Brown Marmorated Stink Bug: an update from Ontario

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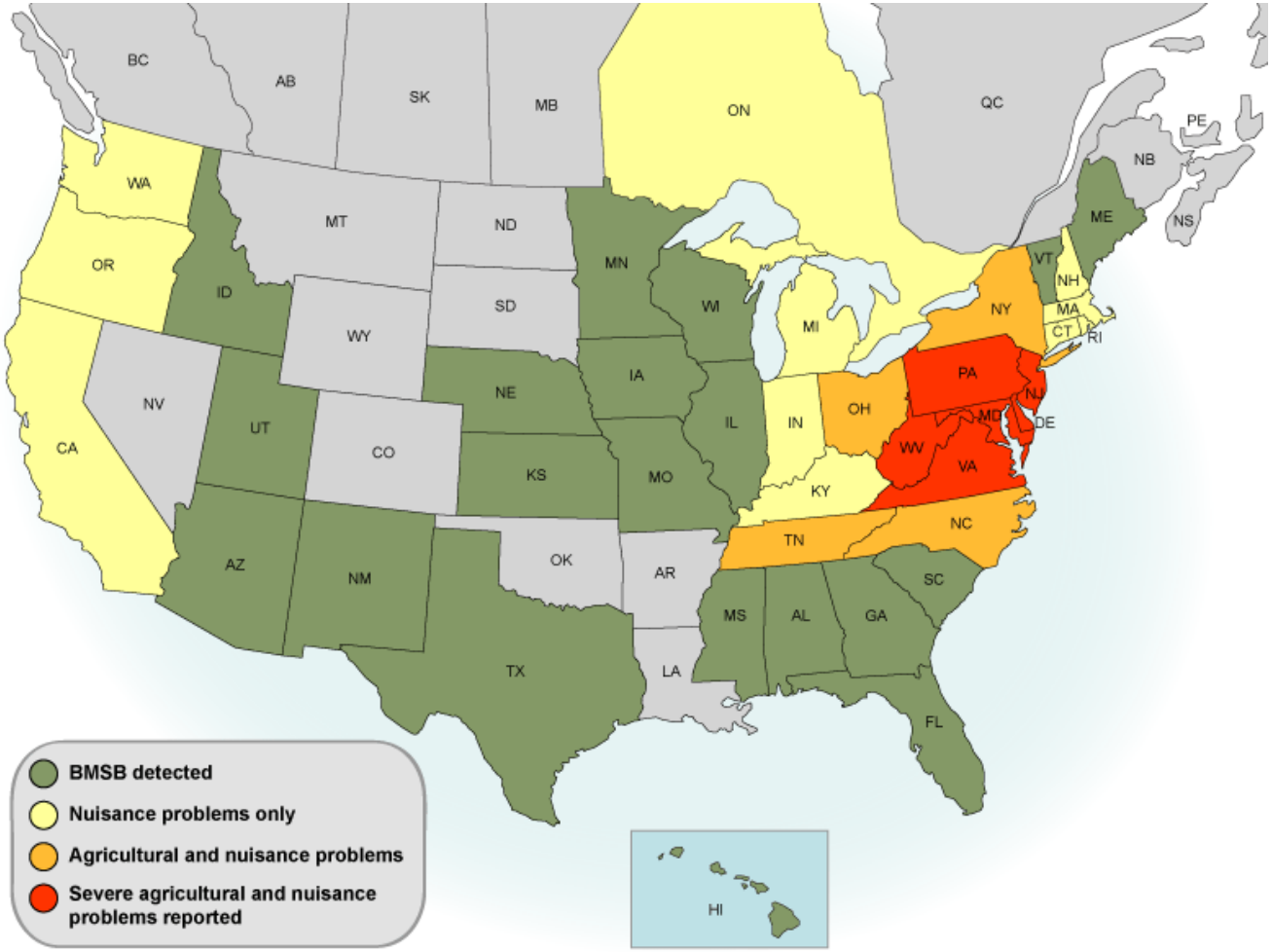
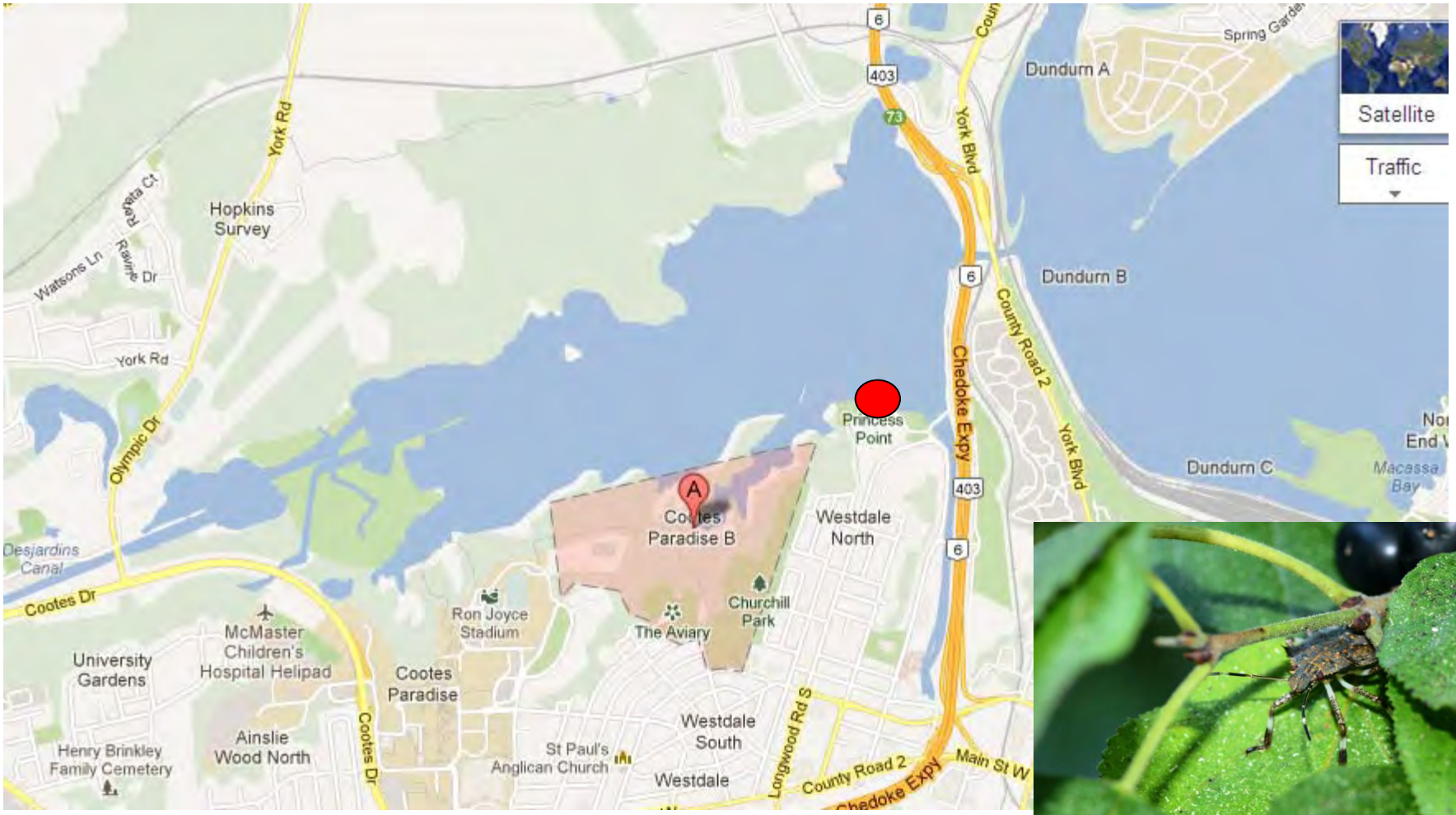
BMSB IPM Working Group
December 3, 2013

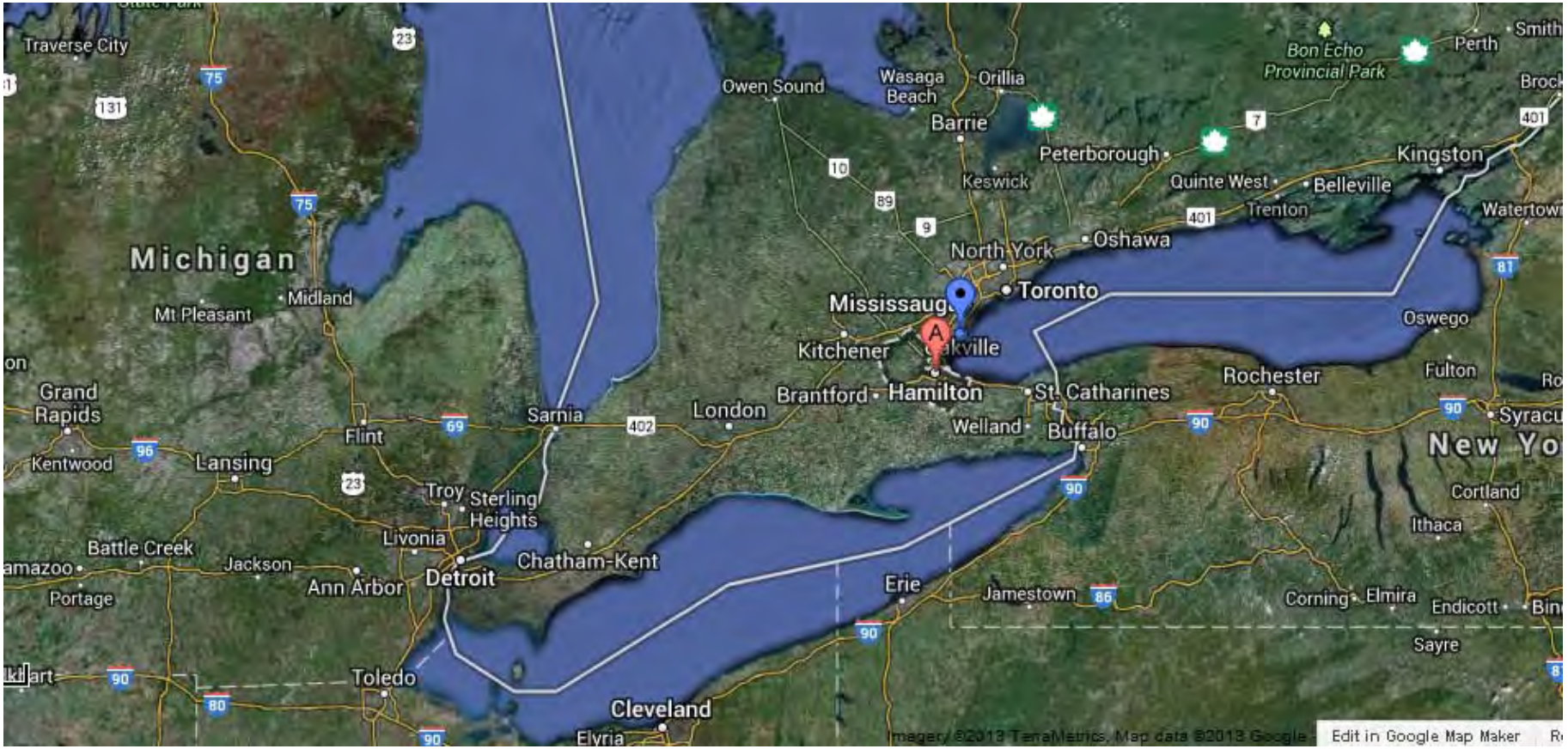
Known distribution and abundance



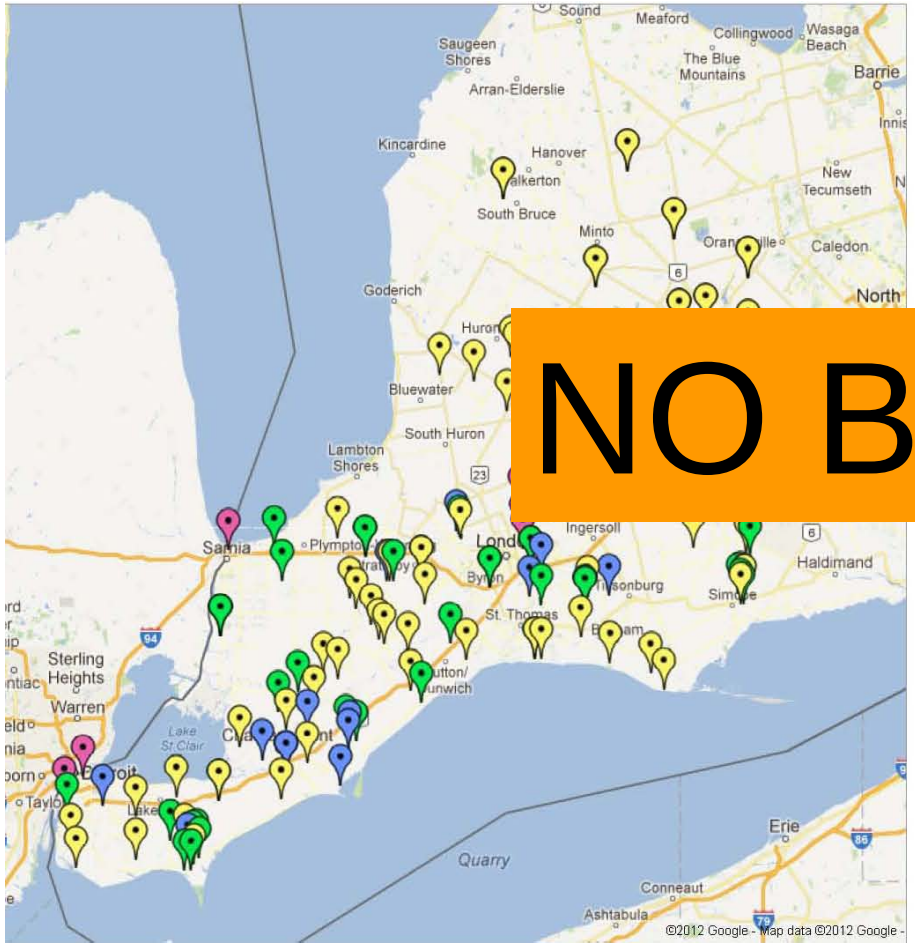
Cootes Paradise, Hamilton, ON
August 2012



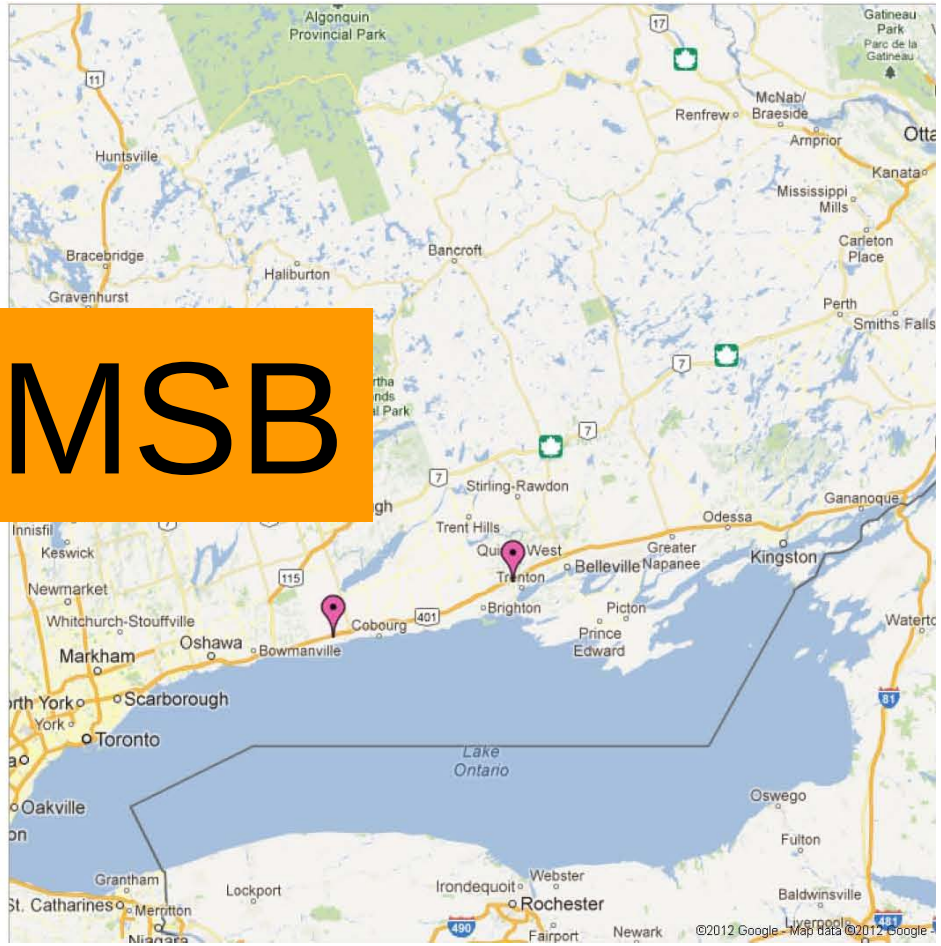
BMSB “hot spot”



Field Surveys 2011-12 (corn, soybeans, wheat)



NO BMSB



133 fields were scouted in two scouting periods in July and August.

Assessment of the Distribution and Natural Enemies of the Brown Marmorated Stink Bug in Southern ON

Funding through the OMAF / MRA University of Guelph Partnership Agreement - Emergency Management Theme (2013-14), and financial support from the following grower organizations:

- *Grain Farmers of Ontario*
- *Ontario Apple Growers*
- *Ontario Tender Fruit Producers*
- *Niagara Peninsula Fruit & Vegetable Growers' Association*
- *Grape Growers of Ontario*

Research Plans for 2013-2014

1. Assessing the distribution and abundance of, and patterns of host use by BMSB in southern Ontario;

   I. Sentinel plants – known non-crop landscape hosts*

   II. Surveys in field and hort crops

How?

   a) Sweeps / beat trays / nets

   b) Visual observations (including binoculars)

   c) Traps

   * Based on Nik Wiman's work, OSU

Site Categories

Urban / Industrial (n=65)

Areas of land with potential plant hosts surrounded on at least 3 sides by urban subdivisions, industrial and / or commercial zones.

Parks, walking trails and conservation authority properties can be placed in this designation if they fit the above criteria.

Natural / Rural (n=36)

Areas of land with potential plant hosts that do not border directly on urban subdivisions or industrial / commercial zones. They may however, border on agricultural land on one side of the property.

Examples: trails, parks, conservation authority properties that fit the above described criteria.

Agricultural (n=136)

Areas of land with potential native / invasive plant (i.e., hedgerows) or cultivated crops with no urban/industrial connection at all.

Survey will take place either in the actual cultivated crops, or in hedgerows or pastureland bordering these areas.

Transportation Corridor (n=27)

A linear tract of land that contains lines of transportation like highways, railroads, or canals.

Focus will be on MTO truck inspection sites, picnic areas and truck stops along major transportation corridors in southern Ontario

Examples: HWY 401, QEW and county roads.

Common (non-crop) Landscape Hosts

- Ash
- Birch
- **Buckthorn**
- Butterfly bush
- Catalpa
- Cedar
- Chokecherry
- Coleus
- Crab apple
- Dogwood
- Dahlia
- Elderberry
- Euonymus
- Holly
- Lilac
- Magnolia
- Maple
- Mountain ash
- Mulberry
- Sycamore
- T of Heaven
- Viburnum
- Walnut
- “others”

Over 170 hosts identified in North America to date

Research Plans for 2013 - 2014

2. Identifying agricultural areas in southern Ontario at risk from BMSB impact;

   I. Landscape factors conducive to population build-up and migration, abundance of seasonal hosts, overwintering sites, track movement of BMSB

Research Plans 2013-2014

3. Inventory parasitoids and predators that are using BMSB as a resource. This will provide baseline data on the potential for augmentative biological control of BMSB in Canada.

   I. Expose newly-laid sentinel egg masses of several stink bug species (non-BMSB!) on a weekly basis
   II. Obtain parasitoids for morphological ID
   III. Determine host-parasitoid associations (if any)
   IV. Collect BMSB egg masses to determine level of parasitism / predation by native natural enemies

Research Plans 2013-2014

4. Evaluation of new pheromone trapping system
   I. Utility for early detection?

Public Outreach

5. Facilitate knowledge transfer on the status of BMSB in Ontario:

I. Develop information for use in communications including websites (e.g., ontario.ca\stinkbug, stopBMSB.org),

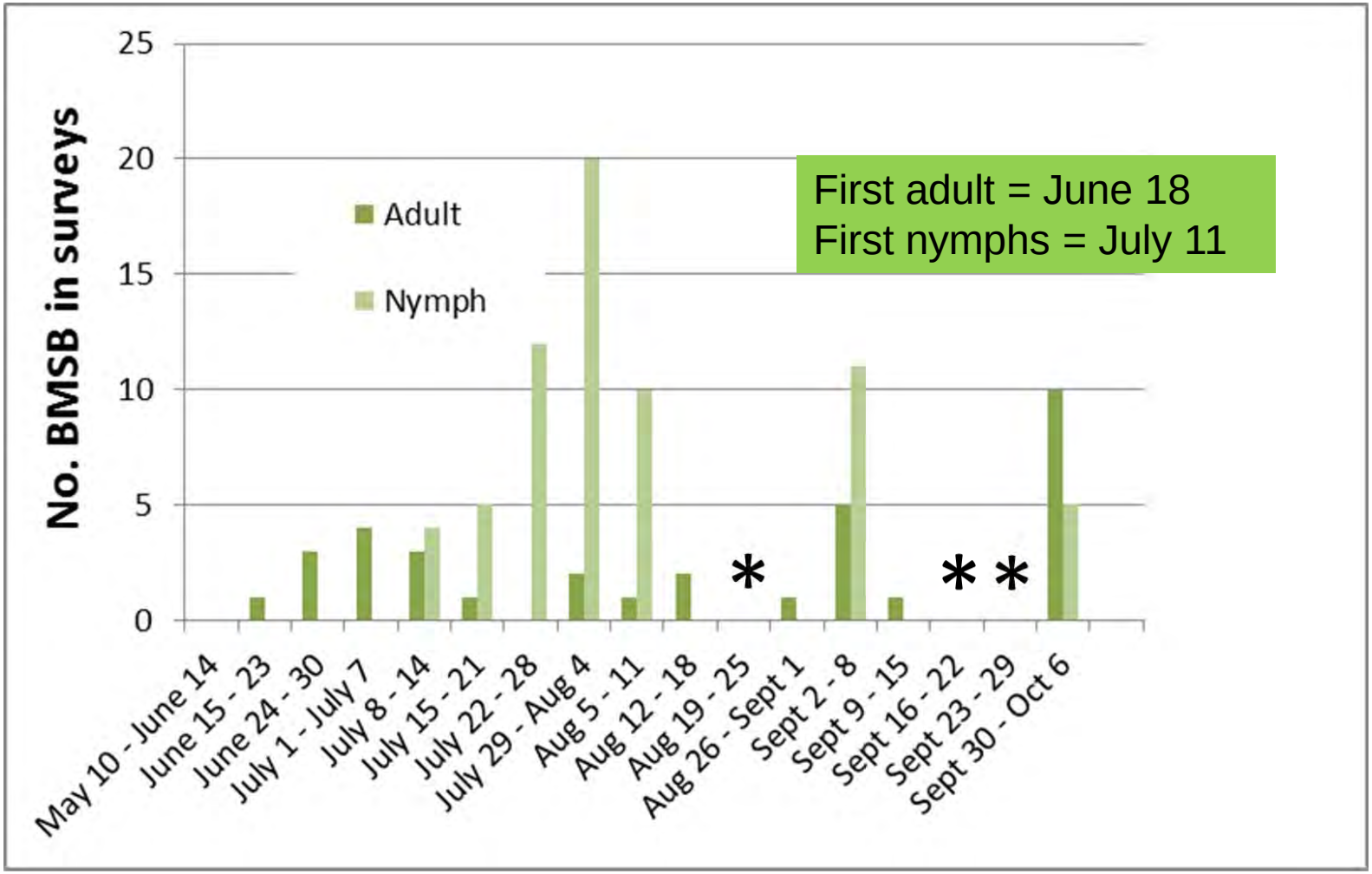
II. newsletters, tweets / blogs, conferences, online tools for IPM (e.g., CropIPM), outreach to traditional (i.e., grower) and

III. non-traditional (e.g., homeowner, botanical gardens, pest control companies and tourism) stakeholder groups.

Survey Sites
Pheromone Trap
BMSB Find

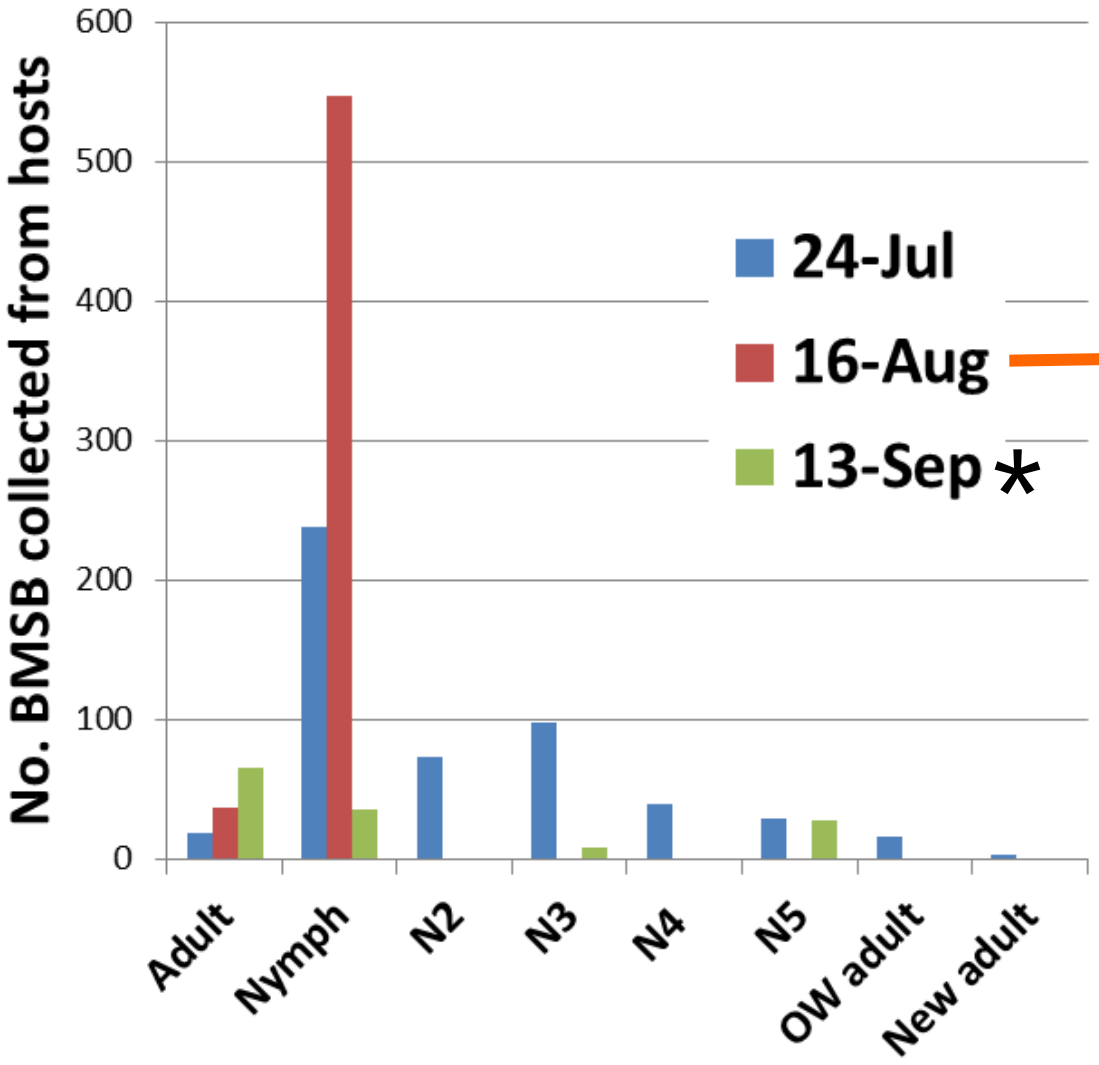
Natural/Rural
Urban/Industrial
Transportation Corridor
Agricultural

Collections on Host Plants (Hamilton sites)



* No collections during this period

Results from 2 mass collections



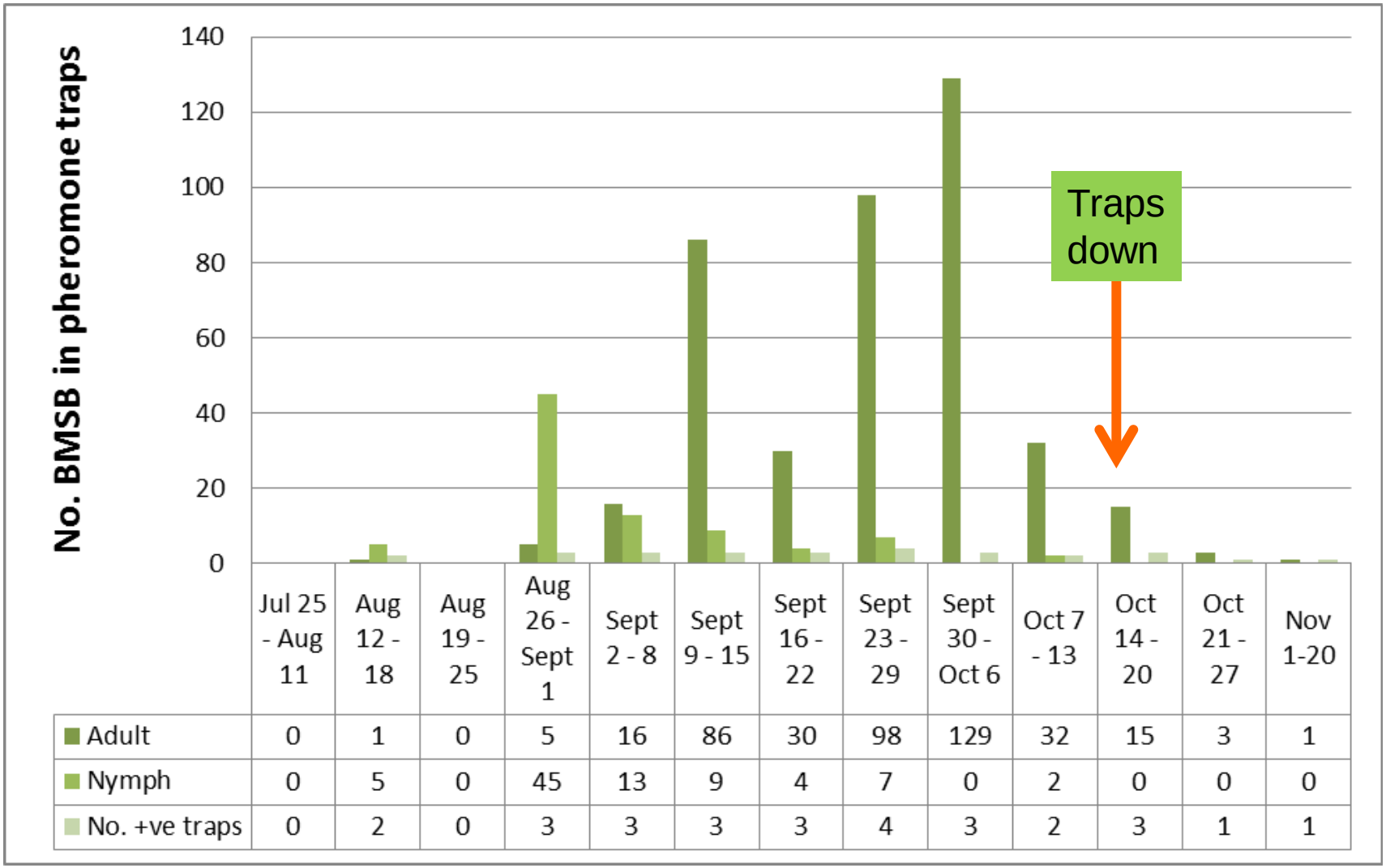
All life stages present (eggs-adult)

* Limited collection

Observed Hosts

- buckthorn
- ash
- Catalpa
- choke cherry
- crab apple
- dogwood
- American cranberry bush
- honeysuckle
- lilac
- American basswood
- Manitoba maple
- maple
- mulberry
- rose
- tree of heaven
- walnut
- wild grape

Trap catches



	Jul 25 - Aug 11	Aug 12 - 18	Aug 19 - 25	Aug 26 - Sept 1	Sept 2 - 8	Sept 9 - 15	Sept 16 - 22	Sept 23 - 29	Sept 30 - Oct 6	Oct 7 - 13	Oct 14 - 20	Oct 21 - 27	Nov 1-20
Adult	0	1	0	5	16	86	30	98	129	32	15	3	1
Nymph	0	5	0	45	13	9	4	7	0	2	0	0	0
No. +ve traps	0	2	0	3	3	3	3	4	3	2	3	1	1

Survey Sites
Pheromone Trap
BMSB Find

Natural/Rural
Urban/Industrial
Transportation Corridor
Agricultural

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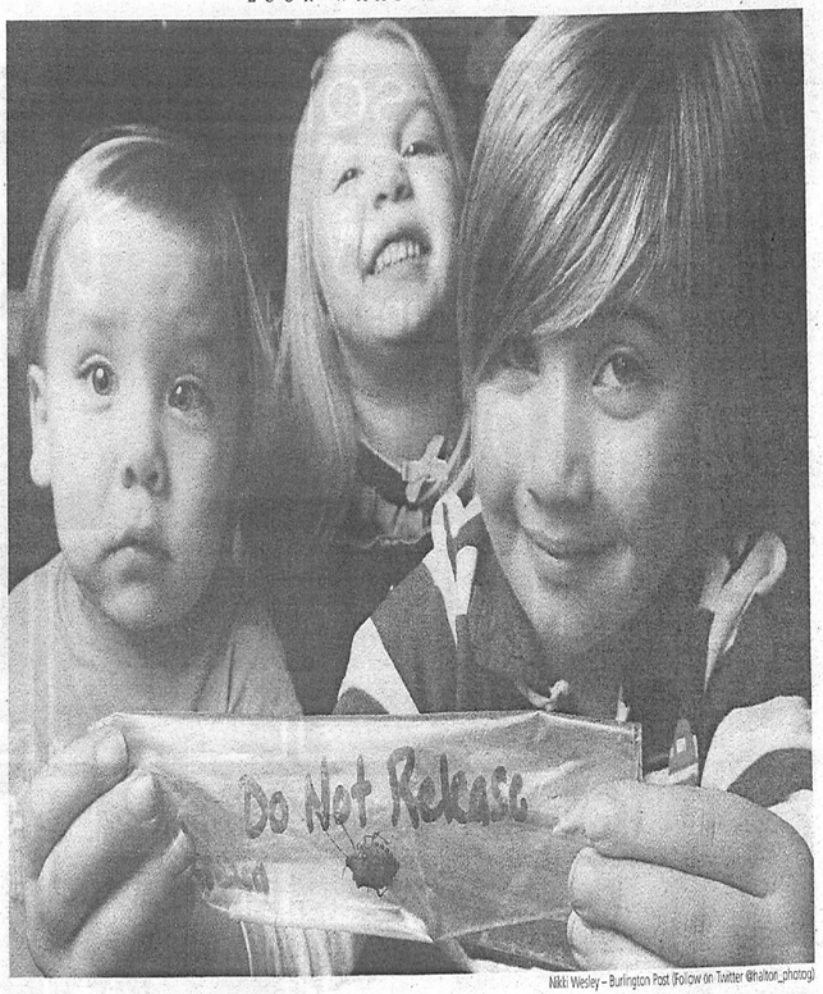
LOOK WHAT WE FOUND

Family 'captures' first local report of invasive stink bug

By Ian Holroyd
BURLINGTON POST STAFF



Nikki Wesley – Burlington Post (Follow on Twitter @halton_photog)

LITTLE STINKER: Max, 1, Lily, 3, and Jack Galivan, 5, proudly display the Brown Marmorated Stink Bug their mother Maureen discovered in a closet on Tuesday morning. The positively-identified invasive insect species — native to regions of Asia — has a voracious appetite for a variety of crops and has negatively impacted the tree fruit industry in the U.S. in recent years.

While Maureen Galivan may have found the first identified Brown Marmorated Stink Bug in Burlington, experts fear it won't be the last.

The mother of three was getting ready for work Tuesday (Oct. 16) morning at her Cindy Lane home in southeast Burlington when she opened her closet and discovered the invasive insect hiding among her clothes.

Galivan didn't know she had just captured a wanted bug, harmless to humans but a reputed crop killer.

"I was going down the stairs saying to my husband 'open the door' so that I could get it out and he looked at it and said, 'Wait, we can't. I have to kill it,'" said Galivan.

Her husband, Mike, had recently read an article in the *Hamilton Spectator* profiling the infamous Brown Marmorated Stink Bug and its voracious appetite.

"So he got a Ziploc bag and scooped it up," said Galivan, "and sure enough, it matched the newspaper article."

The couple immediately did what the article told them to do and called the Ontario Ministry of Agriculture Food and Rural Affairs to report their find.

They were put in touch with entomologist Hannah Fraser and she positively identified the Galivans' unwanted houseguest.

Fraser said the Galivans had stumbled upon a significant agricultural pest, which has been reported in Hamilton but not yet in Burlington — until now.

She said it is common for stink bugs to try and find a warm place to hide in the fall, hence its appearance in the Galivan home. She explained that during the bugs search for warm hiding spots they often fly into cargo containers, campers and vehicles, which leads to the insects migration over large distances.

The Brown Marmorated Stink Bug — native to Asia — was first introduced to North America in the mid-1990s and was first detected in Allentown, Pennsylvania in 2001.

See Stink page 8

Citizen Science

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Special issue on promoting safer worksites

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CHAPTER of the MONTH UPPER CANADA

Halyomorpha halys

Survey to determine spread of stink bug

The Ontario Ministry of Agriculture and Food and the Ministry of Rural Affairs, together with the University of Guelph and Agriculture and Agri-Food Canada, are conducting surveys across southern Ontario in 2013 and 2014 on the invasive marmorated stink bug (BMSB), Halyomorpha halys.

Established in the Hamilton area and expected to spread, the pest poses a significant risk to horticulture crops. Early detection in new geographic areas is important to limiting economic loss to Ontario's agriculture sector.

These surveys will assess the distribution and abundance of BMSB, identify habitats suitable for build-up and associated agricultural areas at high risk for damage, and develop an inventory of natural enemies.

Early detection in new areas is critical for protecting Ontario crops. For more information and tips on how to identify BMSB, visit ontario.ca/bmsb.

Report BMSB to the Agricultural Information Contact Centre by email to aginfo.omafra@ontario.ca, or call 1-877-424-1300. Collect suspect specimens for confirmation. Good quality digital photos, showing key features such as the two white bands on each antenna, can also be useful for identifying BMSB.

BMSB has a wide host range that includes agricultural crops such as tree fruit and nuts, small fruit, grapes, tomatoes, and more. However, it also attacks garden plants and trees commonly found in the landscape (catalpa, maple, ash, tree-of-heaven, lilac, hackberry, butterfly bush, mulberry, etc.).

Infestations normally occur between June and September. Adults often overwinter in human-made structures, including homes. Reports from homeowners are often the first indication of local establishment.

NEW ONLINE RESOURCE HELPS EMPLOYERS WITH COMPLIANCE

The Ministry of Labour has a variety of resources to help understand the rights and responsibilities under the Employment Standards Act.

In late April the ministry introduced a new set of tools and resources to help business owners understand pay issues, hours of work and time off, severance pay, etc.

The website at http://bit.ly/Y7cHeW has special sections. Each section has its own link to areas entitled Special Rule Topic, Hours of Work and Overtime Tool, Public Holiday Pay Calculator, Salary/Job Test, Termination Tool and Employment Standards Workbook.

CONFERENCE ADDRESSES BENEFITS OF GREEN INFRASTRUCTURE

Architects, planners, health professionals and developers, along with landscape architects and designers, gathered at the Evergreen Brickworks in Toronto on May 21-22 for the Tri-Green Grey to Green Conference.

Organized by Steven Peck, of Green Roofs for Healthy Cities, the conference focused on the economics of green infrastructure. More specifically, practical solutions to the challenges of stormwater and air pollution management, the urban heat island effect and increasing urban biodiversity were addressed.

Keynote speakers John Campbell of Waterfront Toronto and Gord Miller, Environmental Commissioner of Ontario, brought powerful messages to the podium. Campbell discussed Toronto's business model for revitalizing its waterfront, and shared the plans to upgrade minimum green building requirements and increase public parks and spaces for many people to enjoy, while improving storm water management and flood control for nearby waterways.

As Environmental Commissioner of Ontario, Miller fully recognizes and supports green infrastructure for its many benefits. He discussed the policy work his office has been involved in while looking to have green infrastructure incorporated into planning policies. Six Ontario ministries have denied the request, saying Ontario's current planning policies are adequate.

Miller noted we need to change the thinking of the provincial ministries and encourage innovation in design. Green infrastructure often saves energy and water, reduces waste and lowers operating and maintenance costs. Miller suggested that planners and development applicants on Ontario's Climate Change Adaptation Plan, as many of the points outlined in the plan mirror green infrastructure initiatives. Ontario's climate change adaptation strategy has been created by government and all ministries are now on board.

After lunch, which was served on the trade show floor, attendees could choose from one of six breakout sessions on the economic opportunities of green infrastructure, urban agriculture and vertical farming, calculating the benefits of green infrastructure through storm water management and energy savings as well as other presentations from landscape, green roof planners and architects.

Ontario's Least Wanted: Report the Brown Marmorated Stink Bug

Help Protect Our Crops

The Brown Marmorated Stink Bug (BMSB) is an invasive insect pest from Asia. It is now established in parts of southern Ontario. Early detection in new geographic areas is important for limiting economic loss to Ontario agriculture.

Shoulders lack serrated edges, with a single spine below the eye (adults)

Photo Credit: Franz Vanoosthuyse

Adults: 14-17 mm

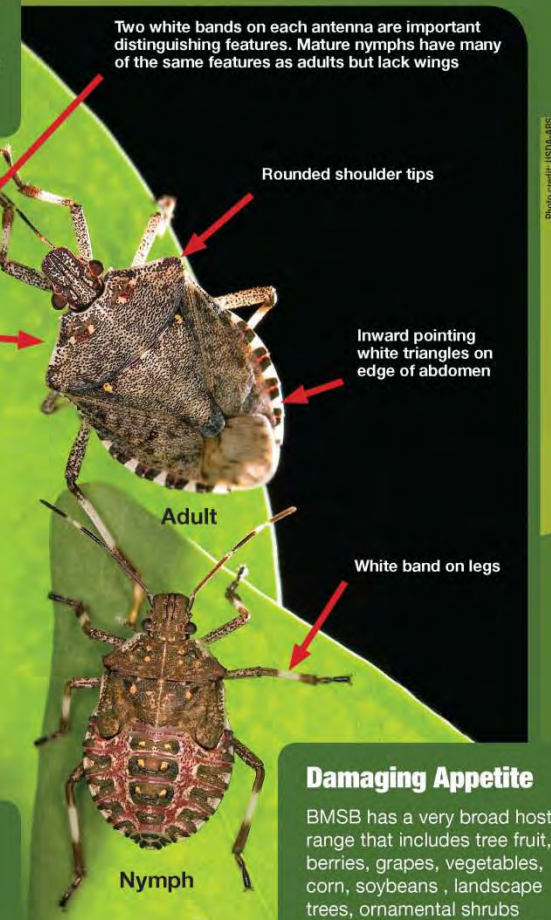

Photo credit: USDA-ARS

A Nuisance to Homeowners

Adults often overwinter in human-made structures including homes and other buildings. In areas where populations are high, BMSB can become a major nuisance pest due to aggregations found indoors through the fall and winter.

Damaging Appetite

BMSB has a very broad host range that includes tree fruit, berries, grapes, vegetables, corn, soybeans , landscape trees, ornamental shrubs and garden plants. Feeding damage affects yield and marketability of commercial crops.

Brown Marmorated Stink Bug (BMSB)

Key Features

- "shield" shape
- 14-19 mm long, 8 mm wide
- two white bands on each antenna
- smooth edge along pronotum or "shoulders"
- white triangles in pattern along abdomen

Photo credit: J. Read, NRCan

Pronotum Close-up

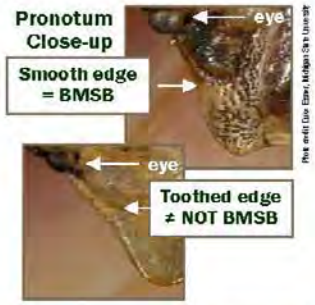

Photo credit: Dave Ebner, Michigan State University

Crops at risk include: tree fruit, berries, grapes, fruiting vegetables, corn, soybeans, ornamental trees and shrubs.

Ministry of Agriculture and Food

Ministry of Rural Affairs

Ontario

BMSB Look-a-Likes

These similar-looking insects all lack BMSB white bands on their antennae.

Western Conifer Seed Bug. Bodies are more elongated. (Photo credit: David Cappaert, Michigan State

Rough Stink Bug. Edge of pronotum is heavily toothed. (Photo credit: Steven Valley, Oregon Department of Agriculture)

Common Brown Stink Bug adult. Edge of pronotum serrated. (Photo credit: David Cappaert, Michigan State University)

BMSB nymphs have white bands on the antennae and prominent white bands on legs. (USDA APHIS PPQ, Bugwood.org)

If you think you have found BMSB, please contact the Agricultural Information Contact Centre at 1-877-424-1300 or ag.info.omafra@ontario.ca
More information is also available at: **ontario.ca/stinkbug**


Pest Watch: Brown Marmorated Stink Bug
Monitoring of Spotted Wing Drosophila in Ontario in 2012
OMAFRA's Field Crop Specialists are working for you ...
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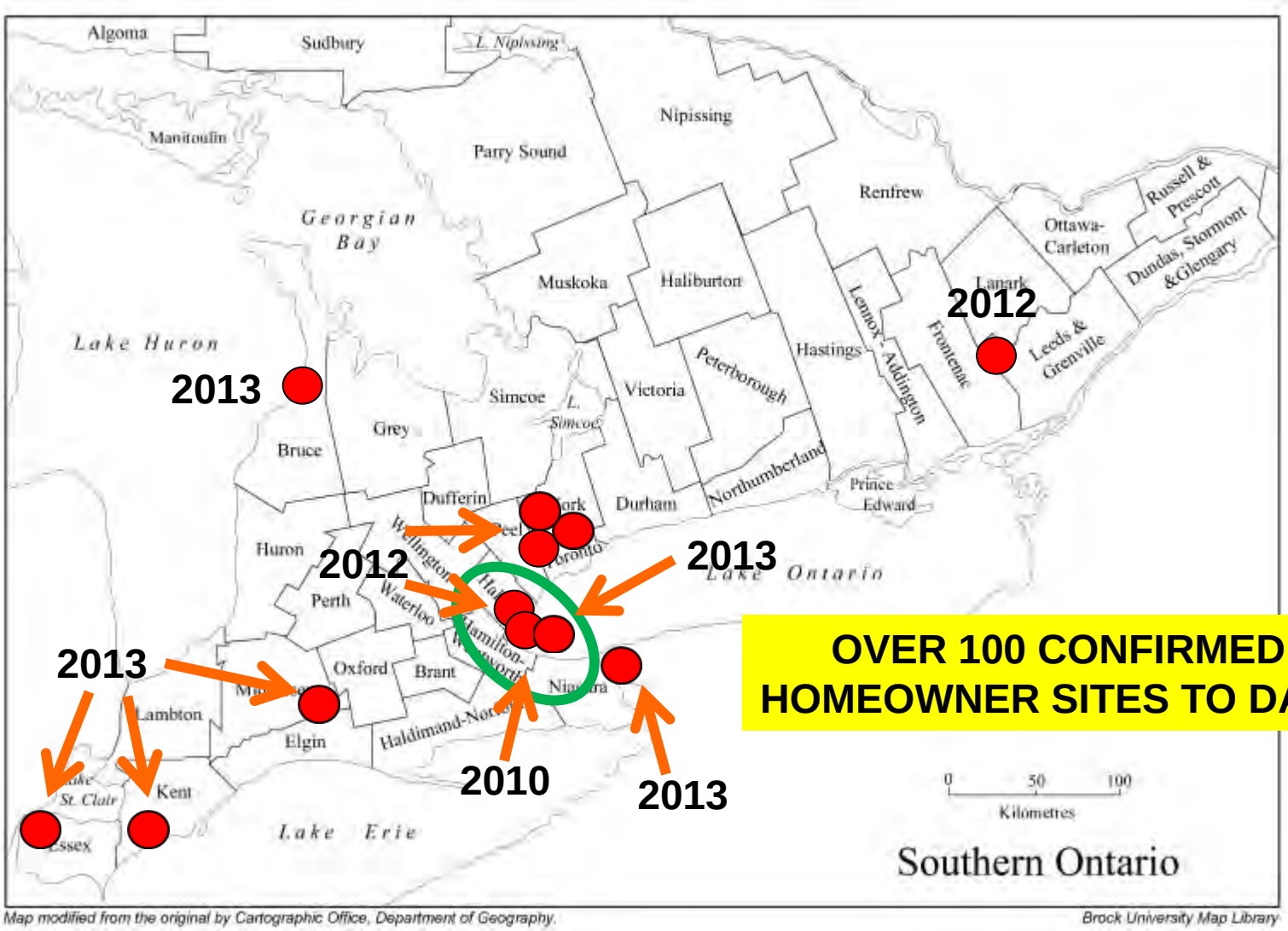
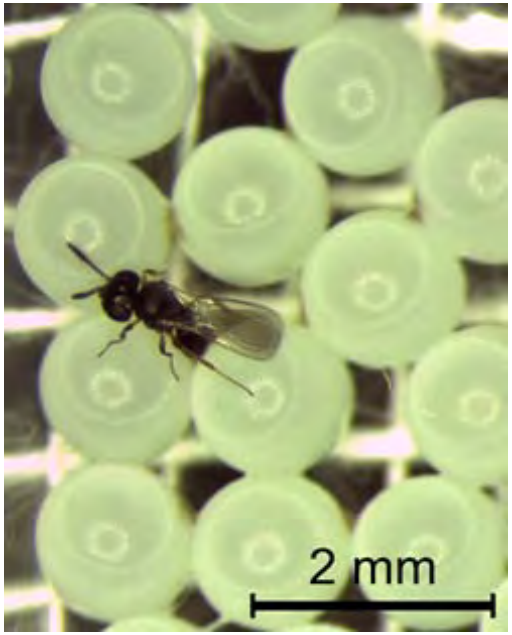
Homeowner Finds in Ontario



OVER 100 CONFIRMED HOMEOWNER SITES TO DATE

Exposure of Sentinel Egg Masses



- 434 egg masses exposed June - October 2013
- *Thyanta acerra* (n=57), *Euschistus variolarius* (n=101), *Acrosternum hilare* (n=25), *Podisus maculiventris* (n=210), and *Holcostethus limbolarius* (n=41)
- 50.5% produced stink bug nymphs once returned to the laboratory for rearing
- 49.5% failed to produce stink bug nymphs …

Exposure of Sentinel Egg Masses

- 15% of the egg masses showed signs of attack by predators
- parasitoids emerged from 3.5% of the exposed egg masses
- 31% failed to produce nymphs or parasitoids, and showed no signs of predation
  - suspect that many of these eggs were attacked by parasitoids which failed to complete development to the adult stage
  - will be confirmed using DNA-based technology to detect parasitoid DNA within unhatched eggs

Summary

1. BMSB may already be widespread in Southern ON
2. Establishment in agricultural crops not confirmed.
3. OW and new adults by mid July - is there potential for a partial 2nd generation of BMSB in southwestern ON???
4. Pheromone trapping systems may be useful as early detection tools.
5. Survey in 2014 needed to determine the potential impact of NEs on BMSB in newly invaded areas.
6. Additional survey work in 2014 will be required to confirm BMSB in other parts of Ontario, including those areas associated with new homeowner finds.

Our Team

University of Guelph

- Dr. Cynthia Scott-Dupree – Supervisor
- Cam Menzies
- Drew Mochrie
- Alexander Kruger
- Melissa Eisen

Agriculture and Agri-Food Canada

- Dr. Tara Gariepy – supervisor
- Allison Bruin
- Chris Hughes
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- Terese Bonefant

UNIVERSITY of GUELPH

Agriculture and Agri-Food Canada | Agriculture et Agroalimentaire Canada

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- Hannah Fraser – supervisor
  - Maureen Balsillie, Brittany Day
- Tracey Baute – supervisor
  - Morgan Kluka, Janet Lowther, Jennifer Bruggerman
- Margaret Appleby – supervisor
  - Megan Williamson, Jordan McDougall

Well this stinks. Then again, what did I expect would happen when I dared enter the domicile of not one but TWO intrepid entomologists?

Questions?