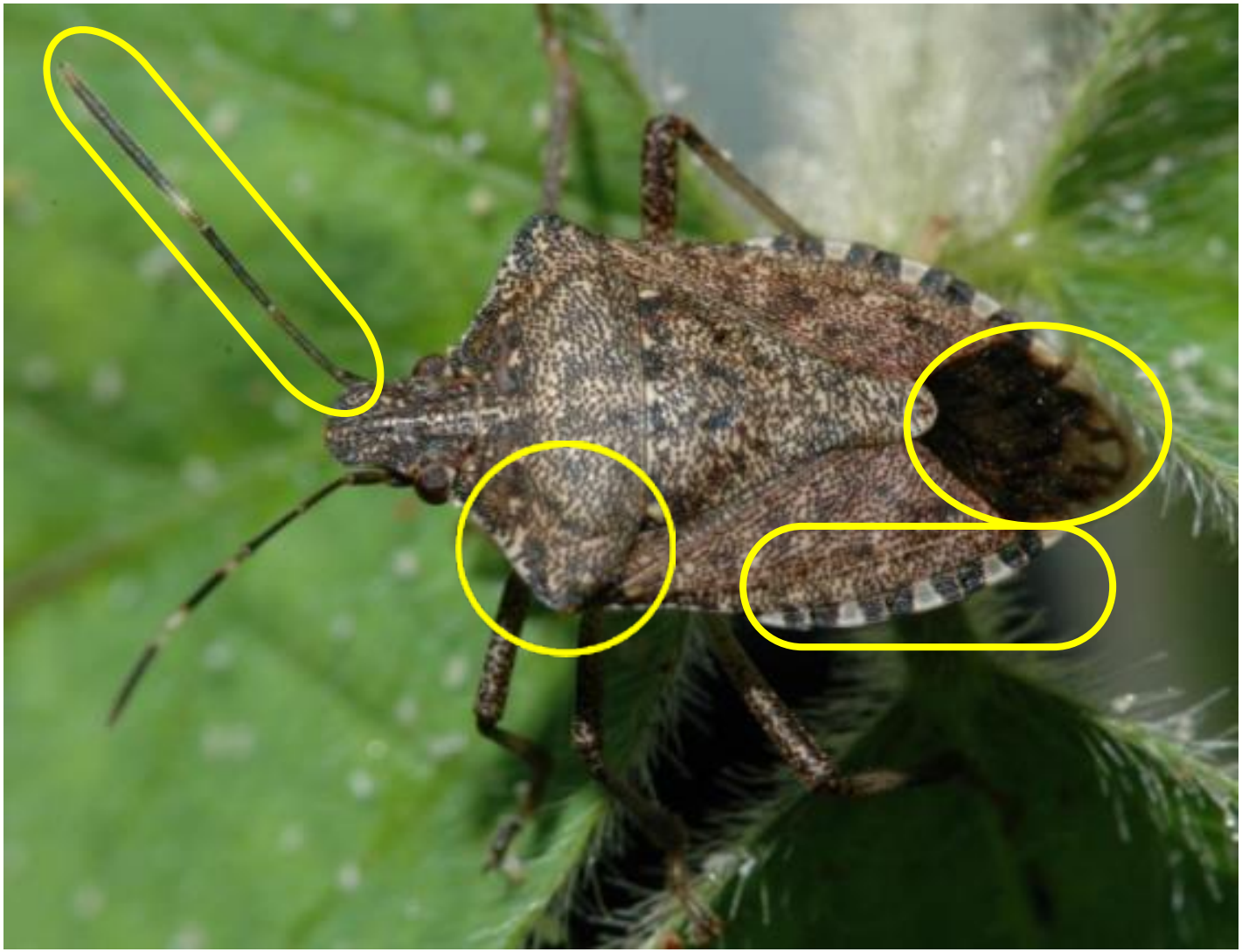


USDA-NIFA SCRI
www.stopbmsb.org

42 states and 2 provinces

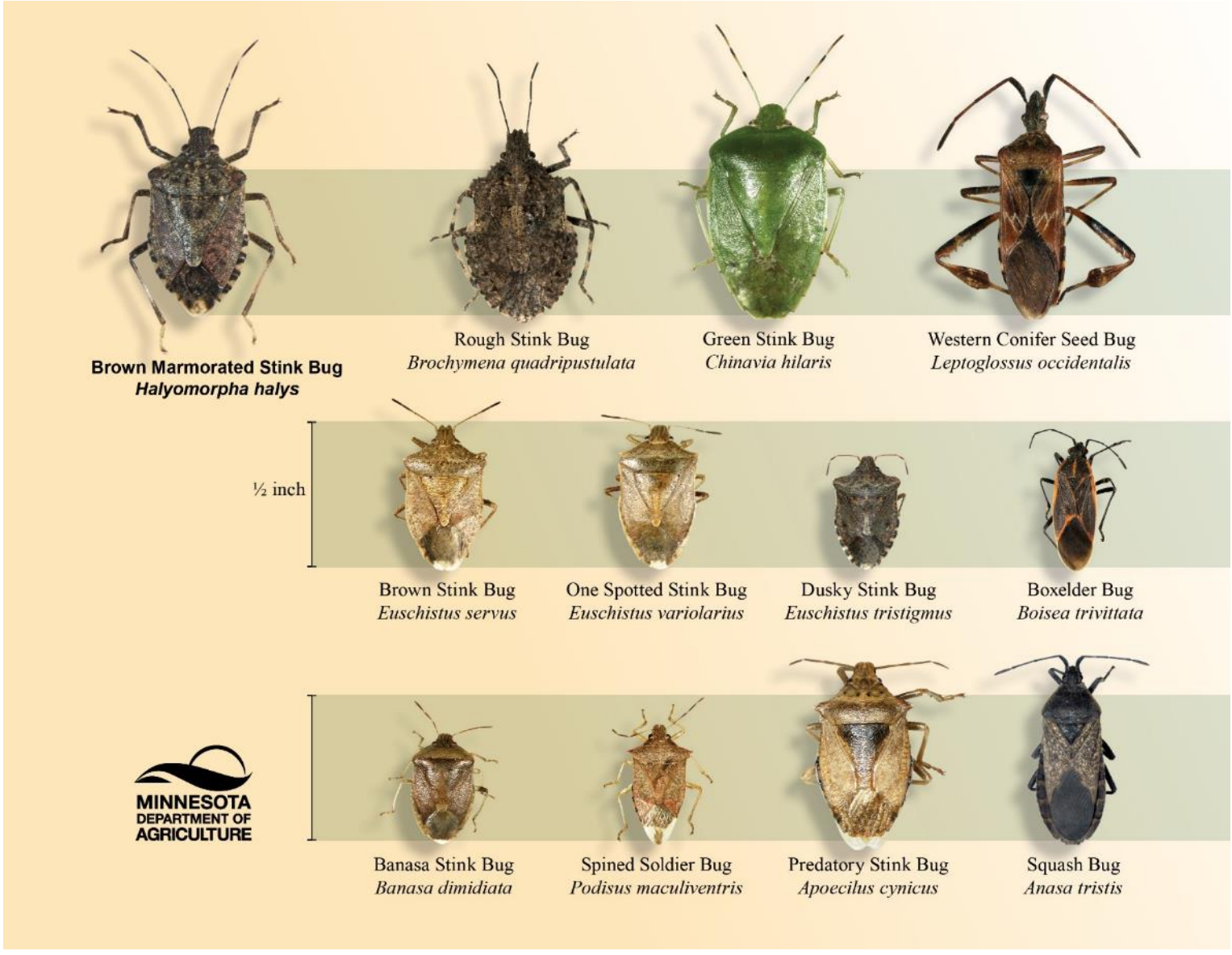

USDA Plant Hardiness Zone Map
Average Annual Extreme Minimum Temperature 1976-2005
Temp (F) Zone Temp (C)
-60 to -55 1a -51.1 to -48.3
-55 to -50 1b -48.3 to -45.6
-50 to -45 2a -45.6 to -42.8
-45 to -40 2b -42.8 to -40
-40 to -35 3a -40 to -37.2
-35 to -30 3b -37.2 to -34.4
-30 to -25 4a -34.4 to -31.7
-25 to -20 4b -31.7 to -28.9
-20 to -15 5a -28.9 to -26.1
-15 to -10 5b -26.1 to -23.3
-10 to -5 6a -23.3 to -20.6
-5 to 0 6b -20.6 to -17.8
0 to 5 7a -17.8 to -15
5 to 10 7b -15 to -12.2
10 to 15 8a -12.2 to -9.4
15 to 20 8b -9.4 to -6.7
20 to 25 9a -6.7 to -3.9
25 to 30 9b -3.9 to -1.1
30 to 35 10a -1.1 to 1.7
35 to 40 10b 1.7 to 4.4
40 to 45 11a 4.4 to 7.2
45 to 50 11b 7.2 to 10
50 to 55 12a 10 to 12.8
55 to 60 12b 12.8 to 15.6
60 to 65 13a 15.6 to 18.3
65 to 70 13b 18.3 to 21.1
Hawaii
HONOLULU
0 25 50 100 Miles
0 45 90 180 Kilometers
Alaska
JUNEAU
0 40 80 160 Miles
0 50 100 200 Kilometers
Puerto Rico
SAN JUAN
0 10 20 40 Miles
0 15 30 60 Kilometers
0 75 150 300 Miles
0 100 200 400 Kilometers
Agricultural Research Service
OSU Oregon State University

BMSB Identification



BMSB Identification

Look - alikes


Brown Marmorated Stink Bug
Halyomorpha halys
Rough Stink Bug
Brochymena quadripustulata
Green Stink Bug
Chinavia hilaris
Western Conifer Seed Bug
Leptoglossus occidentalis
½ inch
Brown Stink Bug
Euschistus servus
One Spotted Stink Bug
Euschistus variolarius
Dusky Stink Bug
Euschistus tristigmus
Boxelder Bug
Boisea trivittata
MINNESOTA
DEPARTMENT OF
AGRICULTURE
Banasa Stink Bug
Banasa dimidiata
Spined Soldier Bug
Podisus maculiventris
Predatory Stink Bug
Apoecilus cynicus
Squash Bug
Anasa tristis

Life Cycle

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Feeding occurs

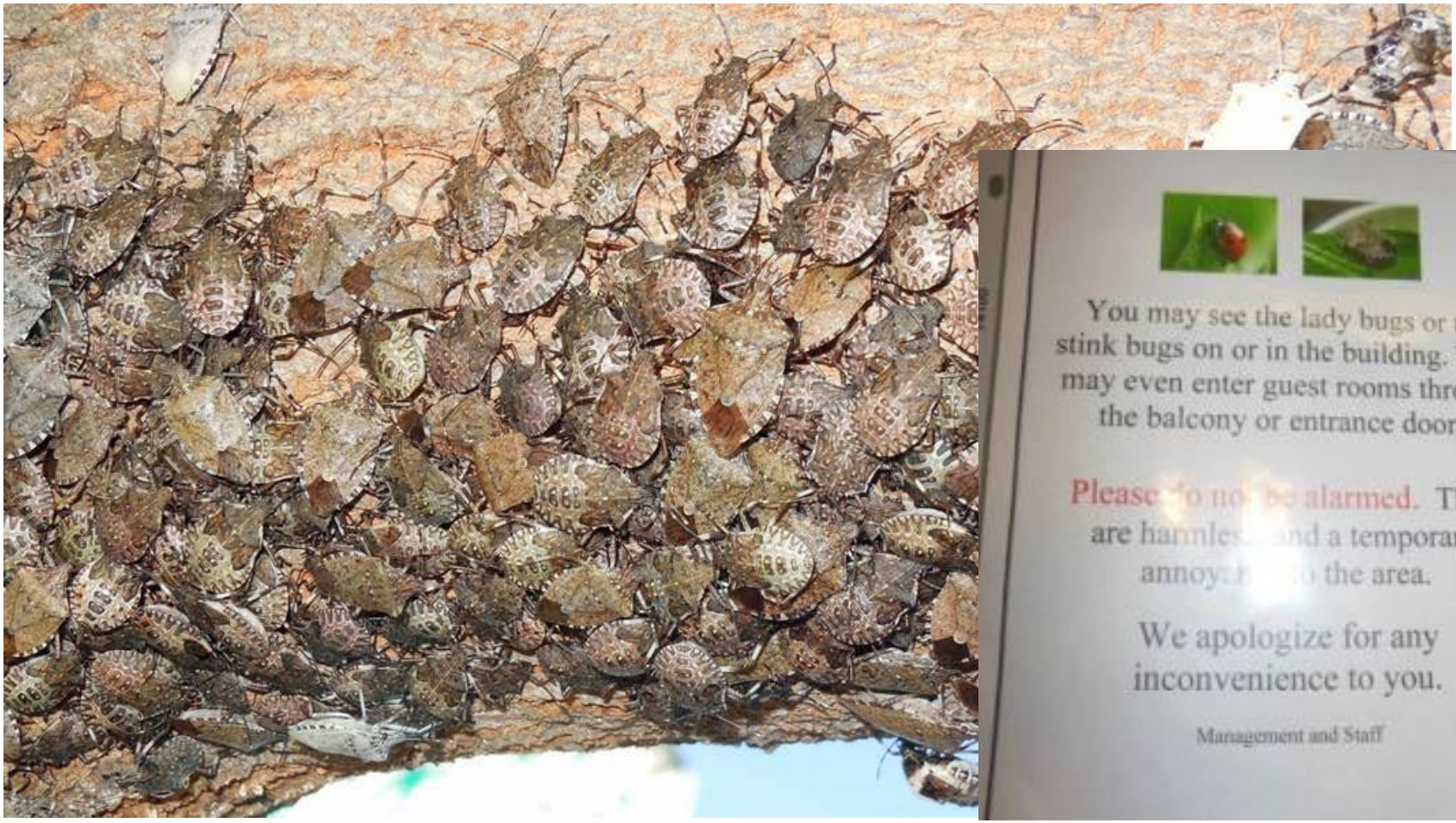
Active

Hibernating

BMSB Life Stages

www.stopbmsb.org

Why is BMSB a Pest?



http://ucanr.edu

Damage

http://ento.psu.edu/extension/factsheets/brown-marmorated-stink-bug

Bill Shane, MSU

Specialty Crops at Risk to BMSB Damage

HIGH RISK	apple, Asian pear, beans (green, pole, snap), bee-bee tree, edamame, eggplant, European pear, grape[1], hazelnut, Japanese pagoda tree, nectarine, okra, peach[2], Peking tree lilac, pepper, redbud, sweet corn, Swiss chard, tomato	
MODERATE RISK	apricot, asparagus, blueberries[1,3], broccoli, cauliflower, cherry[2], collard, cucumber, flowering dogwood, horseradish, lima bean, littleleaf linden, serviceberry, tomatillo	
LOW RISK	blackgum, carrot, cranberries, garlic, ginkgo, greens, Japanese maple, kohlrabi, kousa dogwood, leeks, lettuce, many gymnosperms, onion, potato, spinach, sweet potato, turnip	
UNKNOWN	almond, citrus, hops, kiwi, olive, pistachio, plum, strawberries, walnut	
HOSTS Non-Specialty Crop BMSB Hosts Contributing to Specialty Crops Risk	field corn, soybean	

1—Potential risk of taint/contamination. 2—Additional risk potential due to bark feeding. 3—Considered moderate-high risk.

USDA

Funded by USDA-NIFA SCRI Coordinated Agricultural Project, grant #2011-51181-30937. Image credits—sweet corn: Joe Zlomek; eggplant: Howard F. Schwartz, Colorado State University, Bugwood.org; apple, carrots: morguefile.com/creative/bekahboo42; flowering dogwood: Richard Floyd, Creative Ideas LLC, Bugwood.org; blueberries, cauliflower: Gerald Holmes, California Polytechnic State University at San Luis Obispo, Bugwood.org; ginkgo: Jan Samanek, State Phytosanitary Administration, Bugwood.org; cranberries: Cjboffoli (CC-BY-3.0). Printed May 2015.

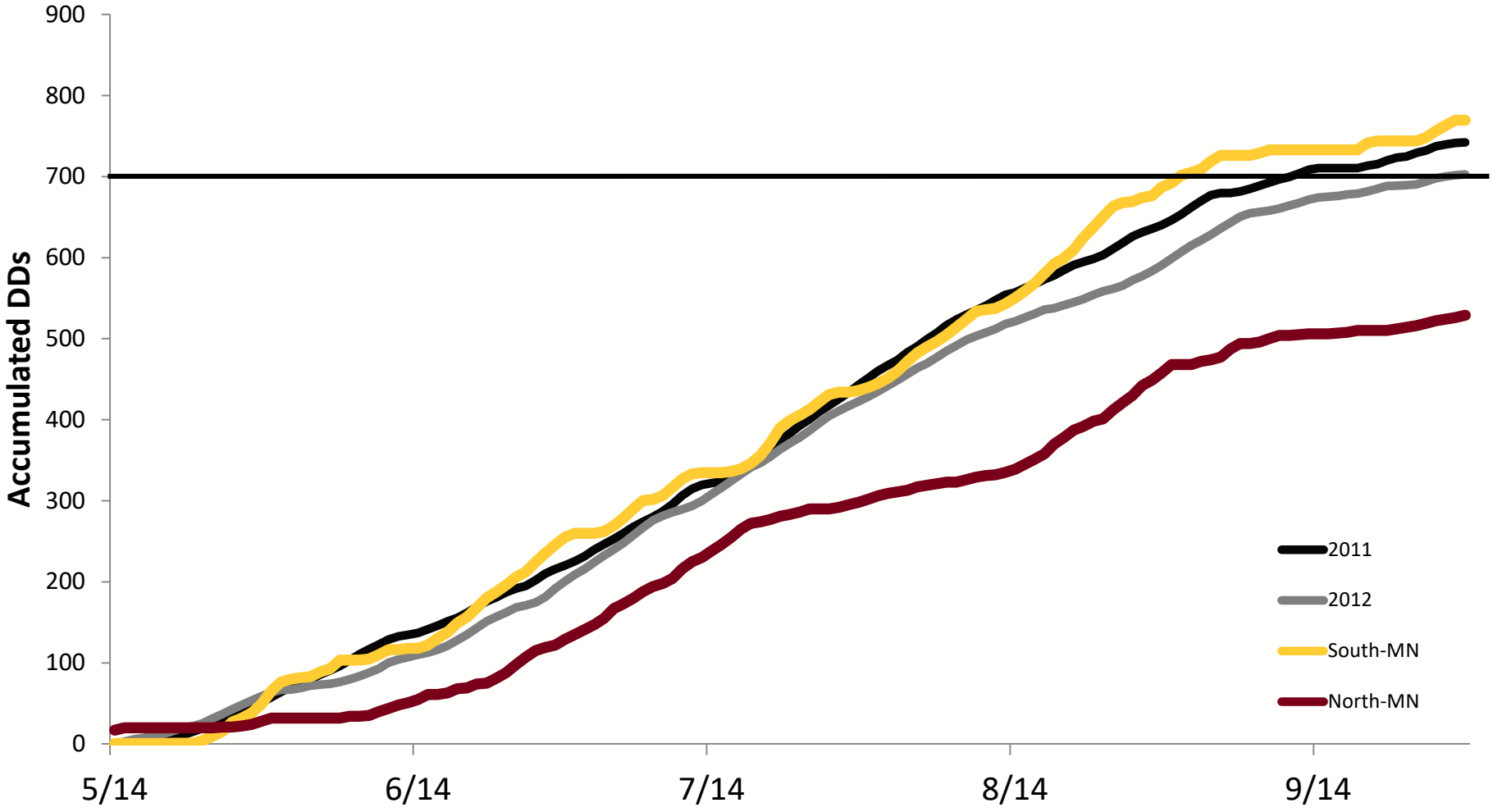
About BMSB

The brown marmorated stink bug, *Halyomorpha halys* (Stål), is a voracious eater that damages fruit, vegetable, and ornamental crops in North America. With funding from USDA's Specialty Crop Research Initiative, our team of more than 50 researchers is uncovering the pest's secrets to find management solutions that will protect our food, our environment, and our farms.

Learn more at **StopBMSB.org**.

Stop BMSB

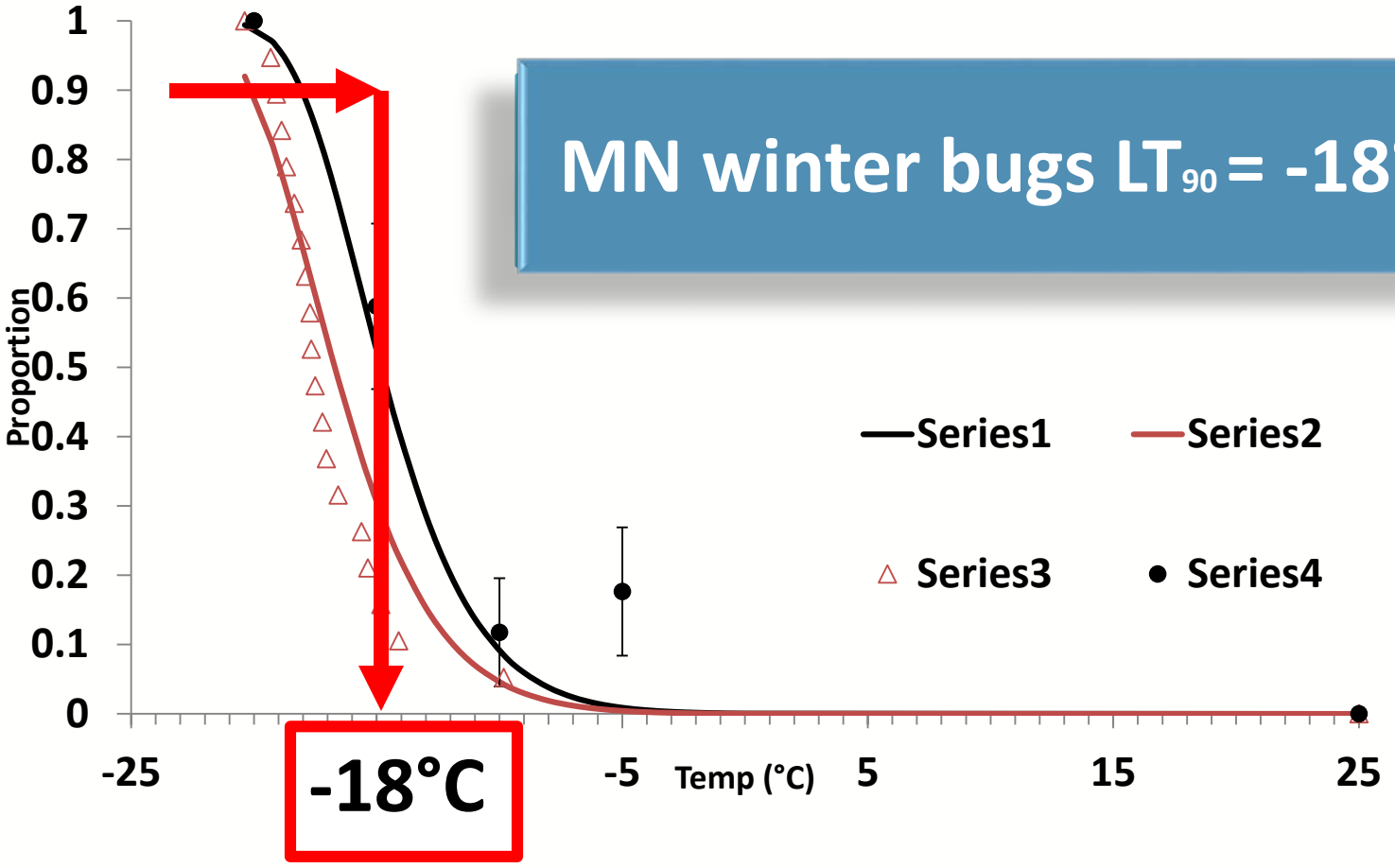
Minnesota Degree-days



Slide courtesy of Chris Phillips, University of Minnesota

Cold tolerance

Predicted and observed BMSB: Cumulative SCP & proportion mortality

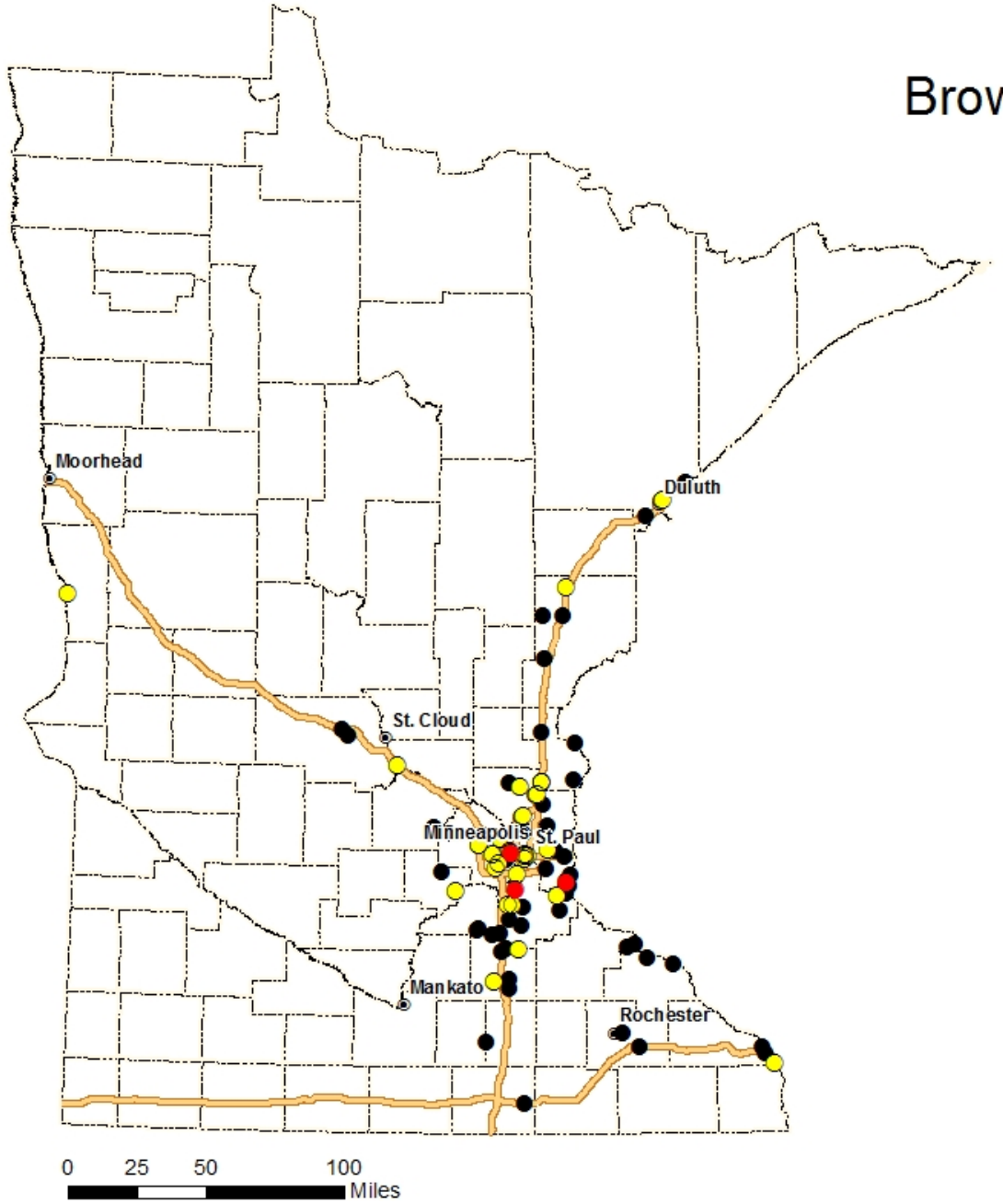


MN winter bugs LT_{90} = -18°C or ~0°F

Cira et al 2015
SCP: n=19 bugs
Mortality: n=17 bugs/each temp (mean ± 95% confidence interval)

BMSB Survey in 2015

Brown Marmorated Stink Bug Survey 2015



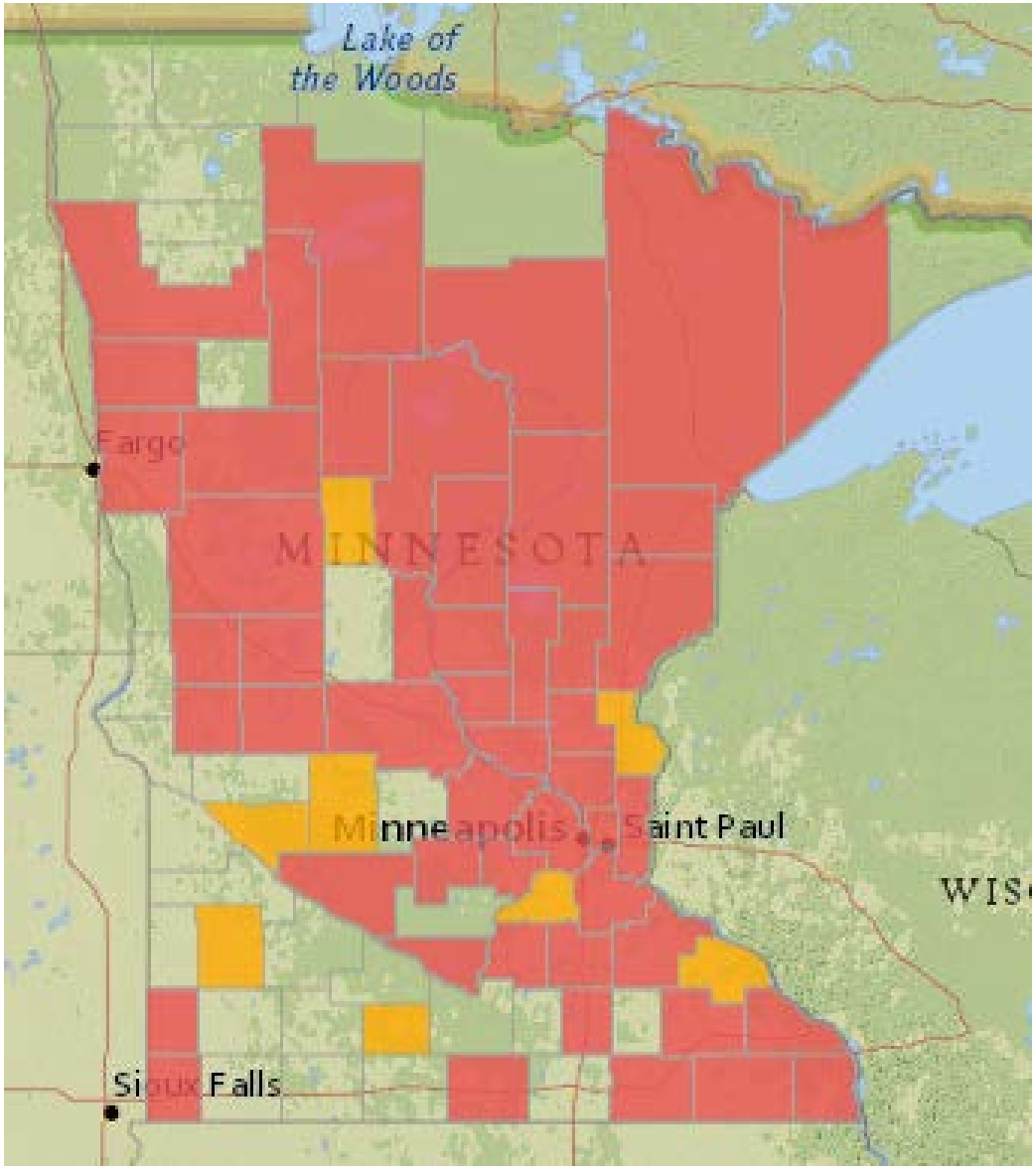
- Positive trap site
- Previously confirmed
- Negative trap site

N

Minnesota Department of Agriculture

Spotted Wing Drosophila

Distribution



Life Cycle

- Overwinter as adults
- Larvae tunnel in fruit
- Pupate in ground
- Life cycle 1 – 3 weeks
- 10 generations/year

Hannah Burrack, NCSU

Male Identification

Bob Koch, U of MN

Female Identification

Bob Koch, U of MN

Larva Identification

Bob Koch, Univ. of MN

SWD Host Plants in MN

Food Preference	Host
Top (Filet mignon)	Raspberries, blackberries, blueberries
	Plums, grapes, strawberries
	Apples and pears if damaged
Least (Hamburger) - Avoided	Cranberries Cherry Tomatoes

Injury

Brown sunken areas, that are soft and often decayed

Eric Burkness, U of MN

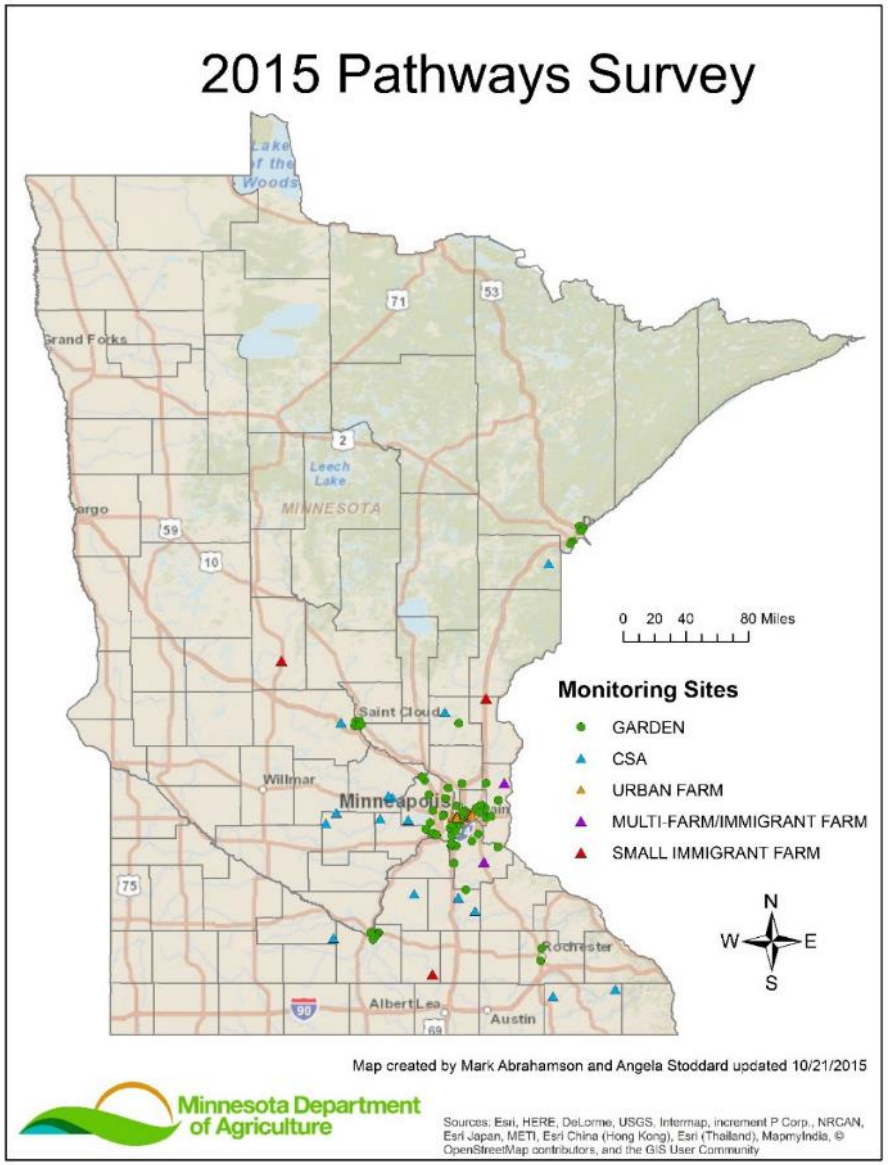
Management

Ipm.Missouri.edu

The Pathways Early Detection Survey:

New Approach

- Pathways-based approach
- Survey monitors for new and emerging pests near urban centers
- Community gardens, CSA farms, and small immigrant farms.
- First state in the nation to survey with this approach.

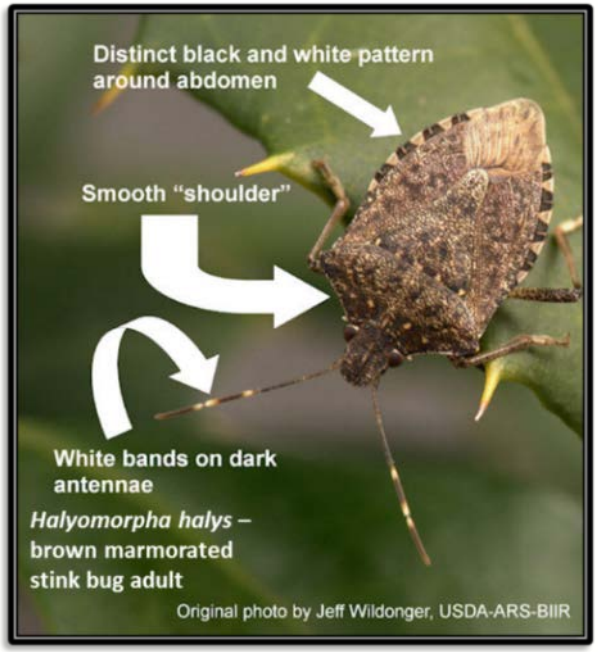


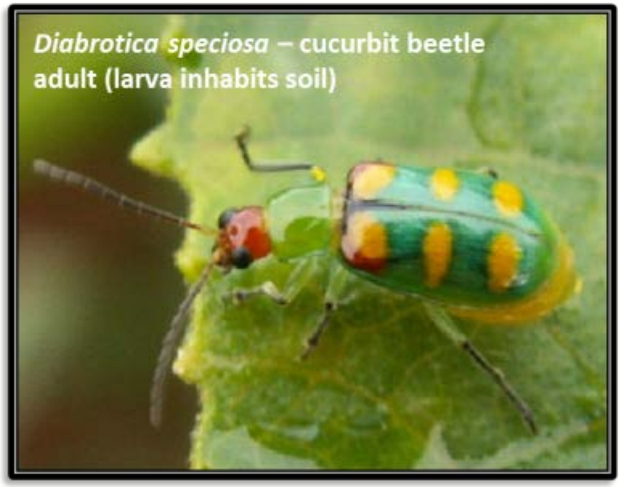
Multi-Pest, Bundled Survey

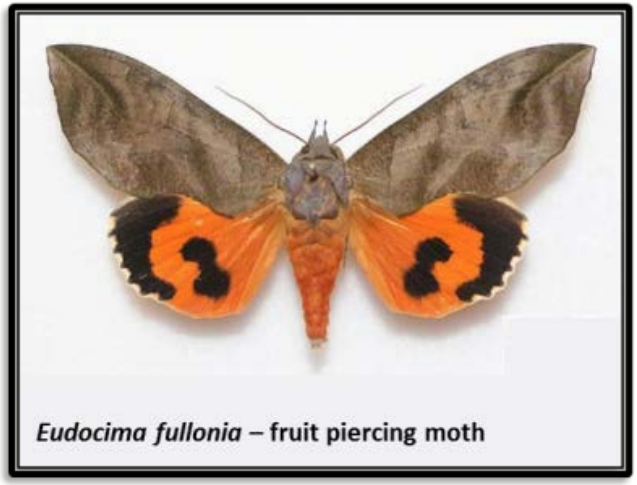
Insects - Trapping		
Common name	**Scientific name**	**Primary Hosts**
Golden twin spot moth	*Chrysodeixis chalcites*	Crucifers, tomato, strawberries
Swede midge	*Contarinia nasturtii*	Crucifers
Brown marmorated stink bug	*Halymorpha halys*	Corn, crucifers, legumes, onion, Solanaceae
Tomato fruit borer	*Neoleucinodes elegantalis*	Solanaceae

Multi-Pest, Bundled Survey

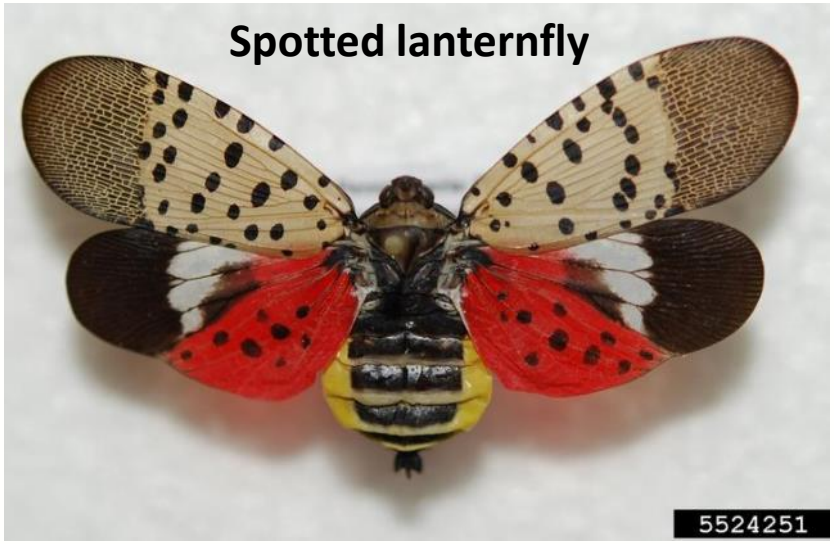
Insects - Visual Survey

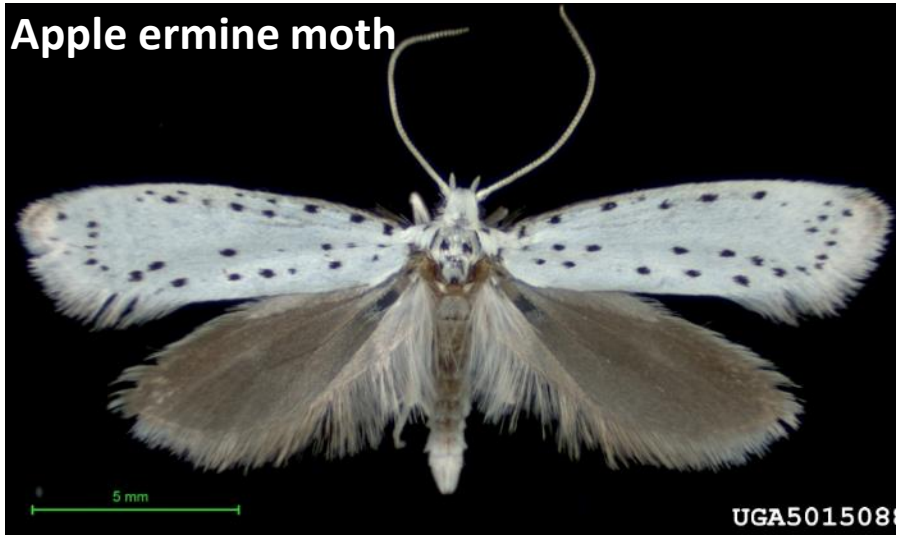






2016 Add Orchards



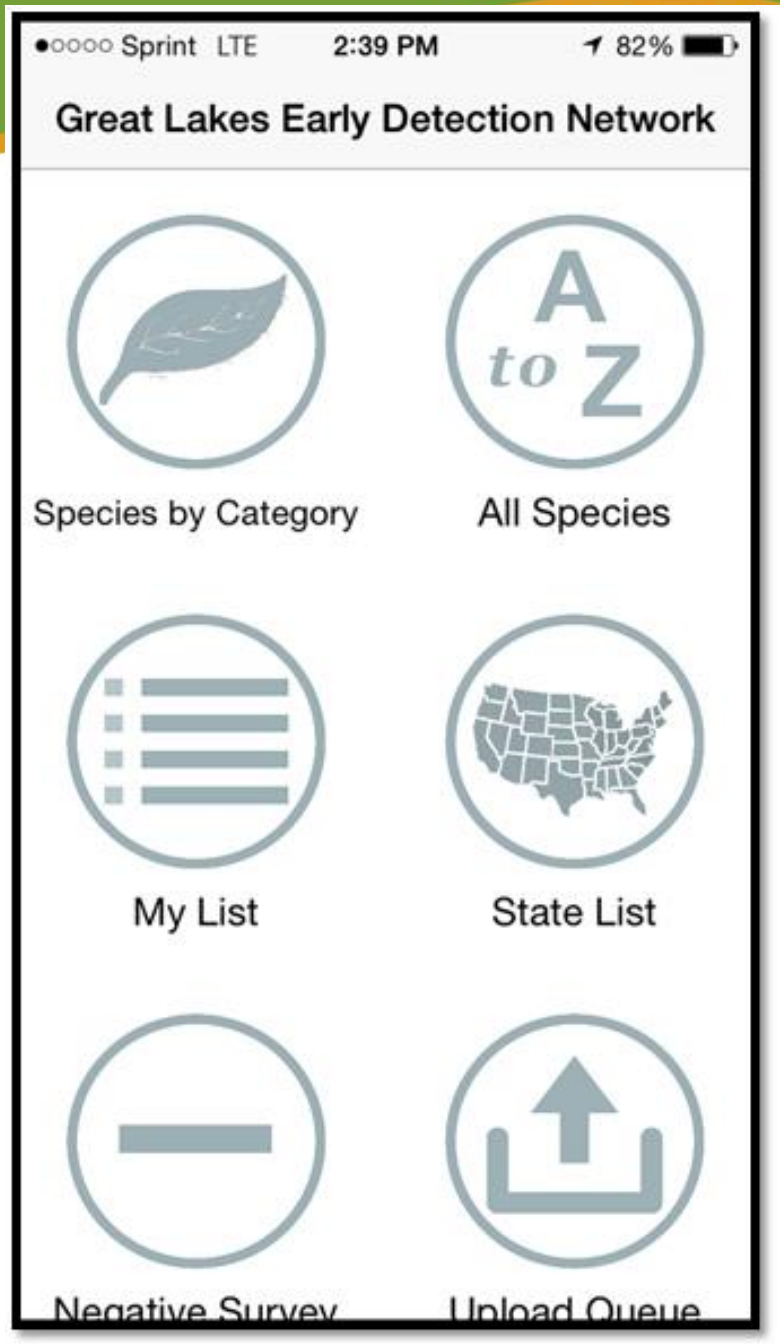


Reporting

Contact Arrest the Pest

- Take pictures and notes
- Capture the insect or take a sample of the plant
- Report
  - mda.state.mn.us/arrestthepest
  - arrest.the.pest@state.mn.us
  - GLEDN app
  - Call 888-545-6684 and leave a detailed voicemail


3G
9:41 AM
Great Lakes Early Detection Network
The Ohio State University
Great Lakes Restoration
Center for Invasive Species Ecosystem Health


Sprint LTE
2:39 PM
82%
Great Lakes Early Detection Network
Species by Category
A to Z
All Species
My List
State List
Negative Survey
Upload Queue


Questions?