Tour d’horizon - Suisse - USA - Canada

Dr. Pierre Girod Plant-Insect Ecology and Evolution – Carrillo's Lab UBC
Groupe de travail *Halyomorpha halys* GIS Fruit – 25 Mars, 2021

Dr Tim Haye CABI Suisse

Dr Paul Abram AAFC BC, Canada

Agriculture and Agri-Food Canada | Agriculture et Agroalimentaire Canada

Land acknowledgment

The University of British Columbia is situated on the traditional, ancestral and unceded territory of the Musqueam people - *xʷməθkʷəy̓əm*

Une invasion mondiale

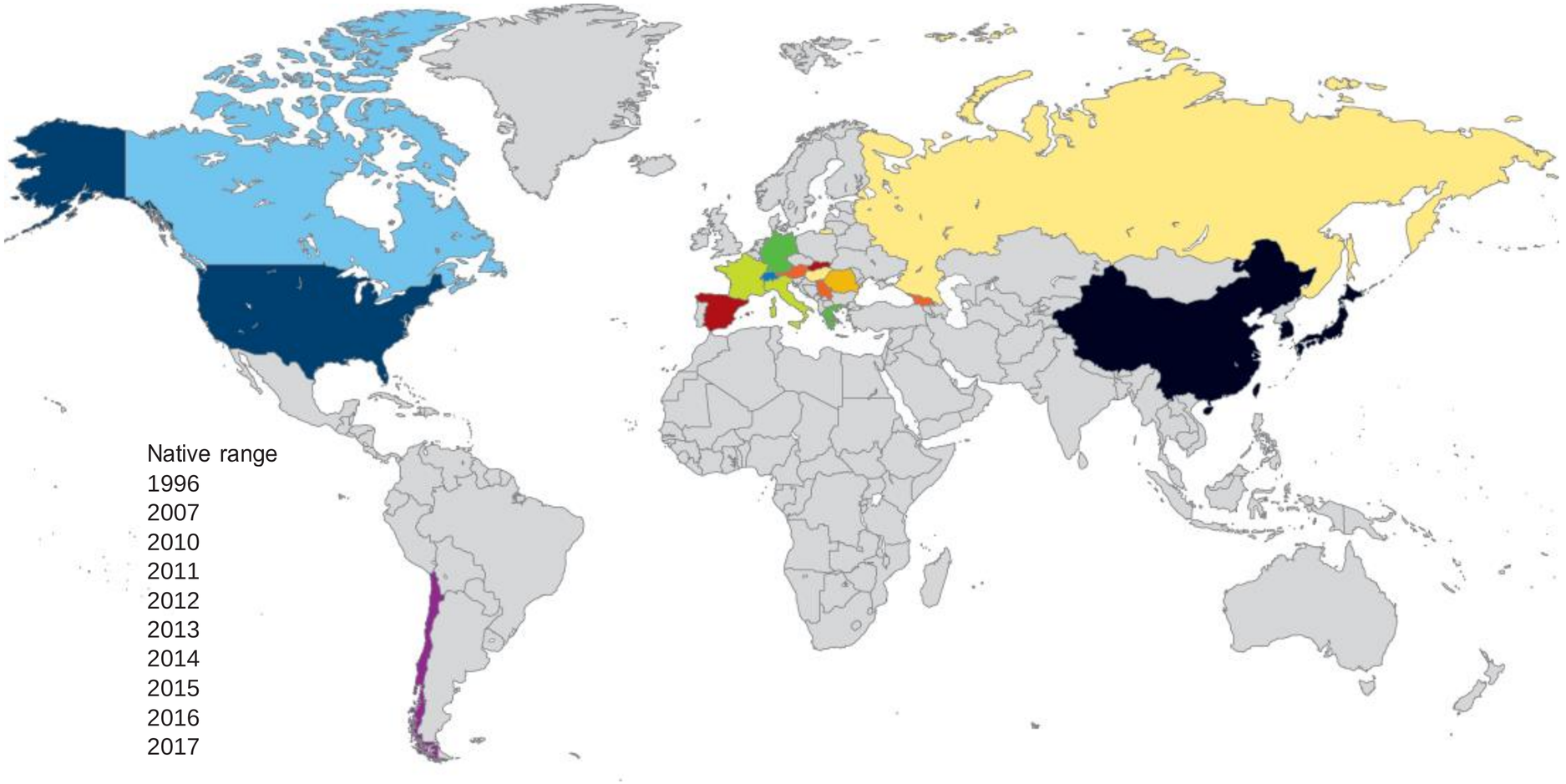
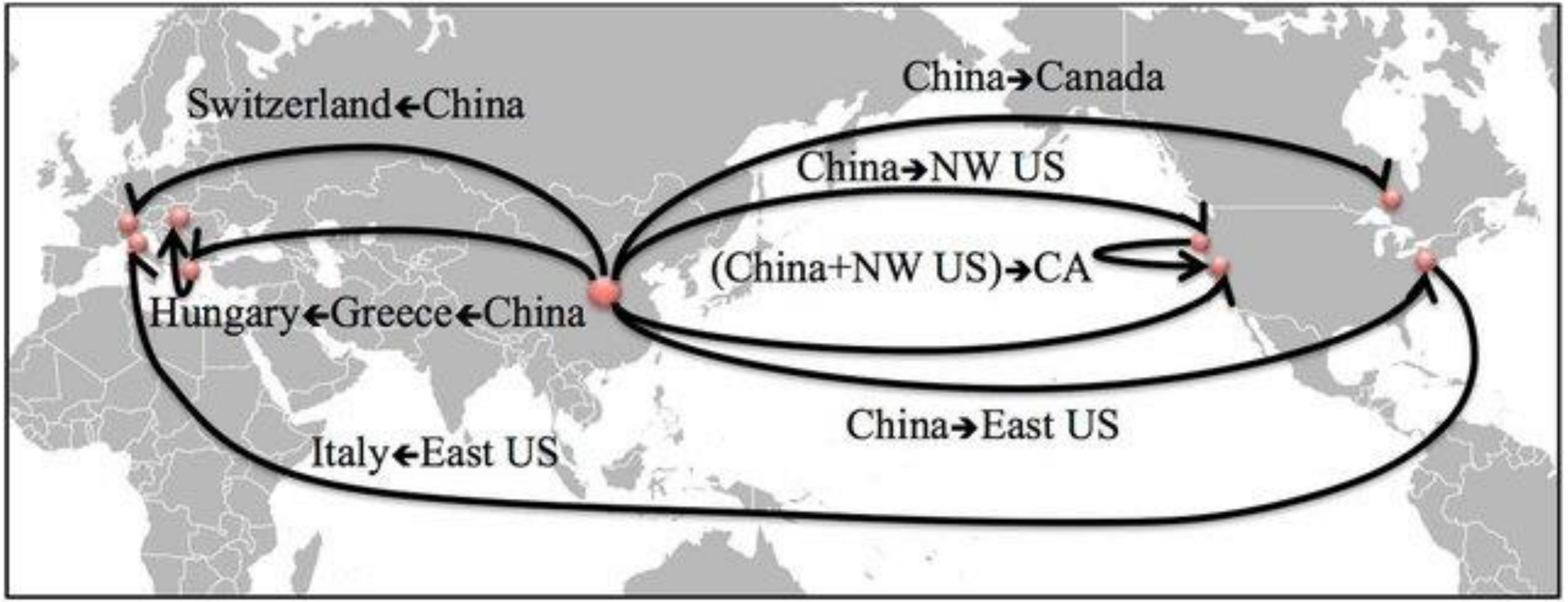


Figure 1

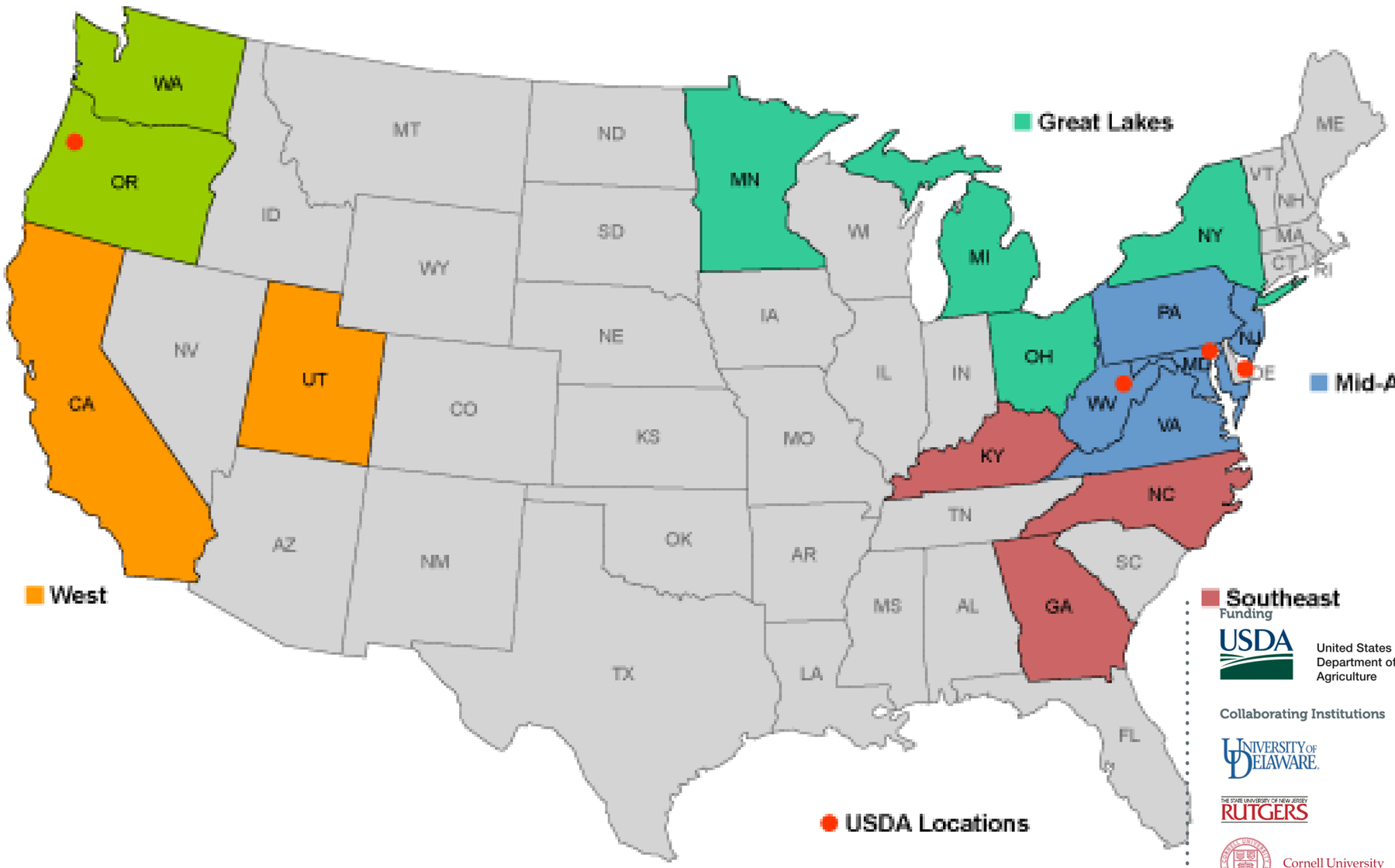
Global distribution of established *Halyomorpha halys* [brown marmorated stink bug (BMSB)] populations in the native range and in the invaded range by year of detection, not of interceptions. Year of detection is based on the earlier of published reports or European and Mediterranean Plant Protection Organization reporting (**https://gd.eppo.int/taxon/HALYHA/distribution**). Detailed information on the distribution of BMSB in the United States is available at **https://www.stopbmsb.org**.

Une invasion mondiale



Organizational Structure

Project Leaders Located in 17 States



Funding

USDA United States Department of Agriculture

National Institute of Food and Agriculture

Specialty Crop Research Initiativ

Grant #2011-01413-30937

Collaborating Institutions

University of Delaware · Penn State · Rutgers · Northeastern IPM Center · Washington State University · Cornell University · University of Maryland · VirginiaTech · OSU Oregon State University · NC State University

HOME - ABOUT US - Project Team

Project Team

Project Directors

Jim Walgenbach, project director, guides our interdisciplinary team of researchers.

- Jim Walgenbach, NC State University

In addition, the project has six co-directors from different regions of the country and the USDA-ARS.

- Elizabeth Beers, Washington State University (Pacific Northwest Region)
- Kent Daane, University of California-Berkeley (Western Region) [Email]
- Larry Gut, Michigan State University (Great Lakes Region) [Email]
- Tom Kuhar, Virginia Tech (Mid-Atlantic Region)
- Tracy Leskey, USDA-ARS Appalachian Fruit Research Station (USDA-ARS) [Email]
- Mike Toews, University of Georgia (Southeastern Region) [Email]

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- David Crowder – Obj. 1 – Landscape ecology, Washington State University [Email]
- Kim Hoelmer – Obj. 2 – Biological control (predators and parasites), USDA-ARS
- Ann Hajek – Obj. 2 – Biological control (pathogens), Cornell University
- Anne Nielsen – Obj. 3 – Decision tools and management tactics, Rutgers University [Email]
- Jayson Harper – Obj. 4 – Economics, Penn State [Email]
- Deb Grantham – Obj. 5 – Outreach, Northeastern IPM Center, Cornell University [Email]

Extension Committee

- Art Agnello, Cornell University
- Diane Alston, Utah State University
- Ric Bessin, University of Kentucky
- George Hamilton, Rutgers University
- Jayson Harper, Penn State
- Nik Wiman, Oregon State University
- Deb Grantham, Northeastern IPM Center
- Mike Webb, Northeastern IPM Center
- Kevin Judd, Northeastern IPM Center
- David Lane, Northeastern IPM Center
- Nancy Cusumano, Northeastern IPM Center
- Jim Walgenbach, NC State University

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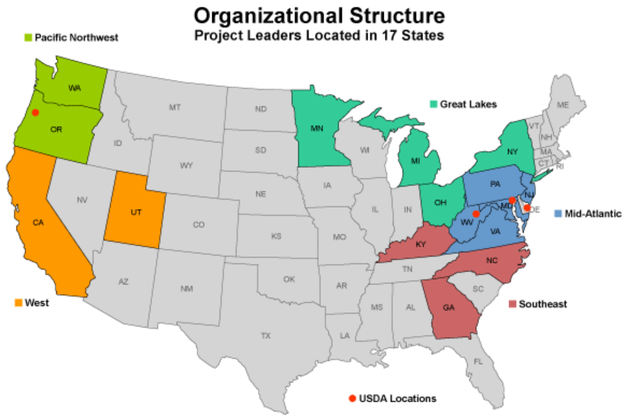

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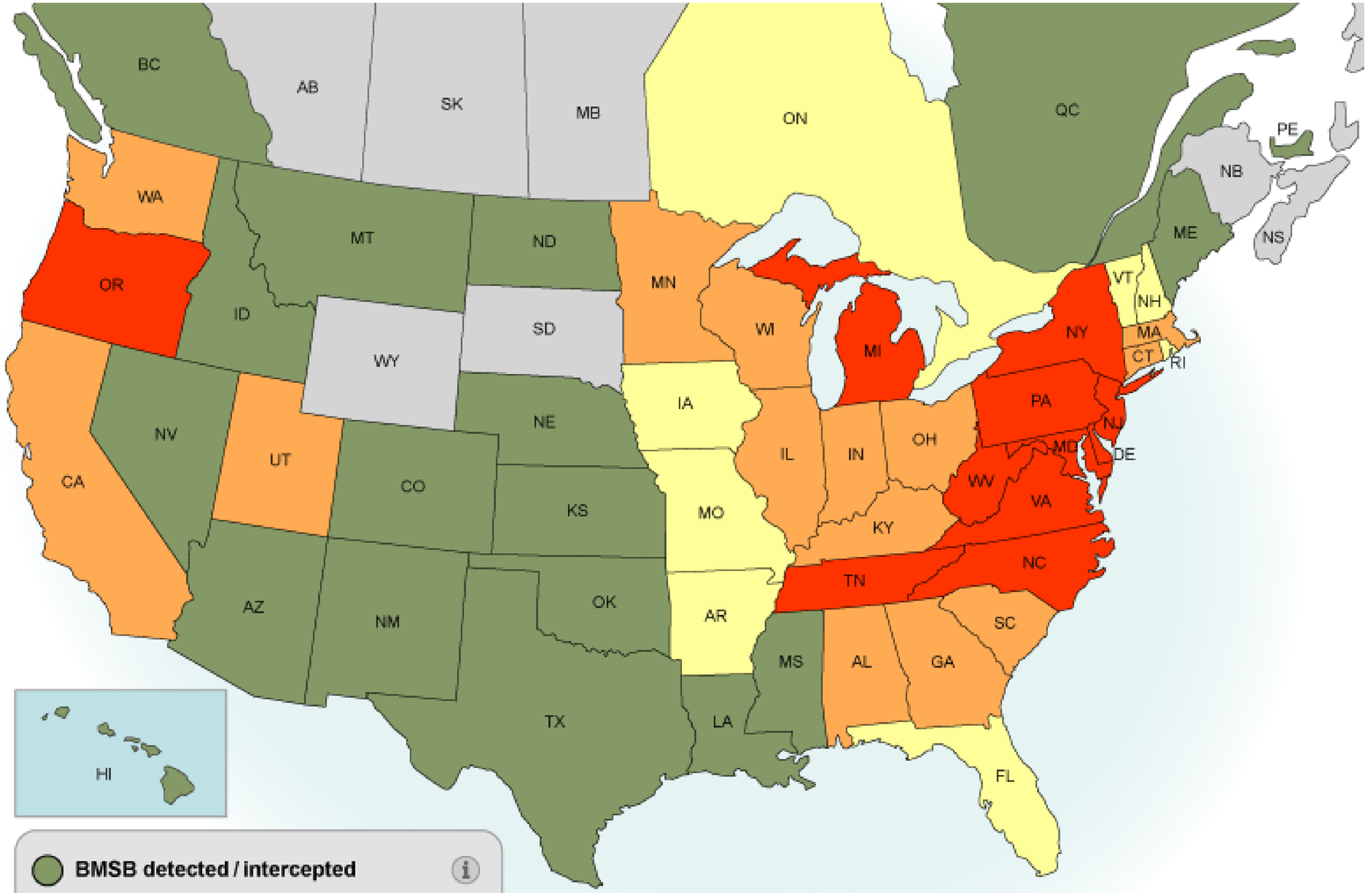
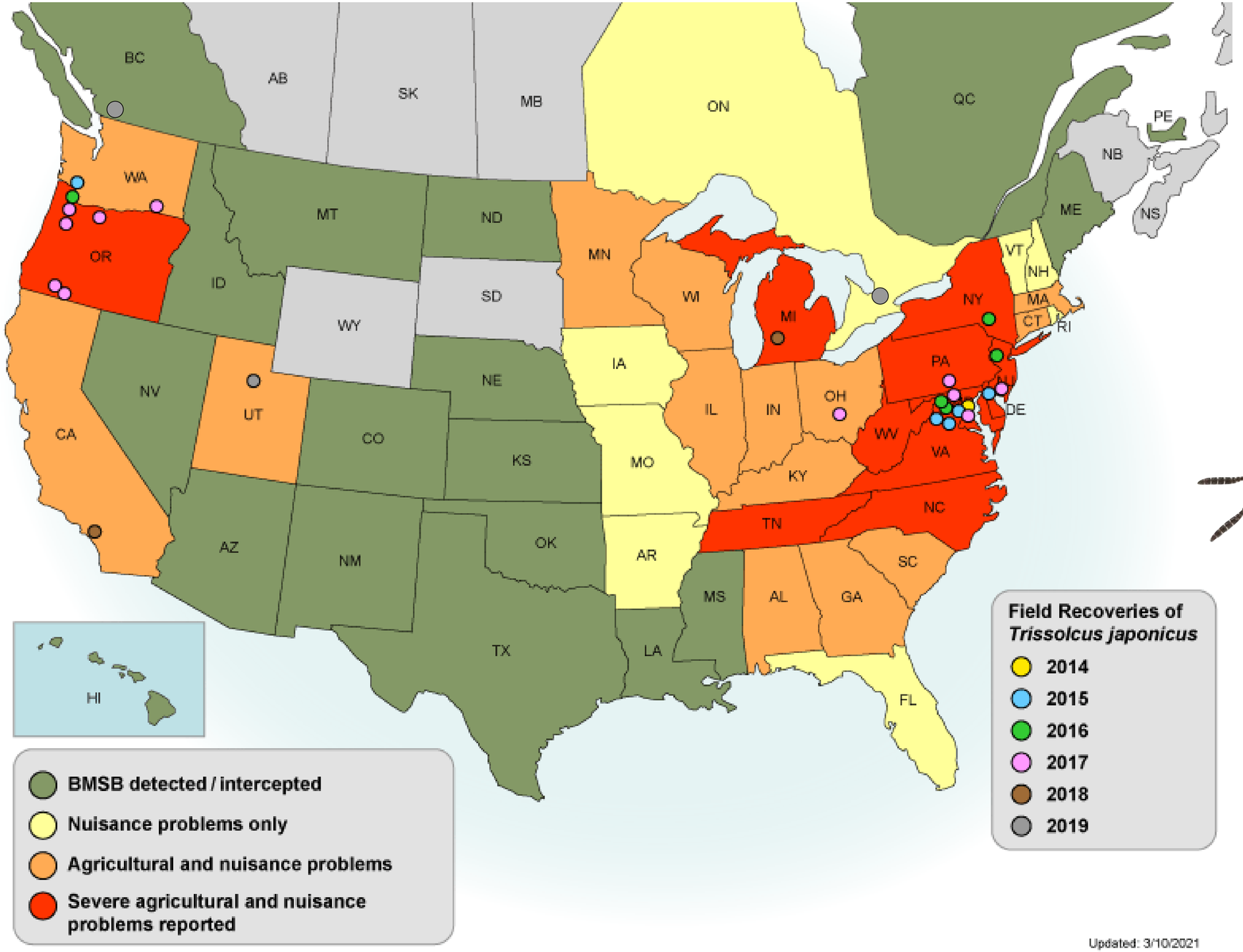


Updated: 3/10/2021

Trissolcus japonicus – la Guêpe Samuraï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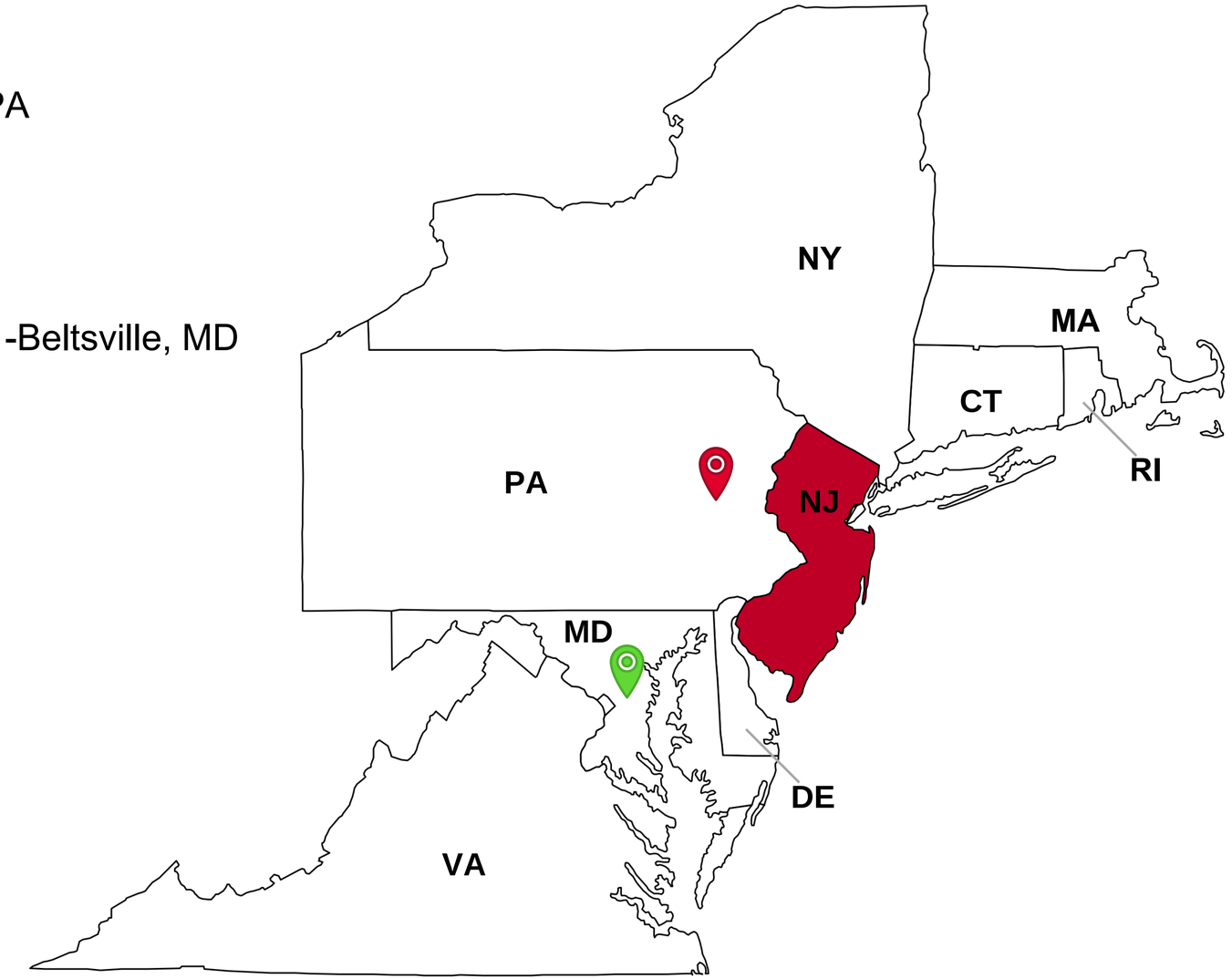
IN
KY
TN
AL
OH
WV
GA
FL
SC
NC
VA
PA
NY
VT
NH
MA
CT
RI
NJ
DE
HI
BMSB detected / intercepted
Nuisance problems only
Agricultural and nuisance problems
Severe agricultural and nuisance problems reported
Field Recoveries of
Trissolcus japonicus
2014
2015
2016
2017
2018
2019
Updated: 3/10/2021

BMSB sur la côte Est

BMSB 1995 - Allentown, PA

Trissolcus japonicus 2014 -Beltsville, MD

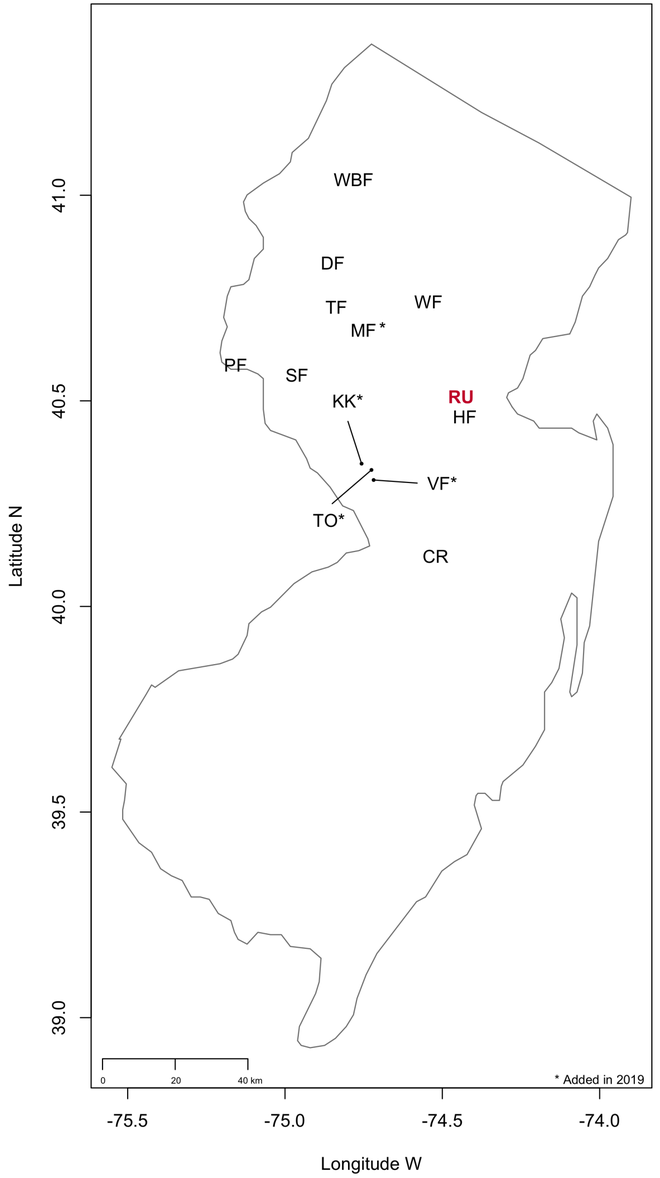


Méthode de surveillance

- Interface Champs/Forêt
- 12 Sites:

  - **3 centres de recherche Rutgers**

- 9 Producteurs



- Méthodes de piégeage

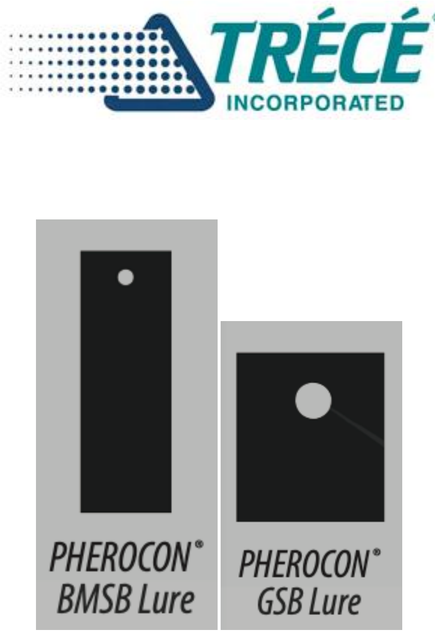
- 2 Pièges collants transparents

- 2 Phéromones TRECE

Méthode de surveillance

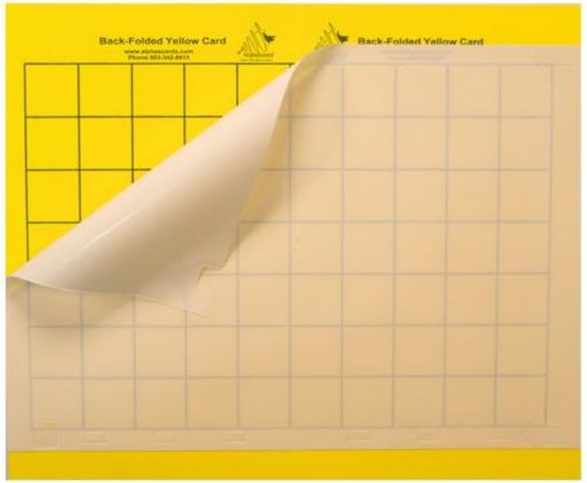
- BMSB:

Pièges collants transparents + TRECE phéromone

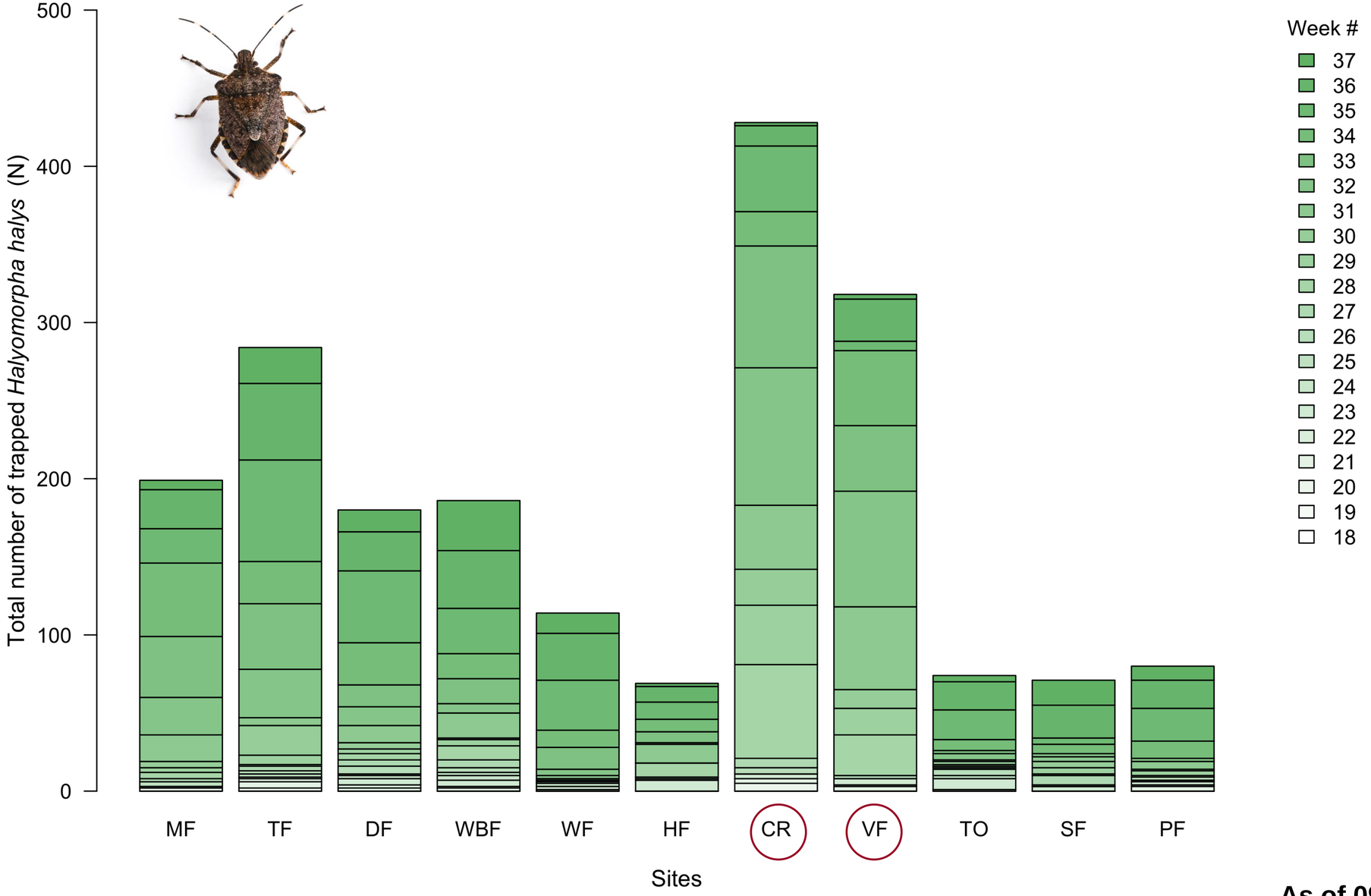


- *Trissolcus* sp.:

Pièges collants jaune

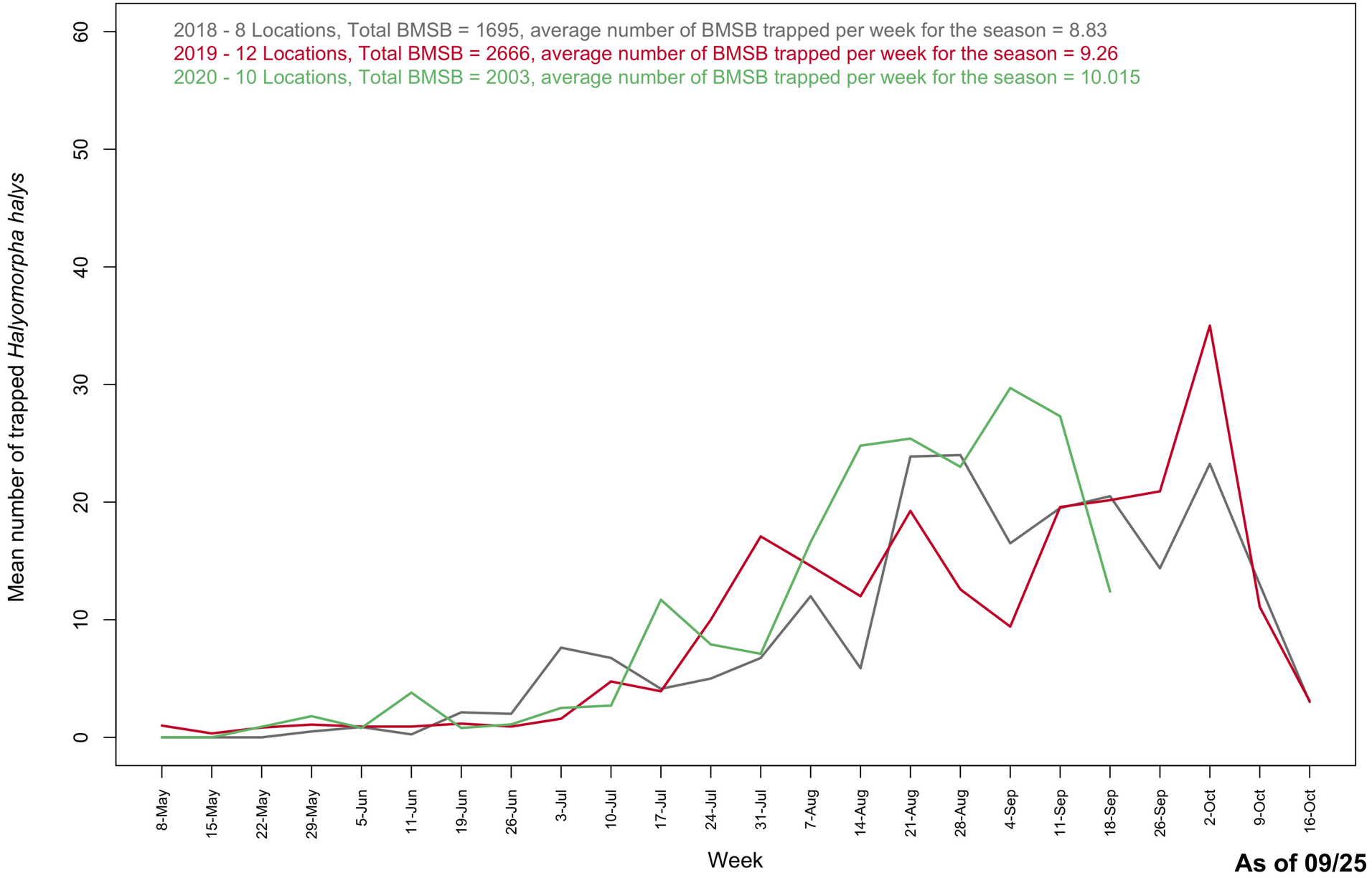


Rutgers Experimental Stations and SCRI Farms BMSB trapping collection in 2020



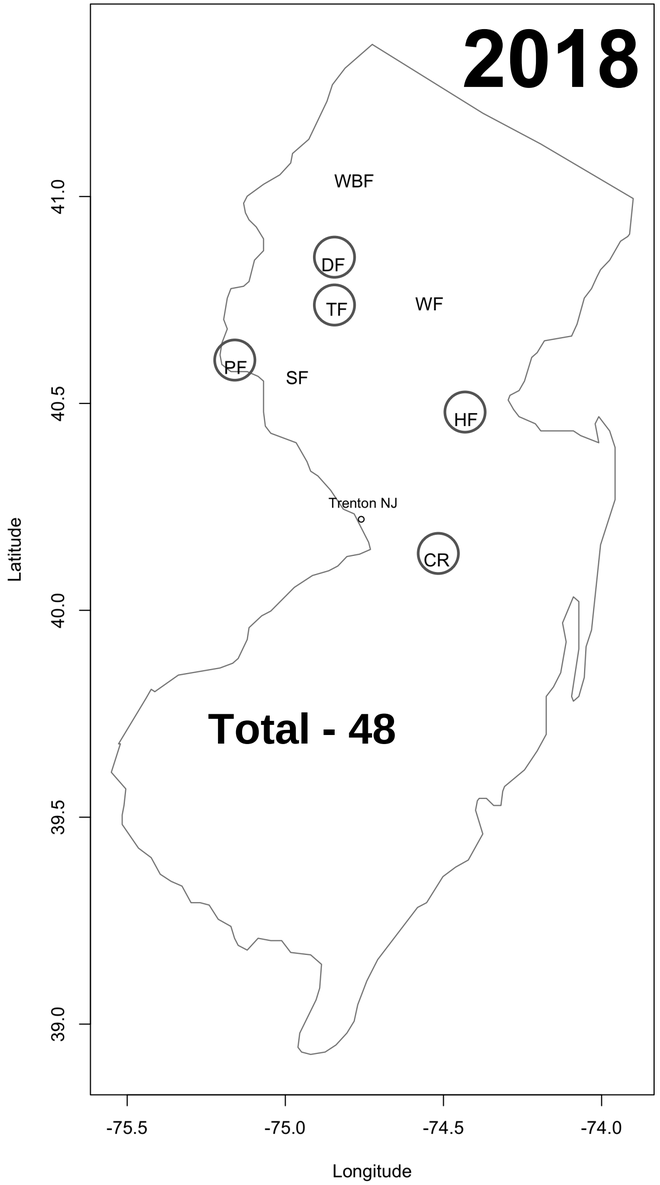
As of 09/25

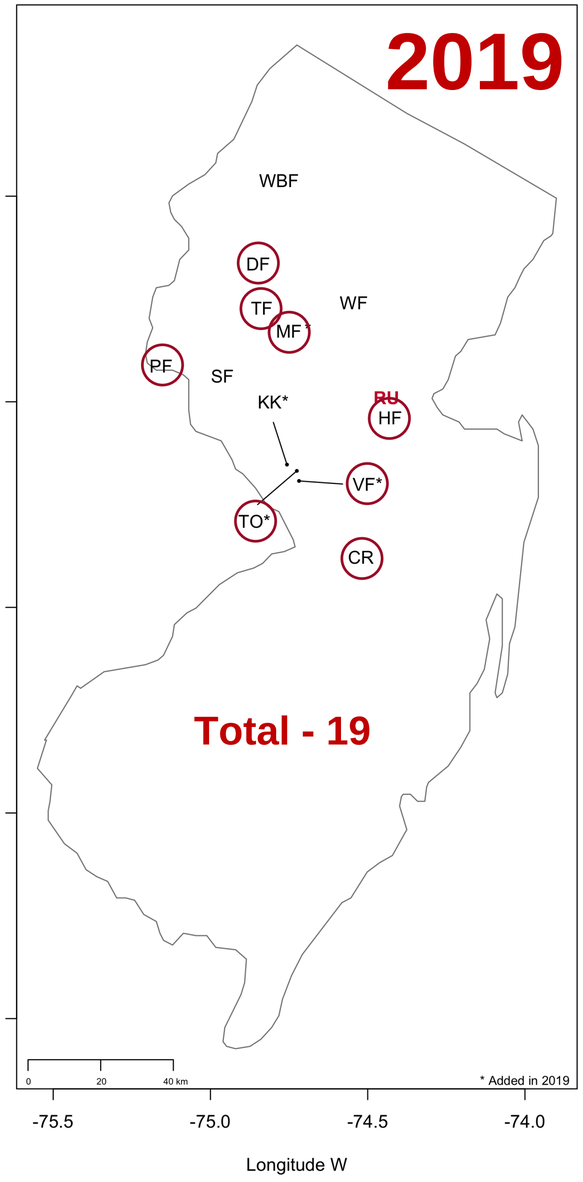
Rutgers Experimental Stations and SCRI Farms BMSB trapping collection in 2018-2020

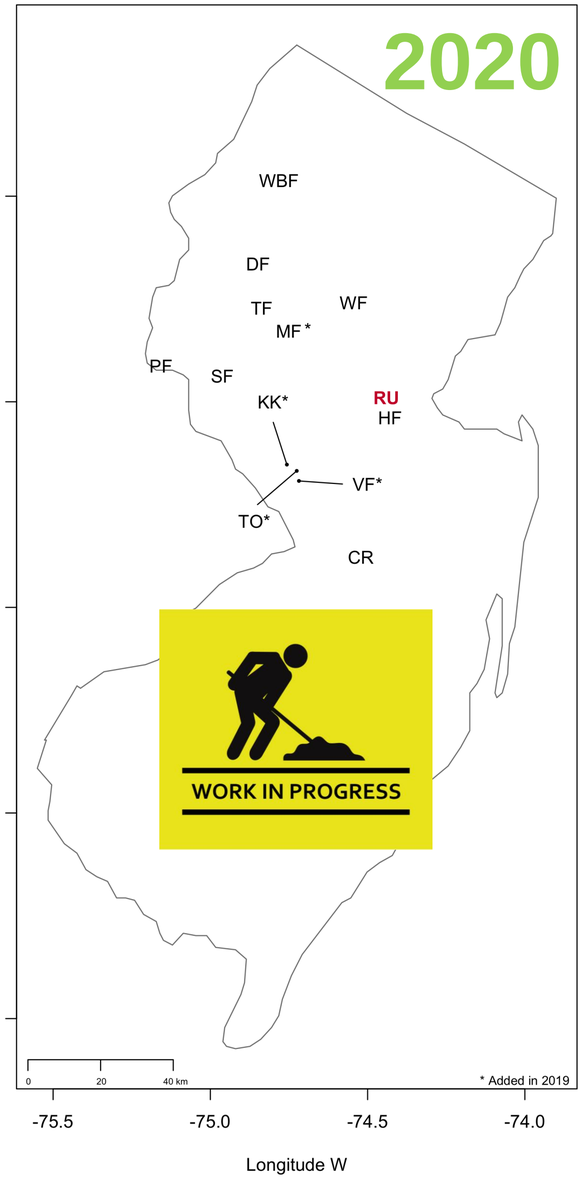


As of 09/25

Distribution de *T. japonicus* dans le New Jersey







Plaques d’œufs sentinelles

- Exposition de plaques d’œufs de punaise
- 24H
- 4 Sites:
  - **R.** Horticultural station
  - **R.** Snyder Farm
  - **R.** Cream Ridge
  - Philipps Farm
- 20 plaques par site

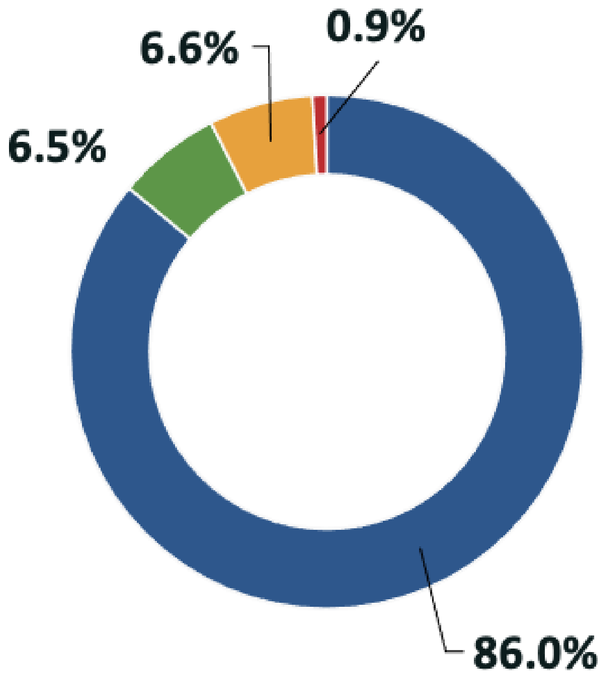
Distribution de *T. japonicus* dans le New Jersey

- 220 egg masses **exposed** - 6,044 eggs
- 27 egg masses **completely** or **incompletely chewed** - 393 eggs
- 17 egg masses **missing** - 394 eggs
- 4 egg masses **parasitized** - 54 parasitoids

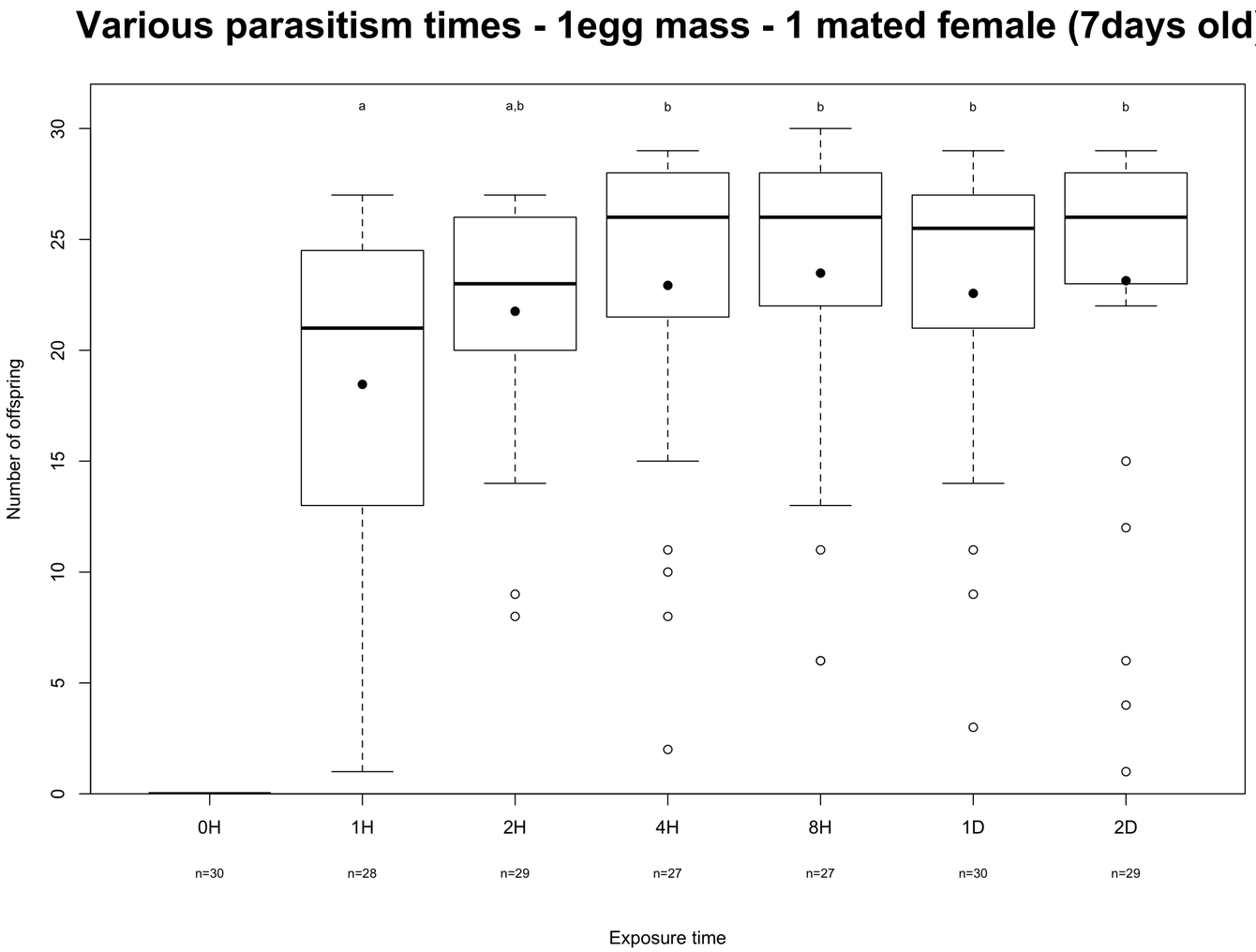
- *Anastatus* sp.

- *Trissolcus brochymenae*

- *Trissolcus japonicus*



Est ce que *Trissolcus japonicus est un bon candidat – durée de parasitisme*

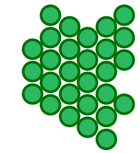


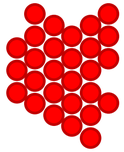
- Positive parasitism in 1H - higly variable parasitism

Est ce que *Trissolcus japonicus est un bon candidat – spécificité*

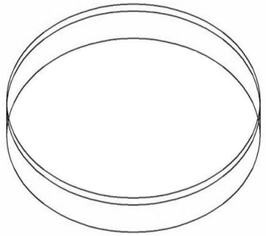
Halyomorpha halys

Podisus maculiventrus





Trissolcus japonicus

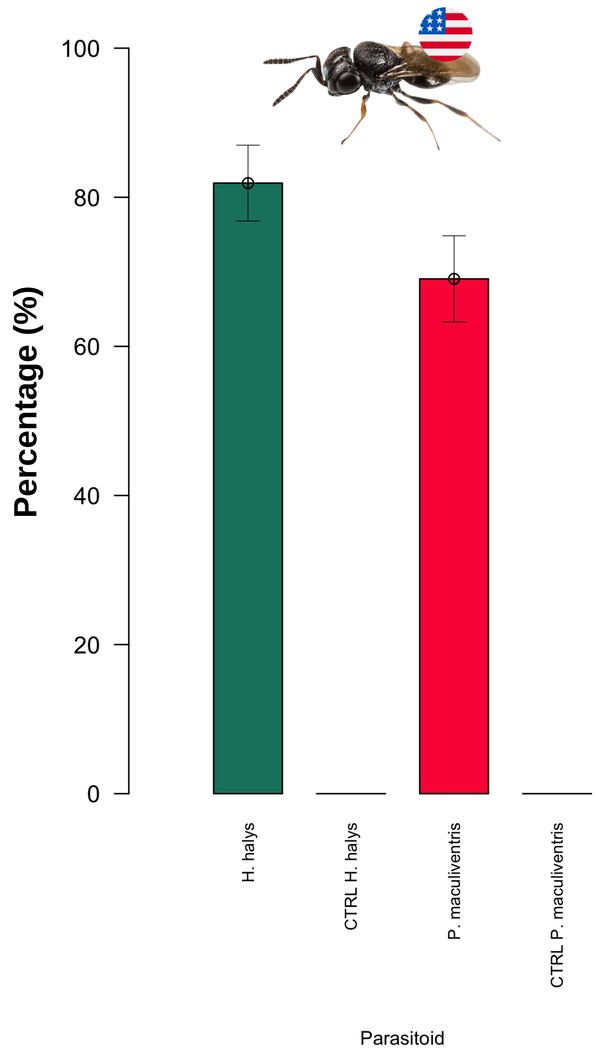


4H parasitism - 1egg mass - n=30 - no choice test

Murgantia histrionica

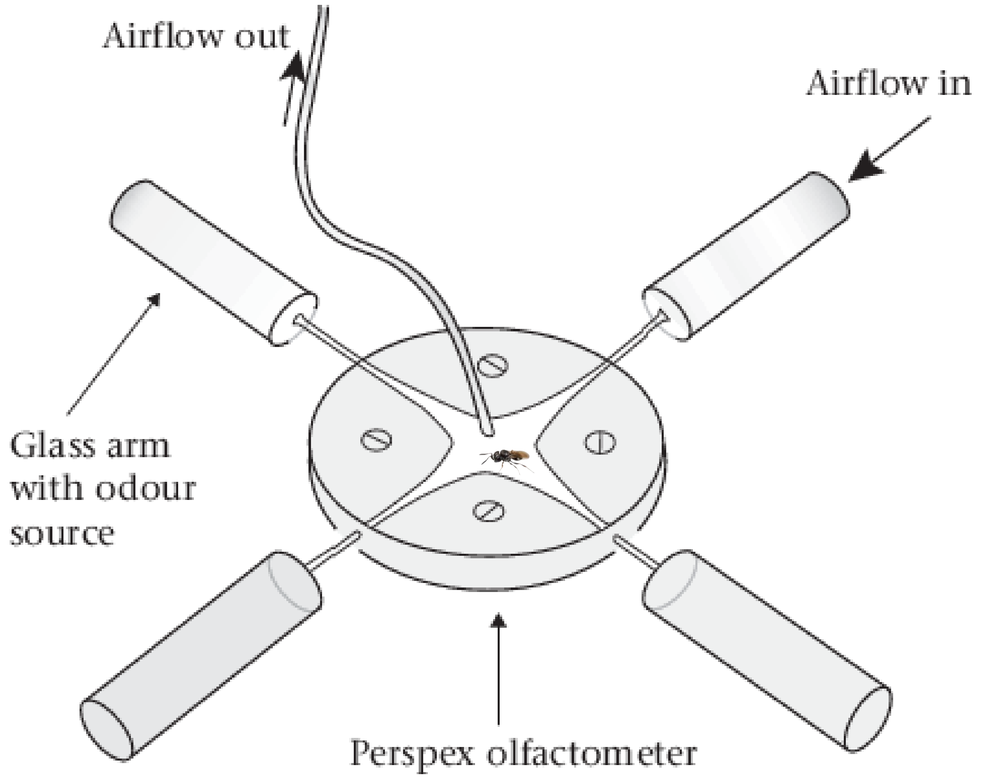
Euschistus tristigmus

Est ce que *Trissolcus japonicus est un bon candidat – spécificité*

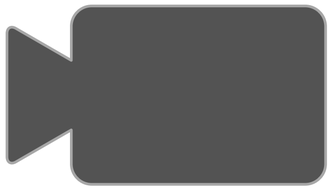


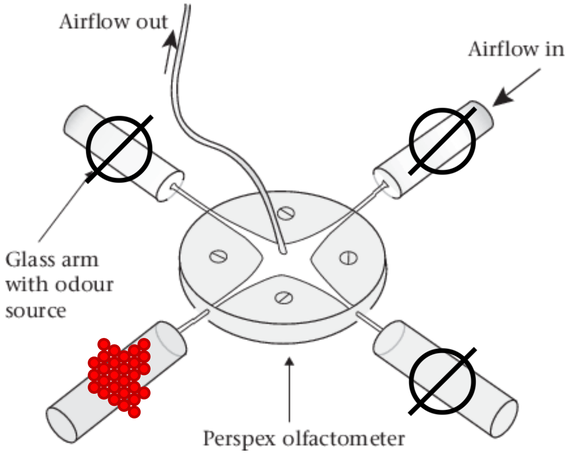
Est ce que *Trissolcus japonicus est un bon candidat – olfactometre*

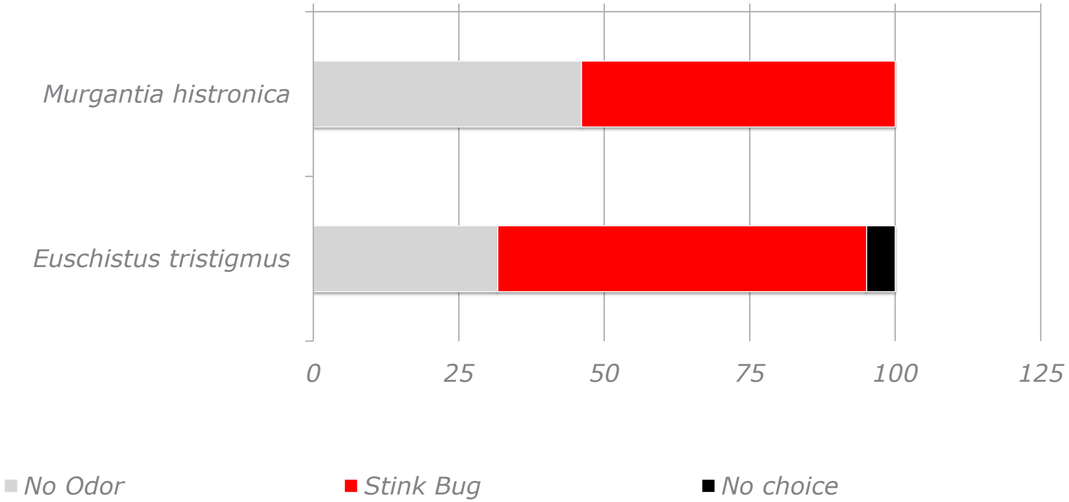
- Olfactomètre à 4 bras
- 1 femelle *T. japonicus* (n=20)
- Observe le choix de l'insecte – Nombre de mouvements et la durée



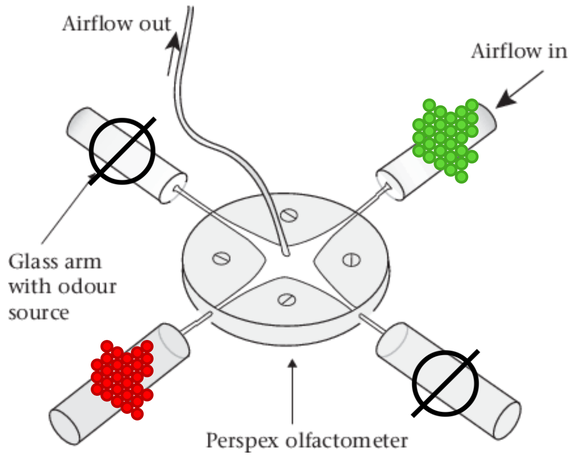
10 minutes

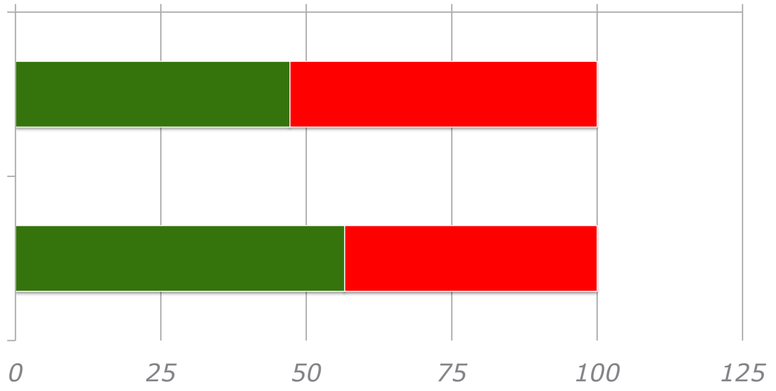


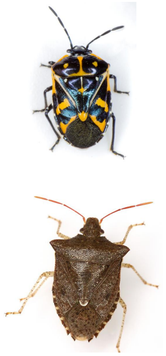

Airflow out
Airflow in
Glass arm
with odour
source
Perspex olfactometer

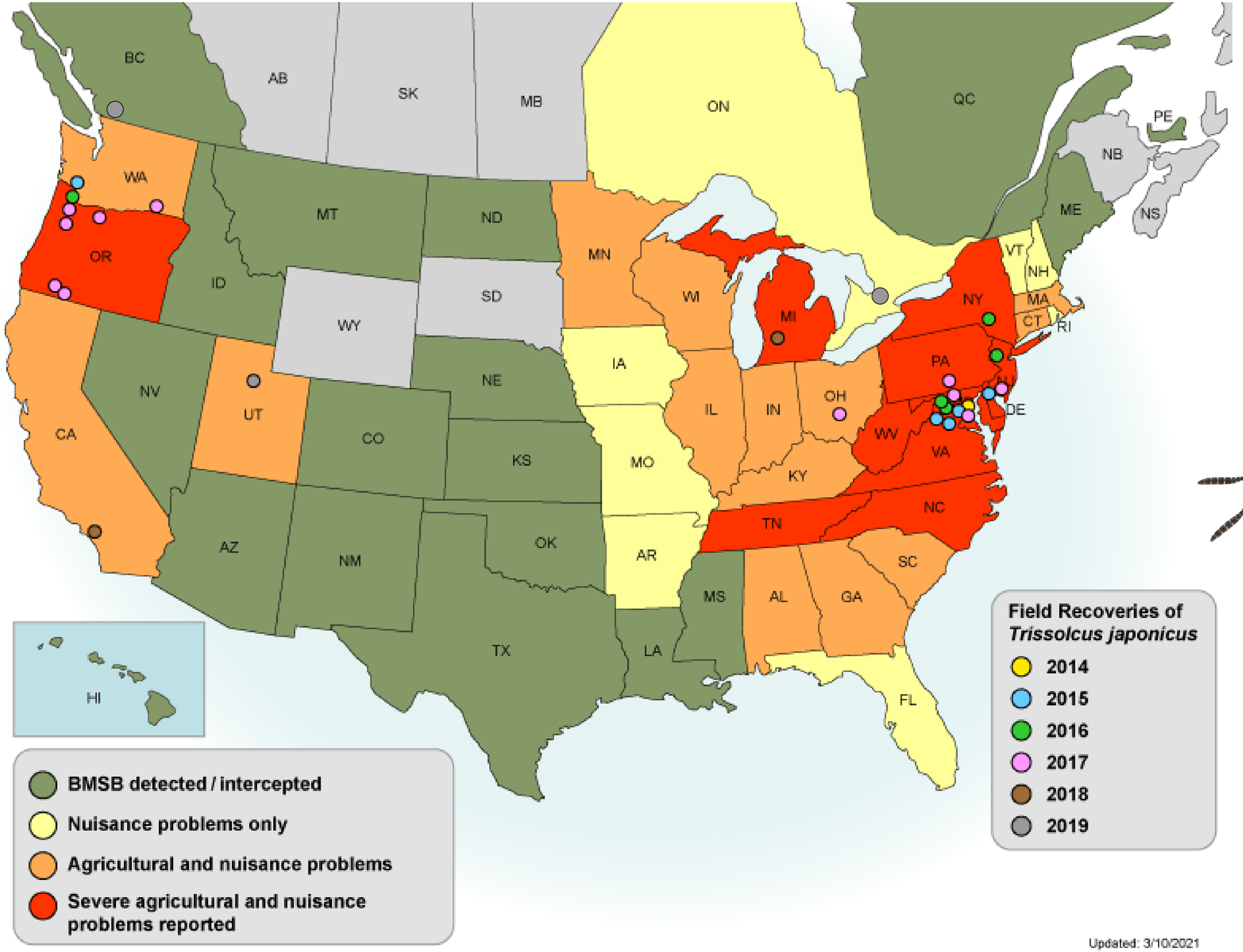

Murgantia histronica
Euschistus tristigmus
0
25
50
75
100
125
No Odor
Stink Bug
No choice

Olfactometer *Trissolcus japonicus* - ***choice***





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IN
KY
TN
AL
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PA
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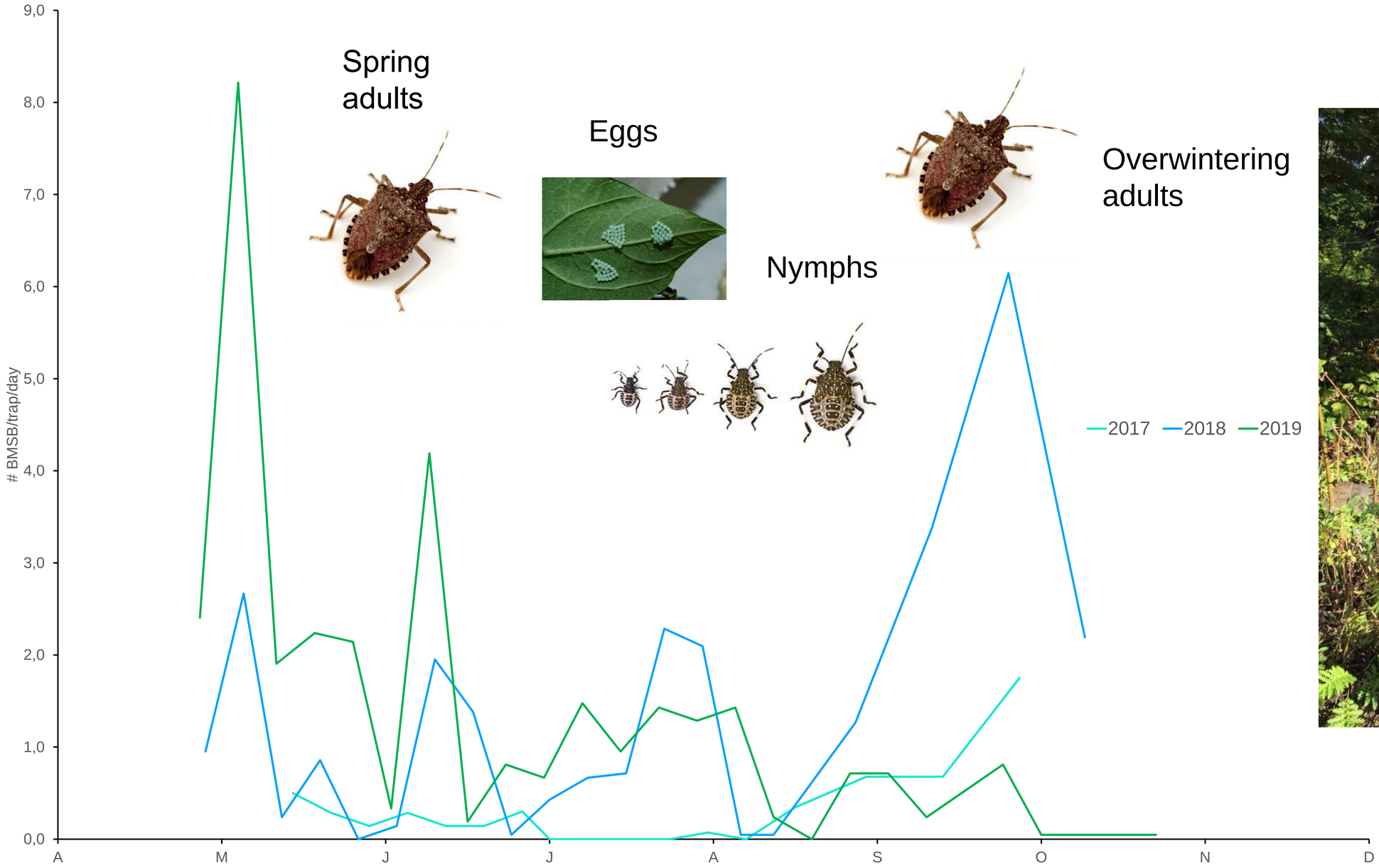
VT
NH
MA
CT
RI
NJ
DE
HI
BMSB detected / intercepted
Nuisance problems only
Agricultural and nuisance problems
Severe agricultural and nuisance problems reported
Field Recoveries of
Trissolcus japonicus
2014
2015
2016
2017
2018
2019
Updated: 3/10/2021

L’ouest Canadien

BMSB populations in Chilliwack, BC

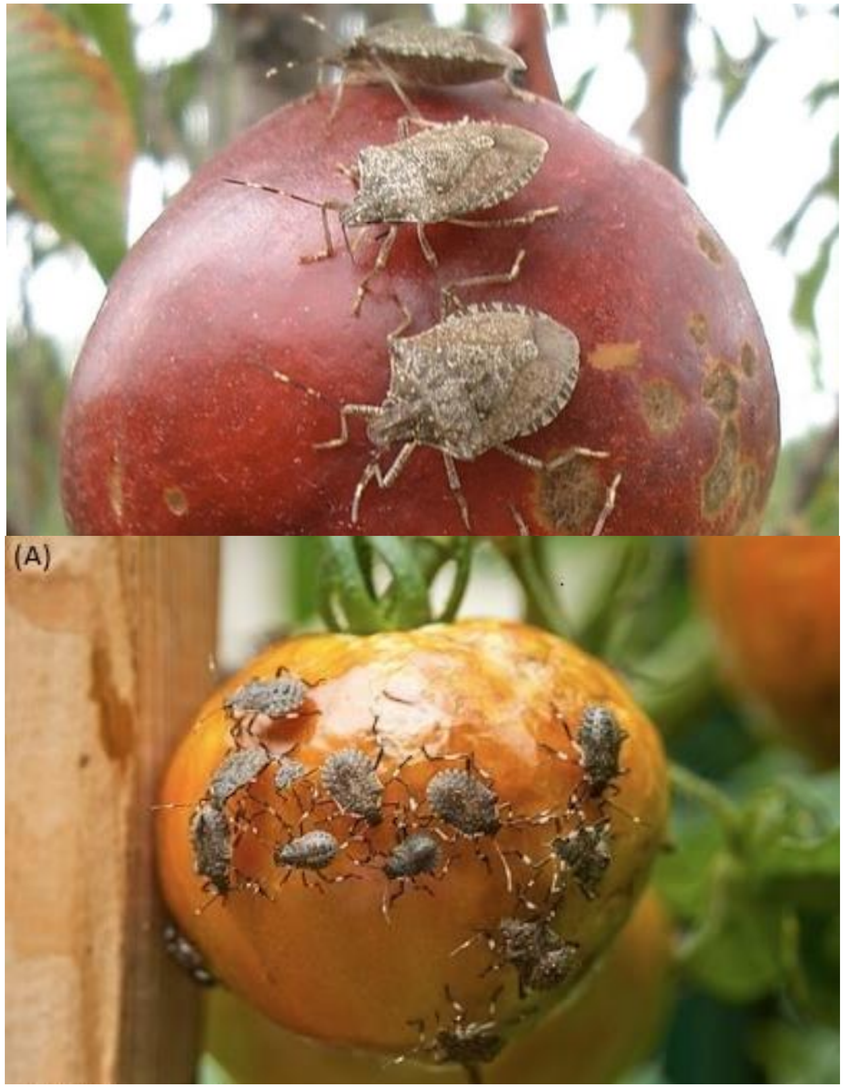


Crops in BC potentially at risk

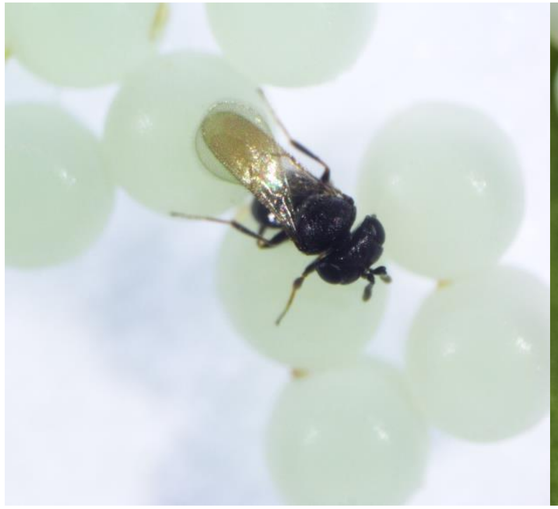
- Apples
- Cherries
- Pears
- Peaches
- Plums
- Hazelnuts
- Blueberries
- Raspberries

- Greenhouse vegetables (peppers, tomatoes)
- Corn

Highly mobile, moves between crop and non-crop habitats



Biological control surveys (2017-2018) – Native parasitoids in British Columbia



Trissolcus euschisti
Trissolcus utahensis
Trissolcus cosmopeplae
Trissolcus hullensis

Telenomus podisi

***Ooencyrtus* sp.**

- **Native parasitoids often emerged from *Podisus* eggs but very rarely from BMSB eggs**
  - **No parasitoid offspring emerge when parasitoids are given BMSB eggs in the lab**

Costi et al. (submitted)
Abram et al. (2019)

Application for release permits

Petition for the release of *Trissolcus japonicus* (Hymenoptera: Scelionidae) for biological control of *Halyomorpha halys* (Hemiptera: Pentatomidae) in Canada

Submitted by:

P. K. Abram[1], T. Haye[2], K. A. Hoelmer[3], T.D. Gariepy[4], P.G. Mason[5]

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[5]Agriculture and Agri-Food Canada, Ottawa Research and Development Centre, Ottawa, Ontario, Canada

Cover Photo: Tim Haye

"Petition" for Canadian release of *T. japonicus* was submitted to Canadian Food Inspection Agency in August 2018

The petition is being evaluated by the Plant Health Division of the CFIA.

JHR 68: 29–36 (2019)
doi: 10.3897/jhr.68.32203
http://jhr.pensoft.net

SHORT COMMUNICATION

JOURNAL OF Hymenoptera RESEARCH

First detection of the samurai wasp, *Trissolcus japonicus* (Ashmead) (Hymenoptera, Scelionidae), in Canada

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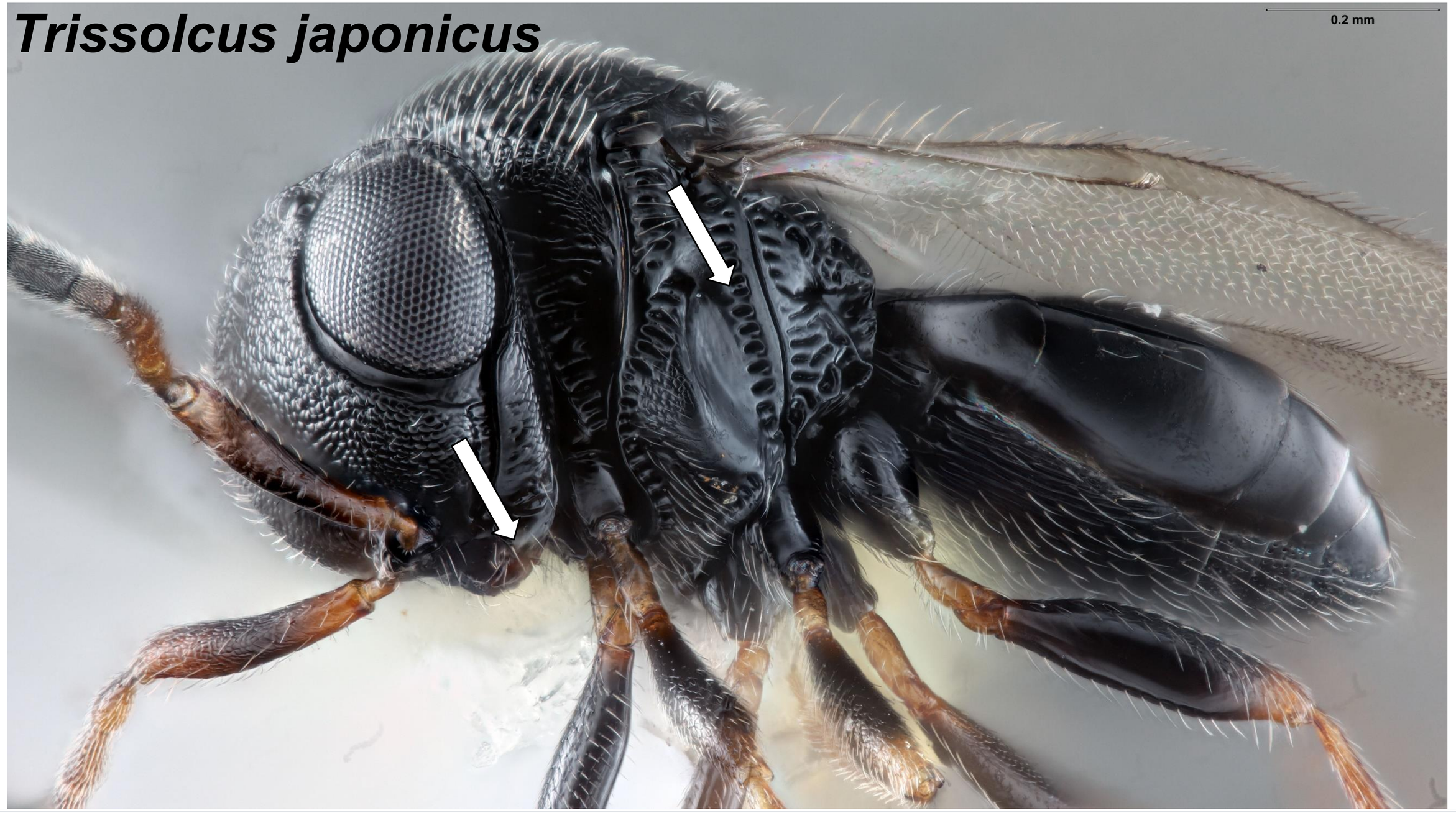
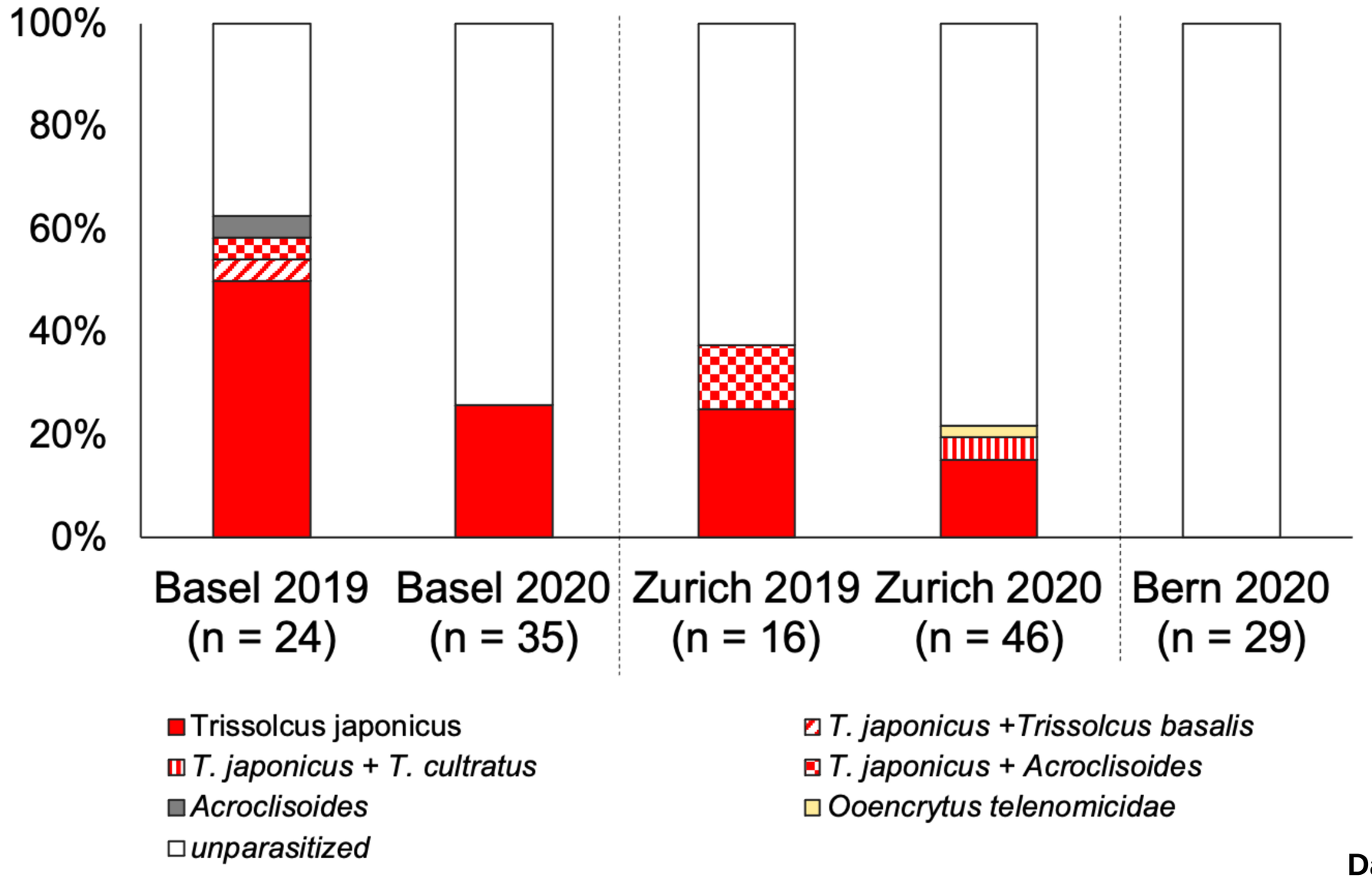
First Canadian record of the samurai wasp in Chilliwack, BC in 2018

Also found in Ontario in 2017 and 2018 (reported in 2019)

Trissolcus japonicus

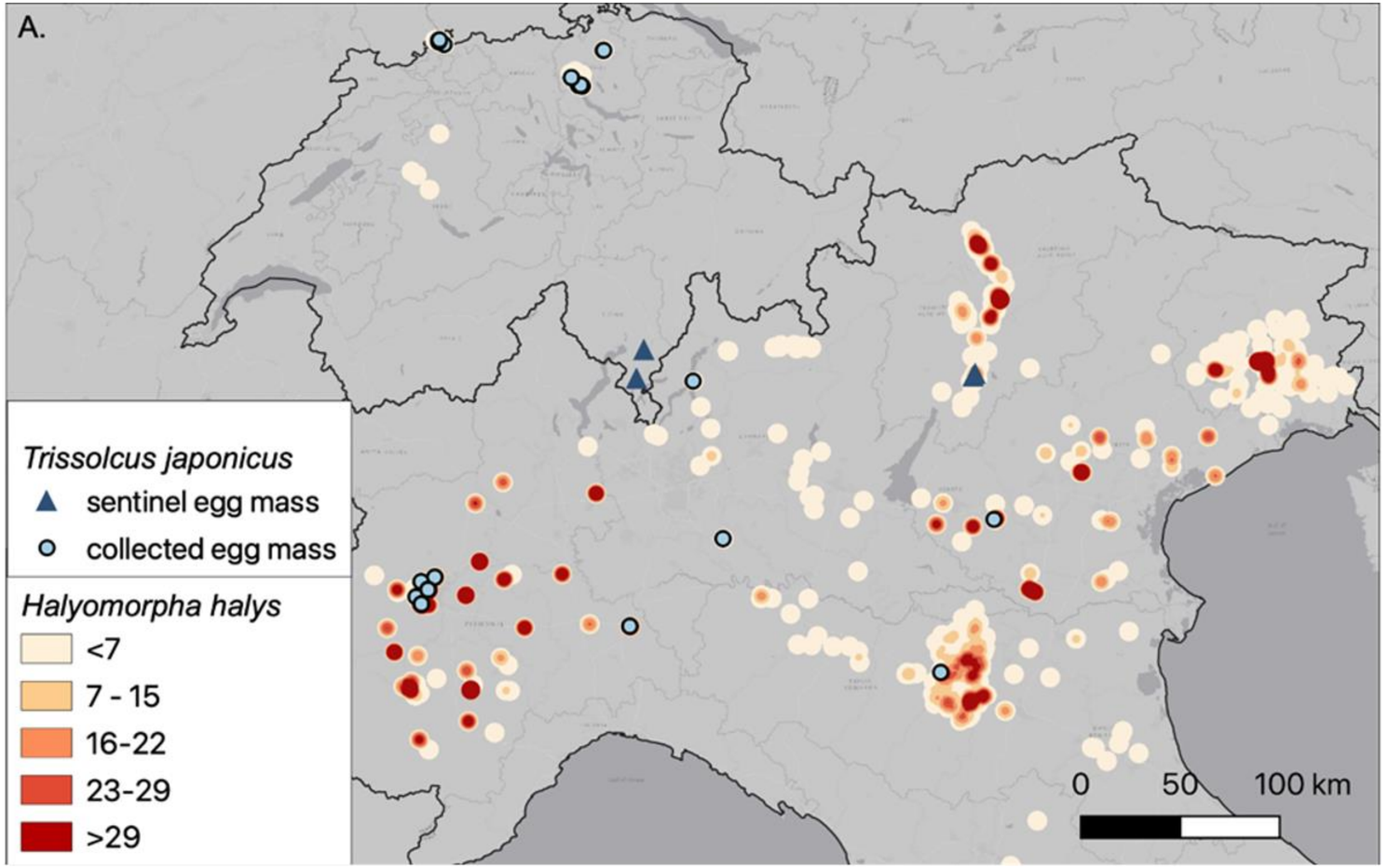


Distribution of *T. japonicus* in Italy and Switzerland



Data: Tim Haye, CABI

Distribution of *T. japonicus* in Italy and Switzerland



Distribution map of the collected egg masses for Halyomorpha halys, showing the emergence of T. japonicus in northern Italy and Switzerland. The heatmap is based on the abundance of collected egg masses of H. halys where orange reflect a low number and red a high number of egg masses. Sentinel egg mass records are derived from Stahl et al. (2019b) and Zapponi et al. (2020).

Data: Zapponia et al. (2021)

Merci de votre attention – Des questions?

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Merci de votre attention

Questions?