

# Presence and Redistribution of Samurai Wasp, *T. japonicus* (Ashmead, 1904), in NYS.



Photograph: Elijah J. Talamas,  
ARS USDA.



Photograph: Christopher Hedstrom  
USDA-APHIS Quarantine Facility,  
Corvallis, Oregon

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90<sup>th</sup> Annual Meeting of the Eastern Branch of the Entomological Society of America  
March 9-12, 2019, Virginia Tech, Blacksburg, Va.



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# Stink Bug Management in NYS



- Late Season Perimeter Pest
- Elusive, Unpredictable
- Mid-August to EOS
- $\leq 2$  Generations / season

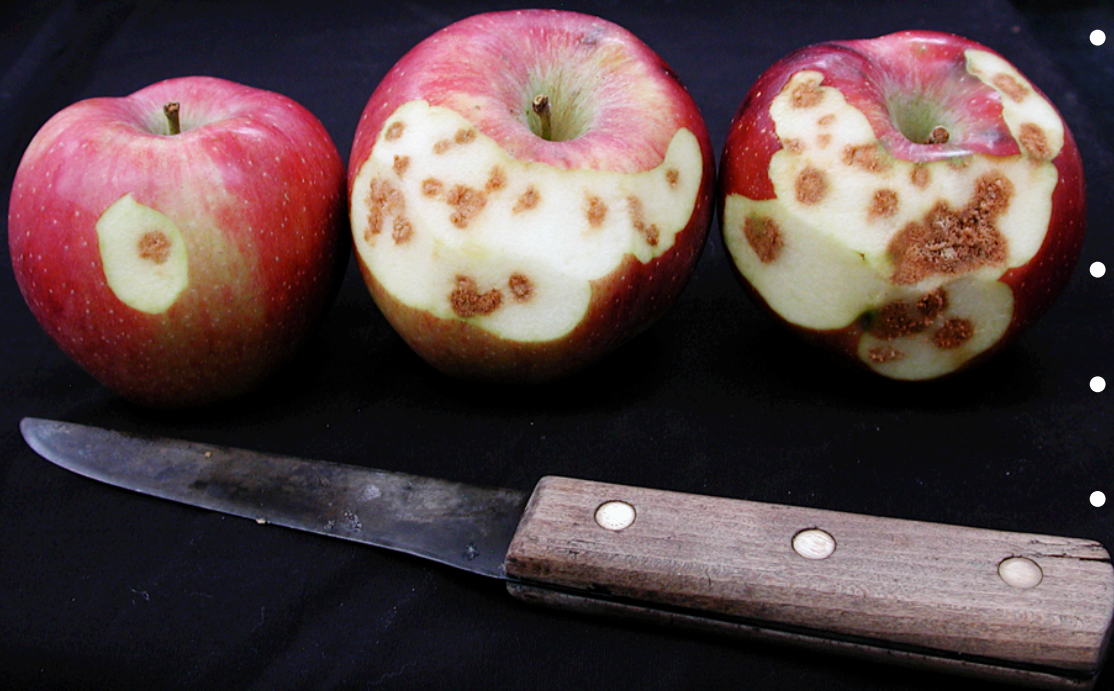
- Economic Injury (21% HV)

High Value Crops

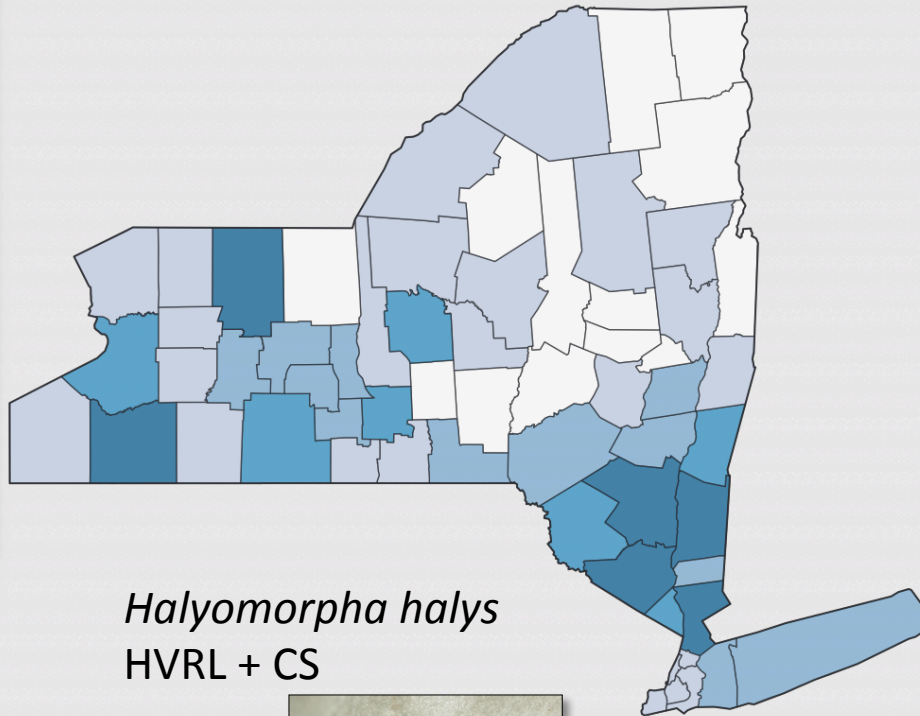
- $>$  MRL's / Drought

- Mgt. DTH  $\geq 7$ d

- Injury expression  $\geq 10$ d



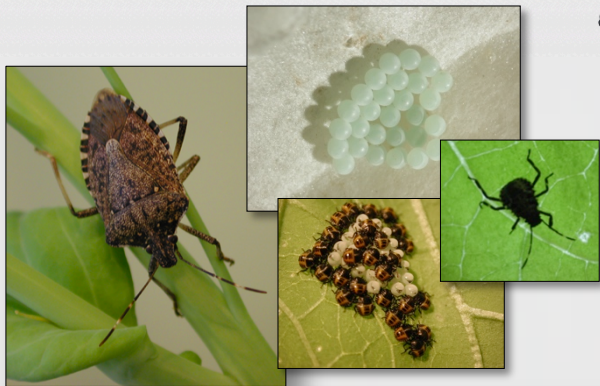
# iMapinvasive New York Invasive Species Public Map



## Citizen Science Project 2011-2015

Multiple sources; HVRL + Individual CS input

- 800 specimens received
- 540 BMSB
- Live and digital submissions
- 87 distinct zip code locations
- 44 NYS counties.



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<http://imapinvasives.org/nyimi/map/>

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**iMapInvasives**

Sharing information  
for strategic management

# New York Invasive Species Map

[Instructions](#)

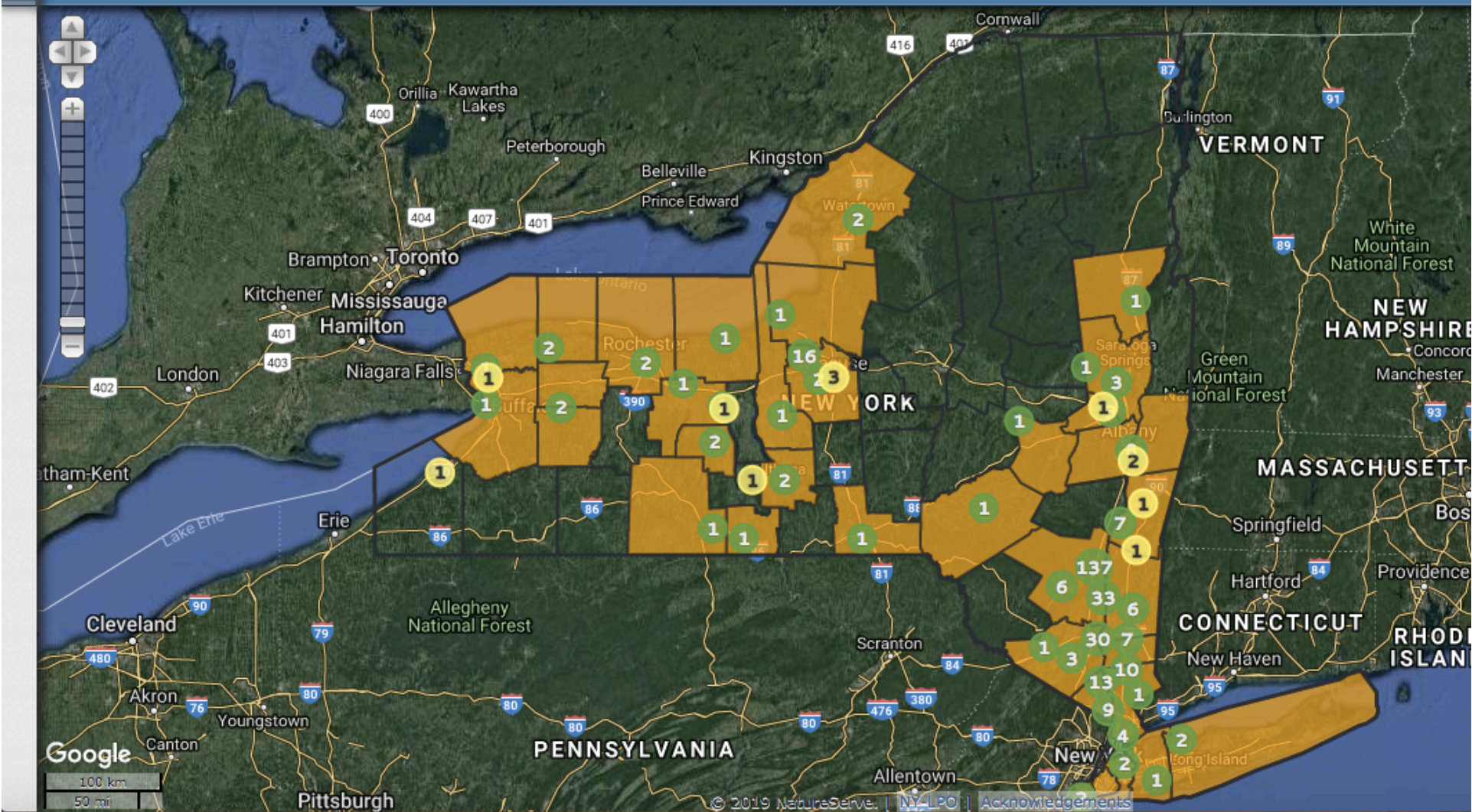
[Generate Reports](#)

[Data Entry](#)

[Links](#)

[iMapinvasives.org](http://iMapinvasives.org)

» **Brown Marmorated Stink Bug**



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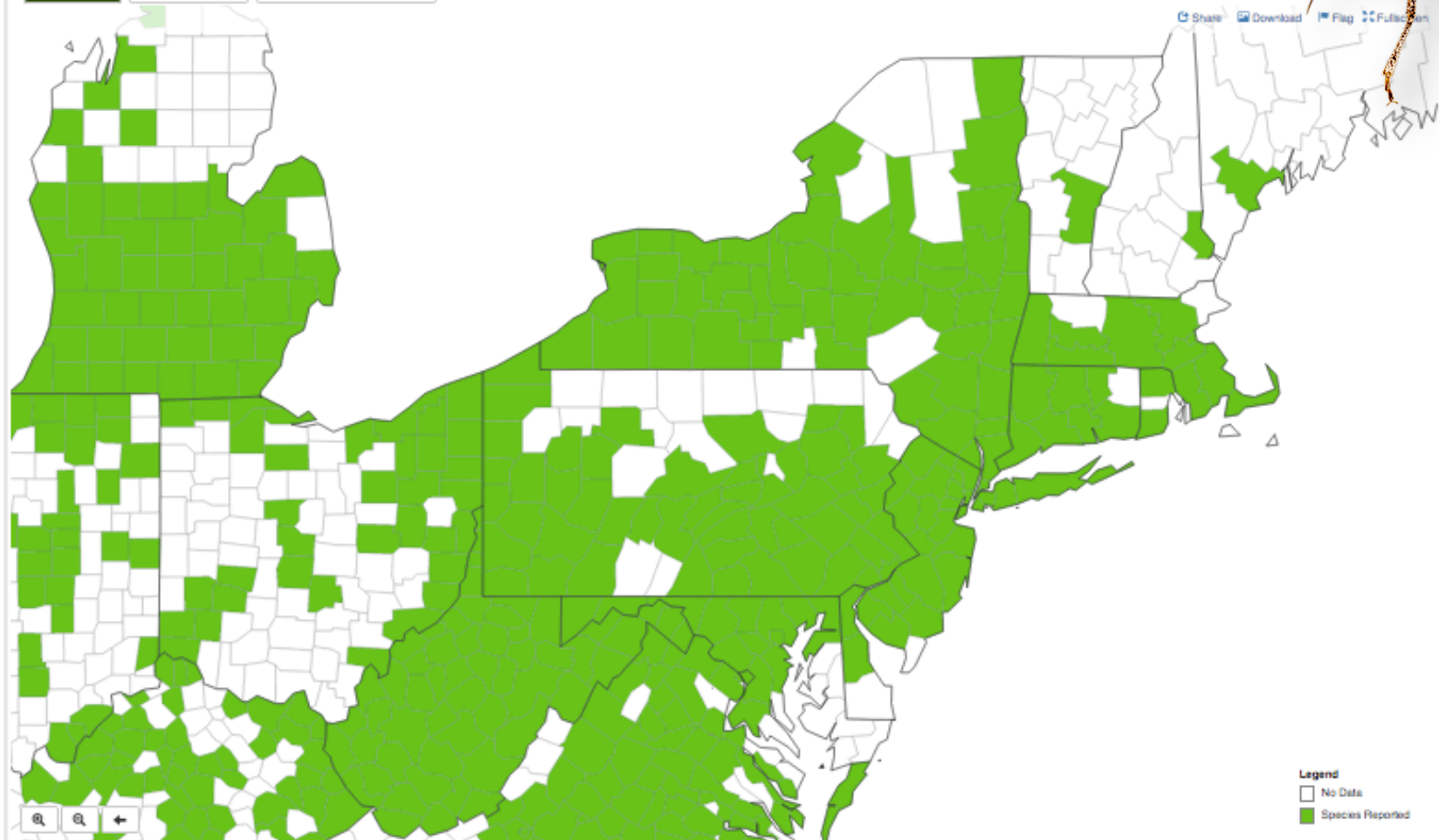
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### brown marmorated stink bug *Halyomorpha halys* (Stal)

States **Counties** Points List

Detected in all but 6 of 62 counties in NYS

**Distribution** Record Density Literature vs Observation

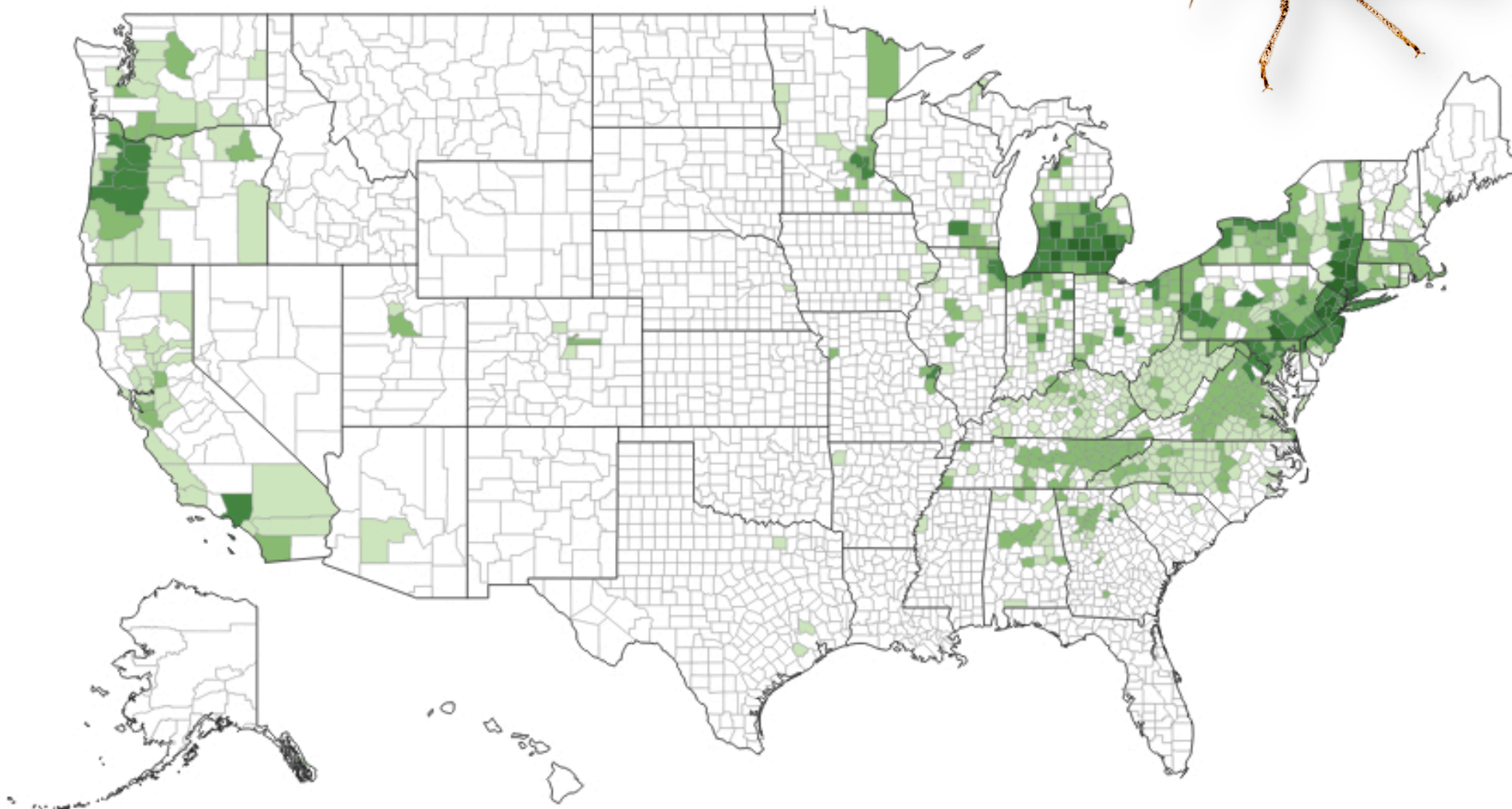


# brown marmorated stink bug

*Halyomorpha halys* (Stal)

States **Counties** Points List

Distribution **Record Density** Literature vs Observation



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EDDMapS Home

## Welcome to BMSBNY

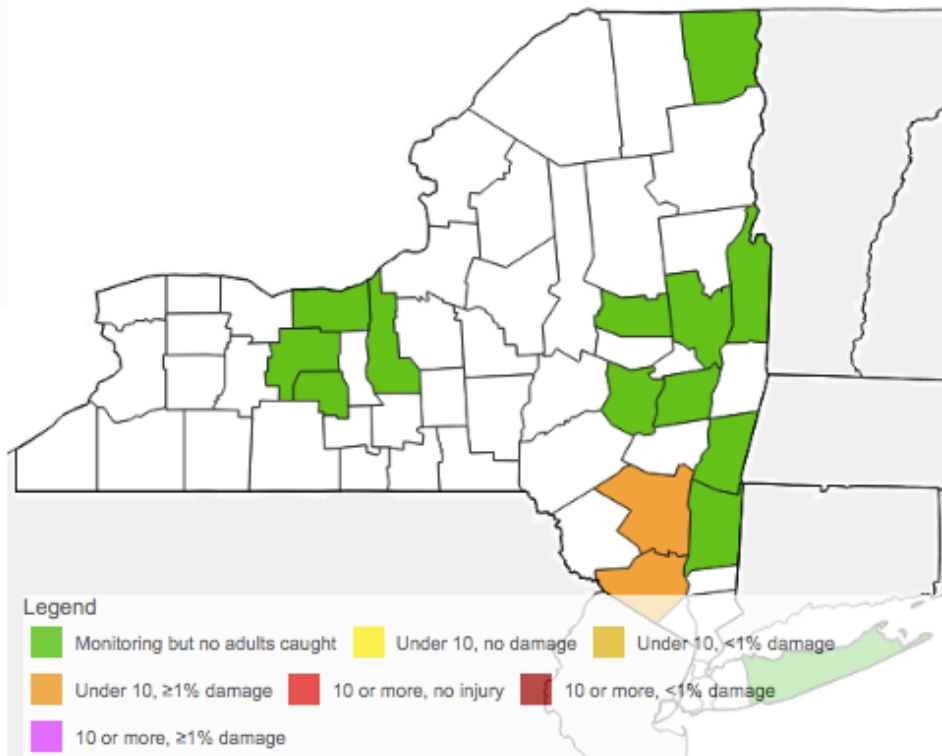
2014 Monitoring

BMSB Detections since 2010

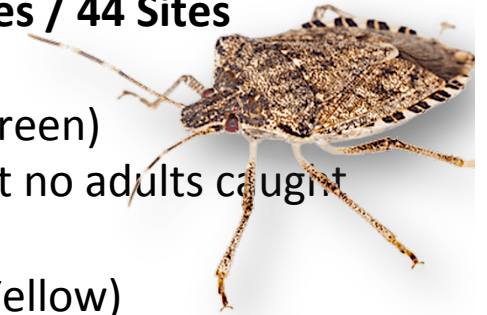
US Counties

Share | Flag | Fullscreen

Brown Marmorated Stinkbug Monitoring - 10-10-2015 to 10-20-2015



## 15 NYS counties / 44 Sites



- • Absence (Green)  
Monitoring but no adults caught
- • Presence (Yellow)  
Under 10, no damage
- • Presence + Damage Levels  
Under 10, <1% damage
- • Presence + Damage Levels  
Under 10, ≥1% damage
- • BMSB Threshold + Damage Levels  
10 or more, no injury
- • BMSB Threshold + Damage Levels  
10 or more, <1% damage
- • BMSB Threshold + Damage Levels  
10 or more, ≥1% damage



# Introduction to *Trissolcus japonicus* (Samurai Wasp) For BMSB Management ?

- Samurai wasp, *Trissolcus japonicus*, is an adventive egg parasitoid of the BMSB in Asia



*Trissolcus japonicus*



# Overview 2016 - 2018



1

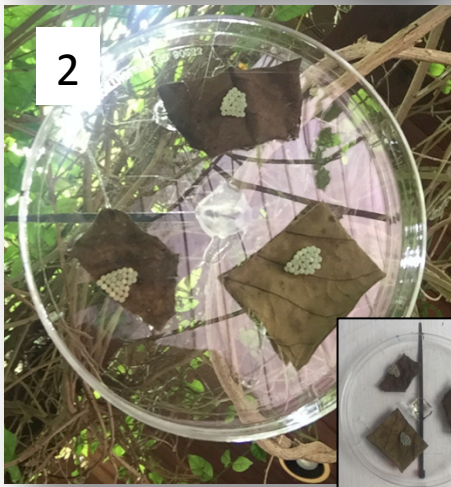
**2016** Sentinal Egg Placement (-80°C BMSB Eggs\*)

**2017** Sentinal Egg Placement\*  
Survey ENY & WNY Counties  
T. japonicus – Colony

T.j. Redistribution

Veg. & Orchard perimeter<sup>1</sup> & Citizen Sci.<sup>2</sup>

Sentinal Egg Recovery



2

**2018** Sentinal Egg Survey  
Alpha Scent Yellow Sticky Cards (YSC)

YSC Recovery

Redistribution & Augmentation in farm & CS



## Pre-release sampling in NY: 2016



- Sentinel egg placement in 2 NY sites
  - via -80°C sentinel eggs
  - Warwick & Ulster Co ENY
  - Late June – mid-September using 2 clusters / week on BMSB host
- First *Tj* detection in NY in Marlboro, NY in 2016
- Unable to maintain specimens from 2016 detection in culture



## Pre-release sampling in NY: 2017



- Sampling using -80°C sentinel eggs from mid-Jun – Oct
- 2 eggs masses/site/week at 9 sites in 3 WNY and 4 ENY counties
- Same sites used for redistribution
- Only detections occurred in July at the Marlboro site as in 2016 providing *T.j.* for a lab culture



# Deployment of parasitized eggs in NY: 2017



- Timing of NYS DEC approval of releases (July), and Tj and egg mass availability dictated the timing of egg releases
- *T. japonicus* parasitize BMSB eggs were sterilized and held at  $-80^{\circ}\text{C}$  for a few days to a few months
- Cornell placement to 9 sites from 15<sup>th</sup> Sept. - Oct. 6<sup>th</sup>, 2017
- Citizen scientist volunteers were sent parasitized eggs fixed to Petri dish late Sept. - Oct 6<sup>th</sup>.



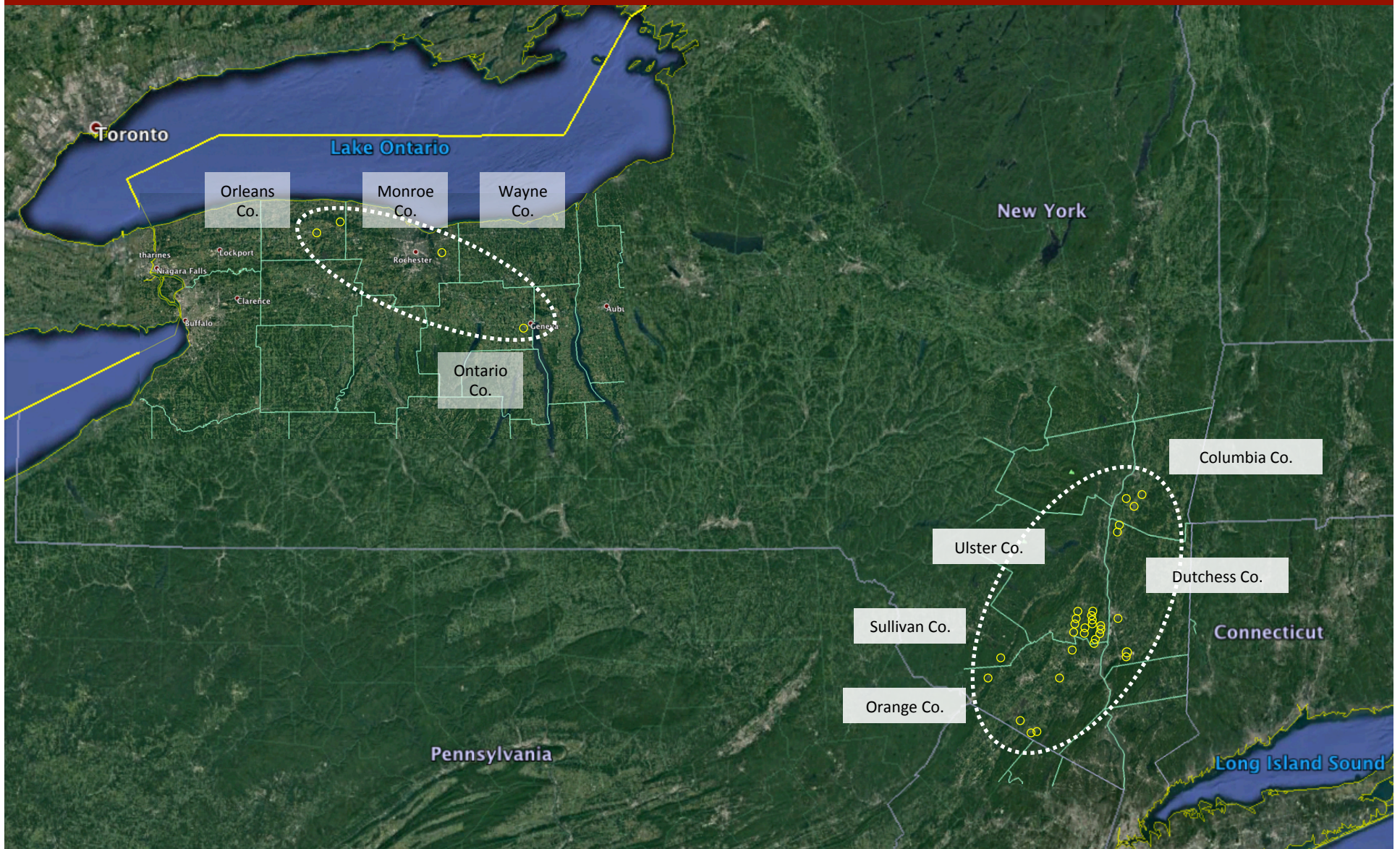
## Deployment of parasitized eggs in NY: 2017



- Farm deployment of parasitized eggs were stapled to BMSB host foliage (*A. altissima*, *R. pseudoacacia*, *V. vinefera*...)
- In total, eggs deployed at 32 sites on 25 farms (Hudson Valley, western NY)
- 2-3 egg masses/site  
mean = 72 eggs/site  
range = 54 – 89 eggs/site



# Deployment of parasitized eggs in NY: 2017-2018



# Post-release Egg Recovery & Inspection in NY: 2017



- Foliage on which many eggs deployed in late Sep and Oct senesced and fell from tree
- 23.4% emergence of adult *Tj*
- 0.7% partially emerged
- 76.4% showed no sign of emergence
- Majority were parasitized but unsuccessful development (BMSB colony **Microsporidium** at 60% (Carrie C. Preston, A. Hajek Lab - CALS))





# Expanding the Range of the Parasitoid Wasp, *Trissolcus japonicus*, (Hymenoptera: Scelionidae) in NYS.



*Normal, hatched BMSB egg mass.*



*BMSB eggs showing damage from sucking predators.*



*BMSB eggs showing damage from chewing predators.*



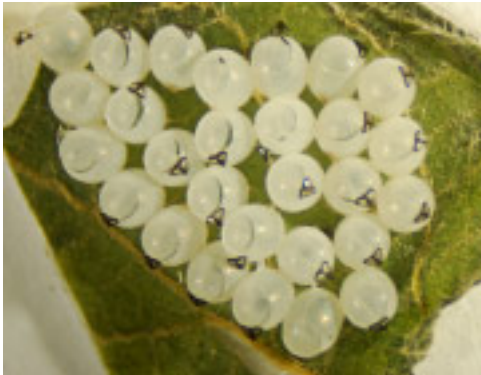
*Spined soldier bug  
*Podisus maculiventris**

## Native Predatory feeding and Parasitism

- Predatory feeding accounts for up to 20% reduction of BMSB egg loss.



# Expanding the Range of the Parasitoid Wasp, *Trissolcus japonicus*, (Hymenoptera: Scelionidae) in NYS.



*Normal, hatched BMSB egg mass.*



*Parasitized BMSB eggs.*

## Native Predatory feeding and Parasitism

- Parasitism by native accounts for < 1% to 5% dependent on habitat.



*Trissolcus brochymenae*



*Telenomus podisi*



Tom Murry. BugGuide

*Trissolcus euschisti*



# Post-release Sentinel Egg Placement in NY: 2017

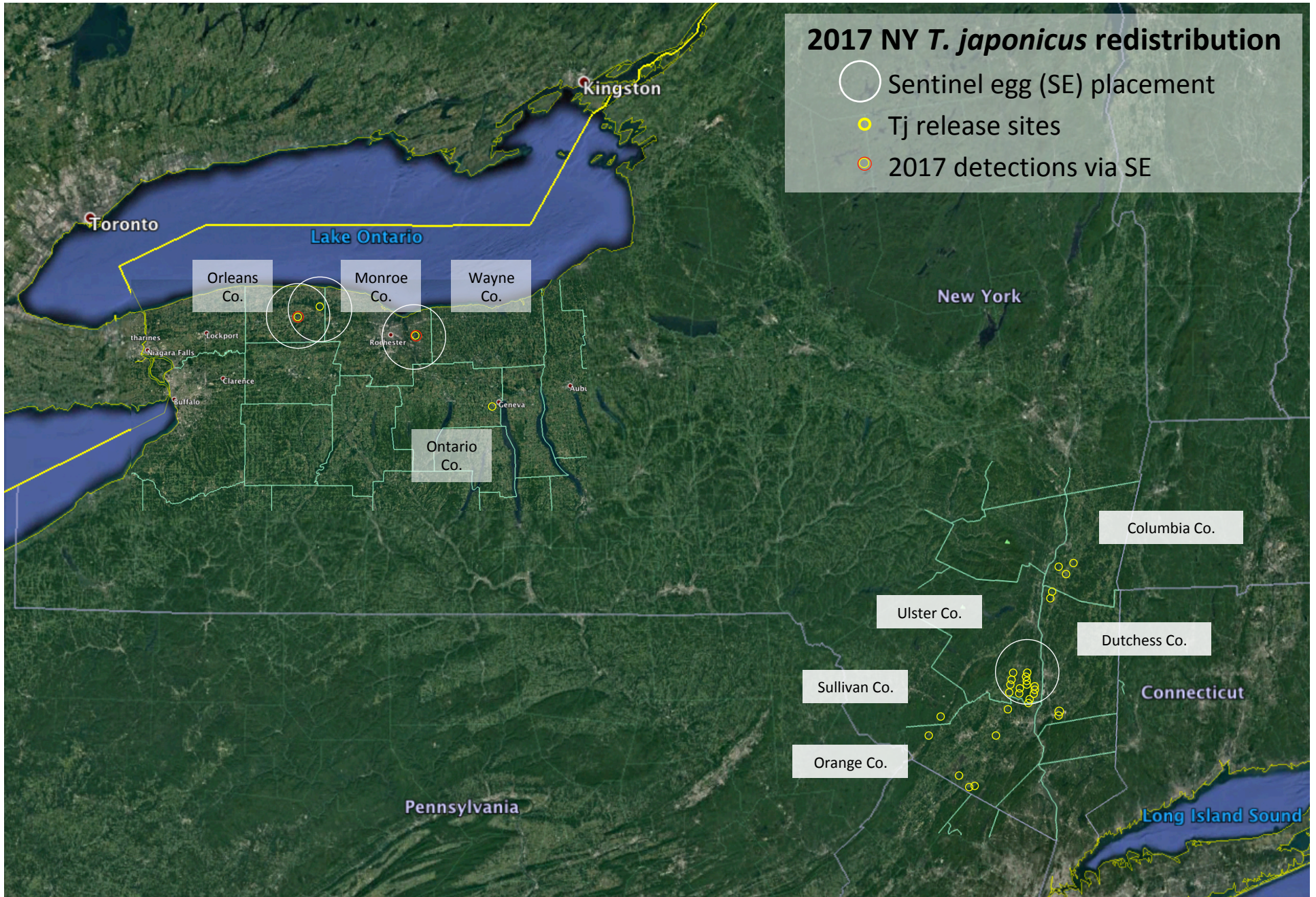


- Sentinel eggs placed at 2 of the WNY redistribution sites, ~30 m from release points
- *Tj* detections from sentinel eggs recaptured at 2 release sites in western NY



## 2017 NY *T. japonicus* redistribution

- Sentinel egg (SE) placement
- Tj release sites
- 2017 detections via SE



## Sentinel egg post-release sampling in NY: 2018



- Sentinel eggs placed at 9 of the redistribution sites from 23<sup>rd</sup> June to 15<sup>th</sup> Sept.
- 2 egg masses/site/week
- No *Tj* recovered from any site, including the Marlboro site where detected in 2016 and 2017

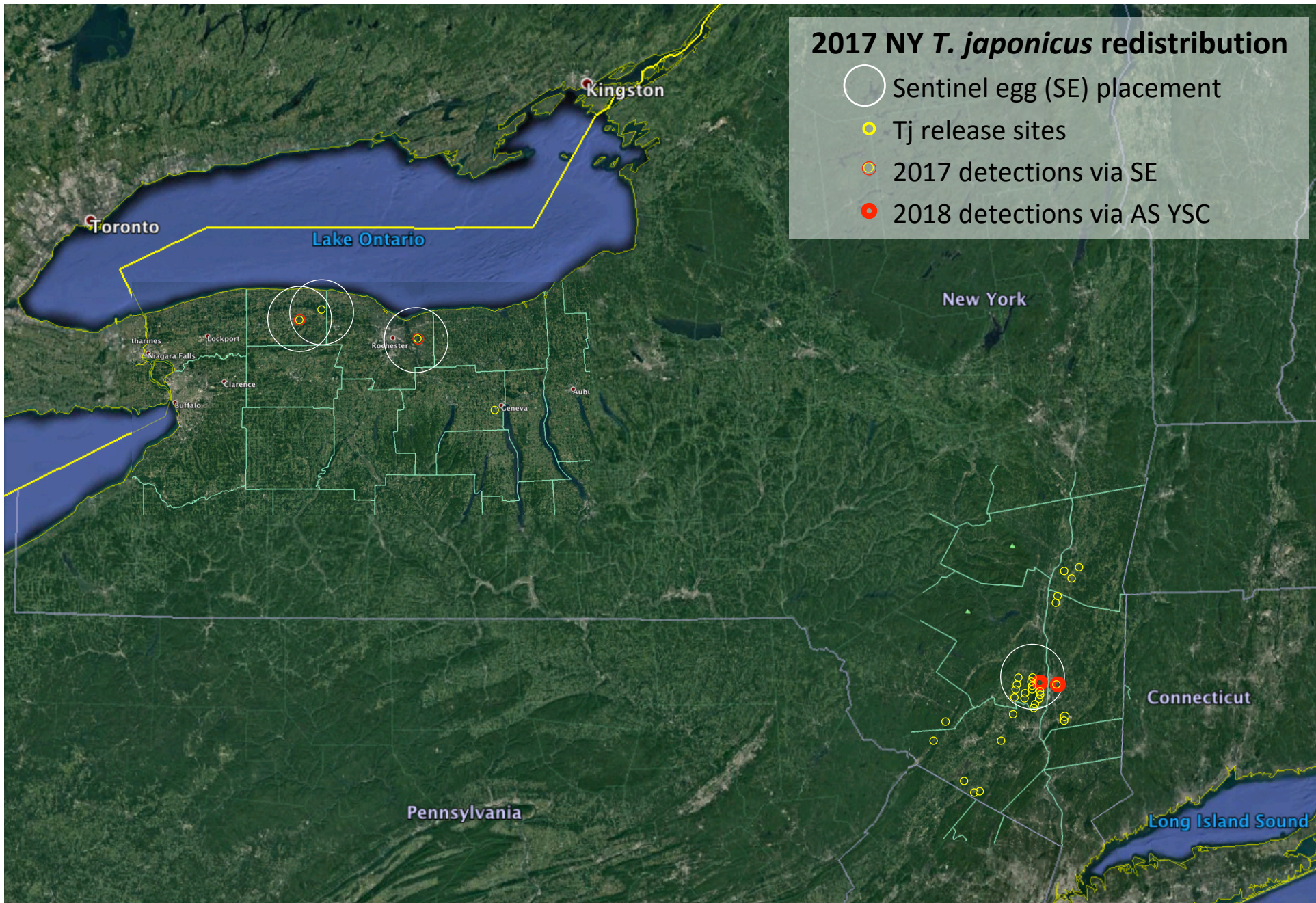


## Post-release YSC sampling in NY: 2018



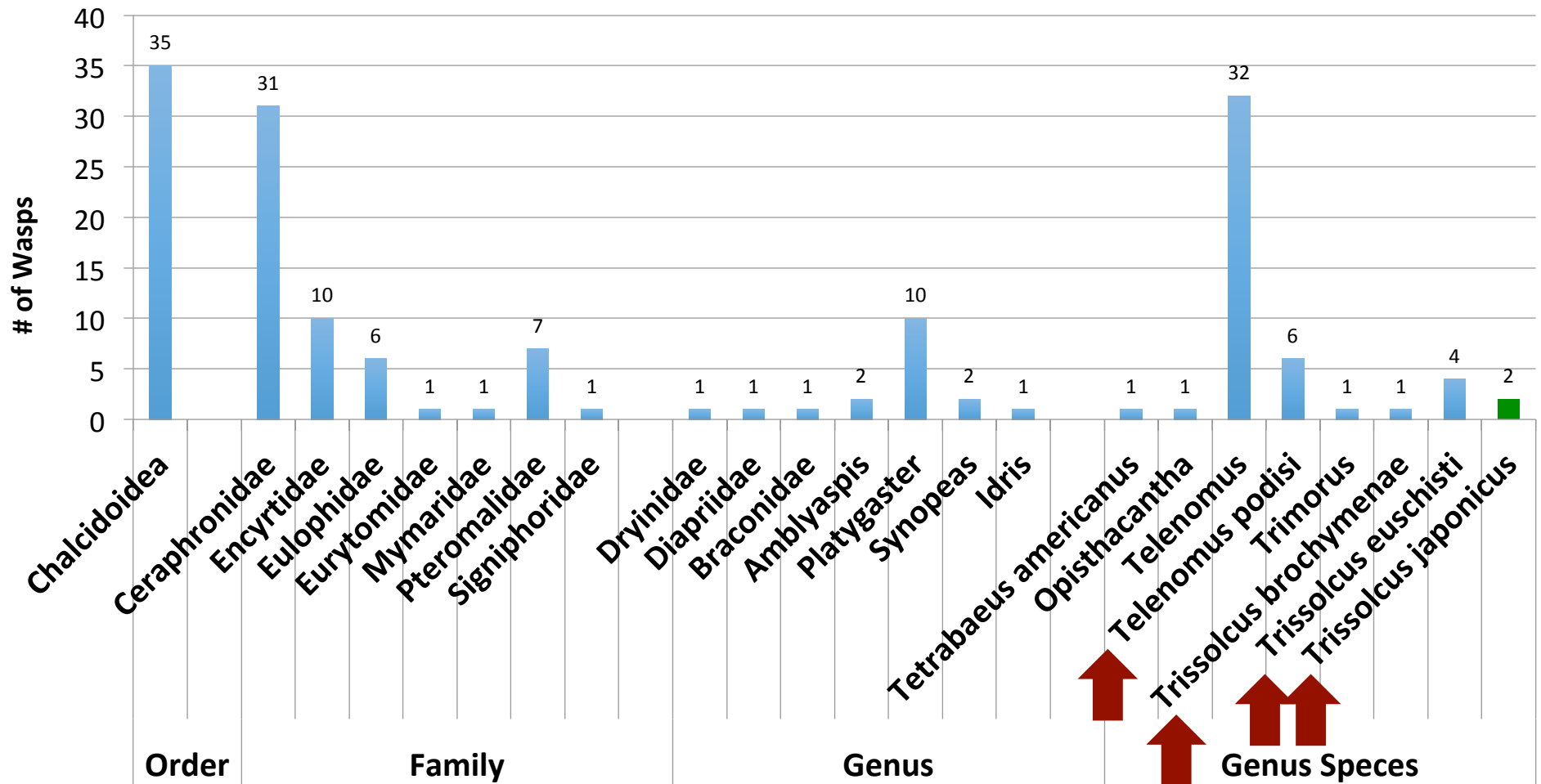
- AlphaScents traps at same 9 sites
- 2 traps/site replaced bi-weekly
- Captured native parasitoids:  
*T. brachynema*, *T. euchesti* &  
*Telenomus podesi*
- ENY *T.japonicus* recovered  
Poughkeepsie, Dutchess Co. (1)  
New Paltz, Ulster Co. (2)
- WNY *T.japonicus* recovered  
Holly, Orleans Co. (1)





# NYS Parasitoid Survey Using Alpha Scent Cards

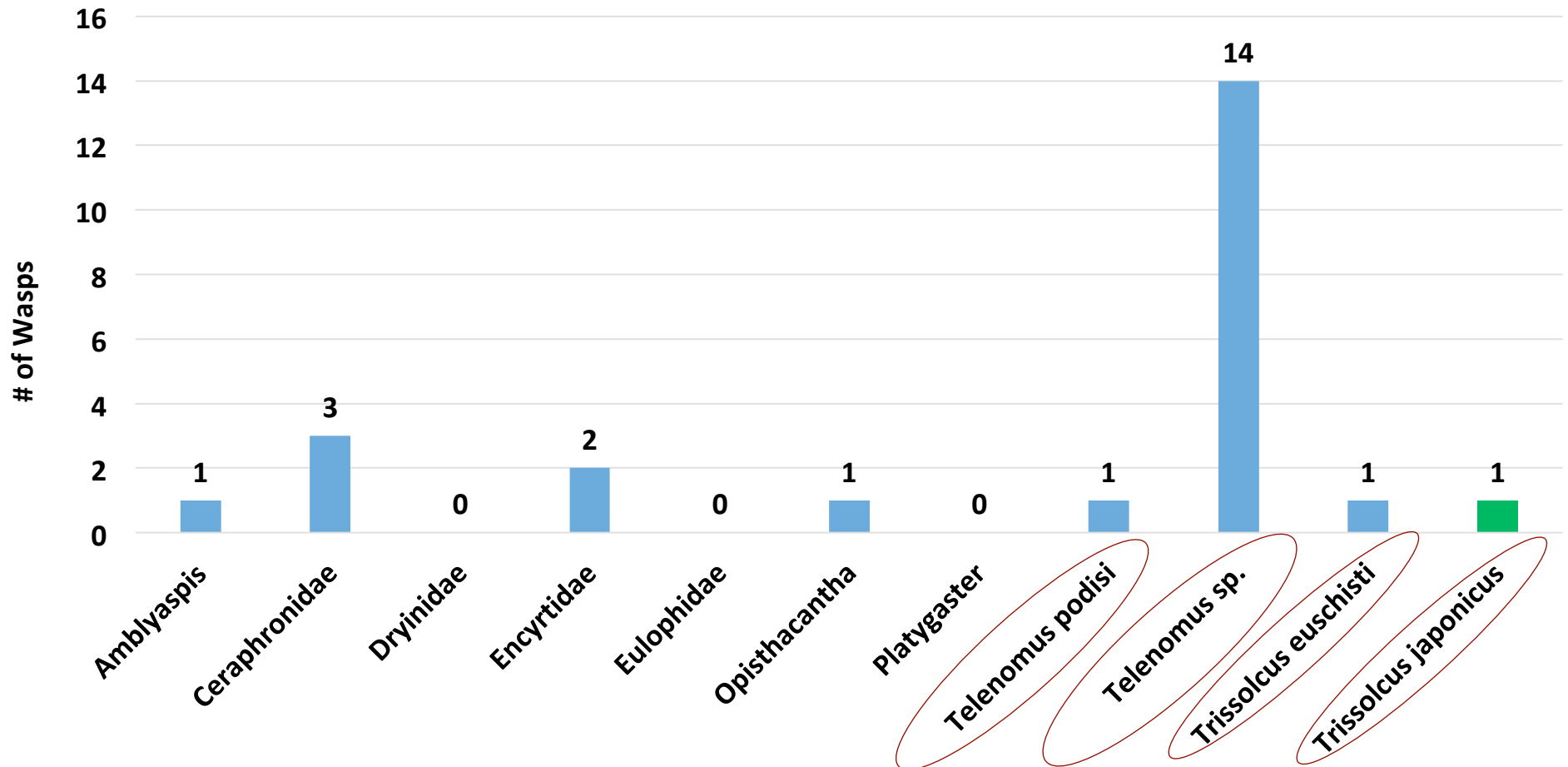
## Hymenopteran Diversity





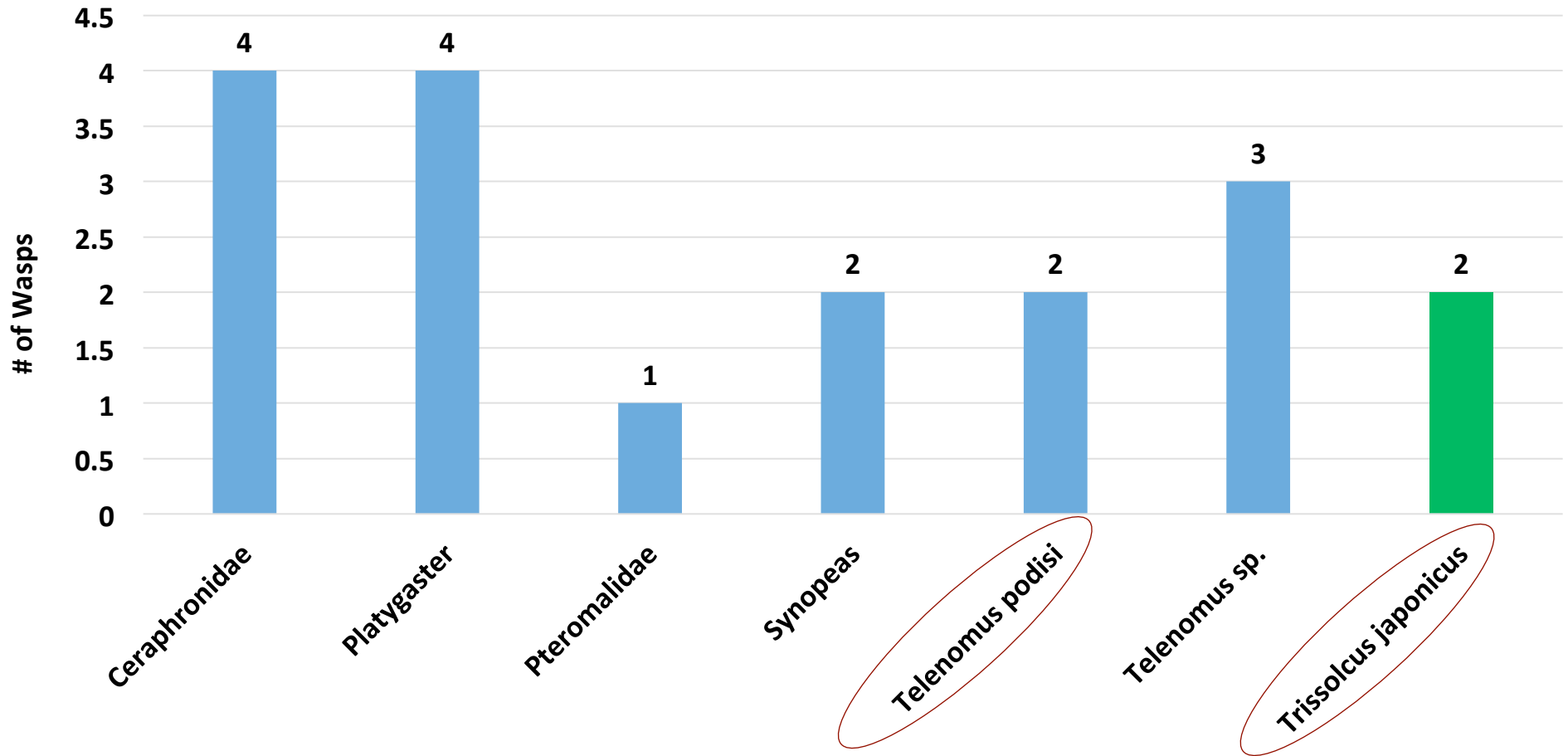
# Parasitoid Survey – Western NY Using Alpha Scent Cards

KM Davies Site 1 Williamson NY  
7/3 - 10/3 2018



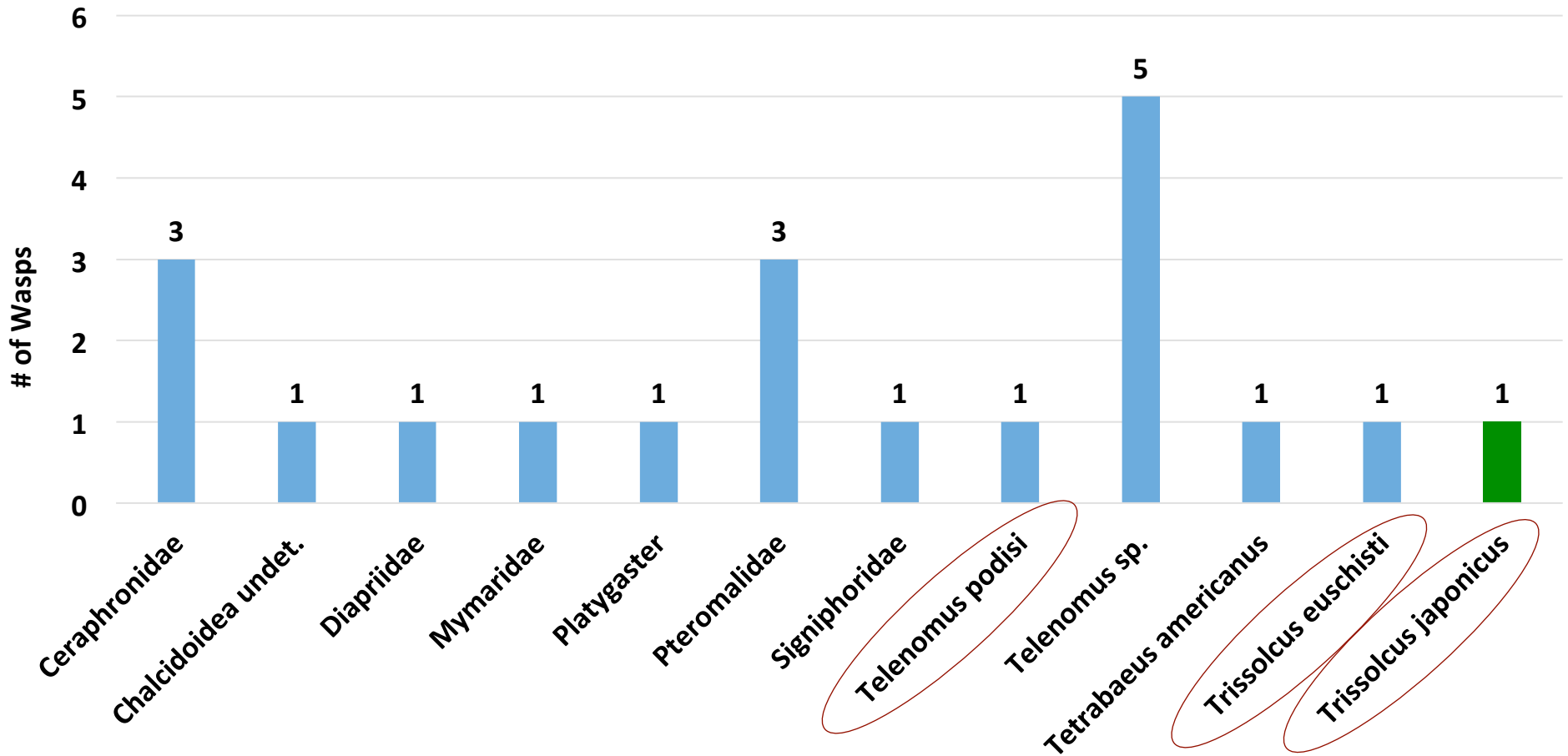
# Parasitoid Survey – Eastern NY Using Alpha Scent Cards

Minard Thruway High New Paltz NY  
5/7 - 10/18 2018



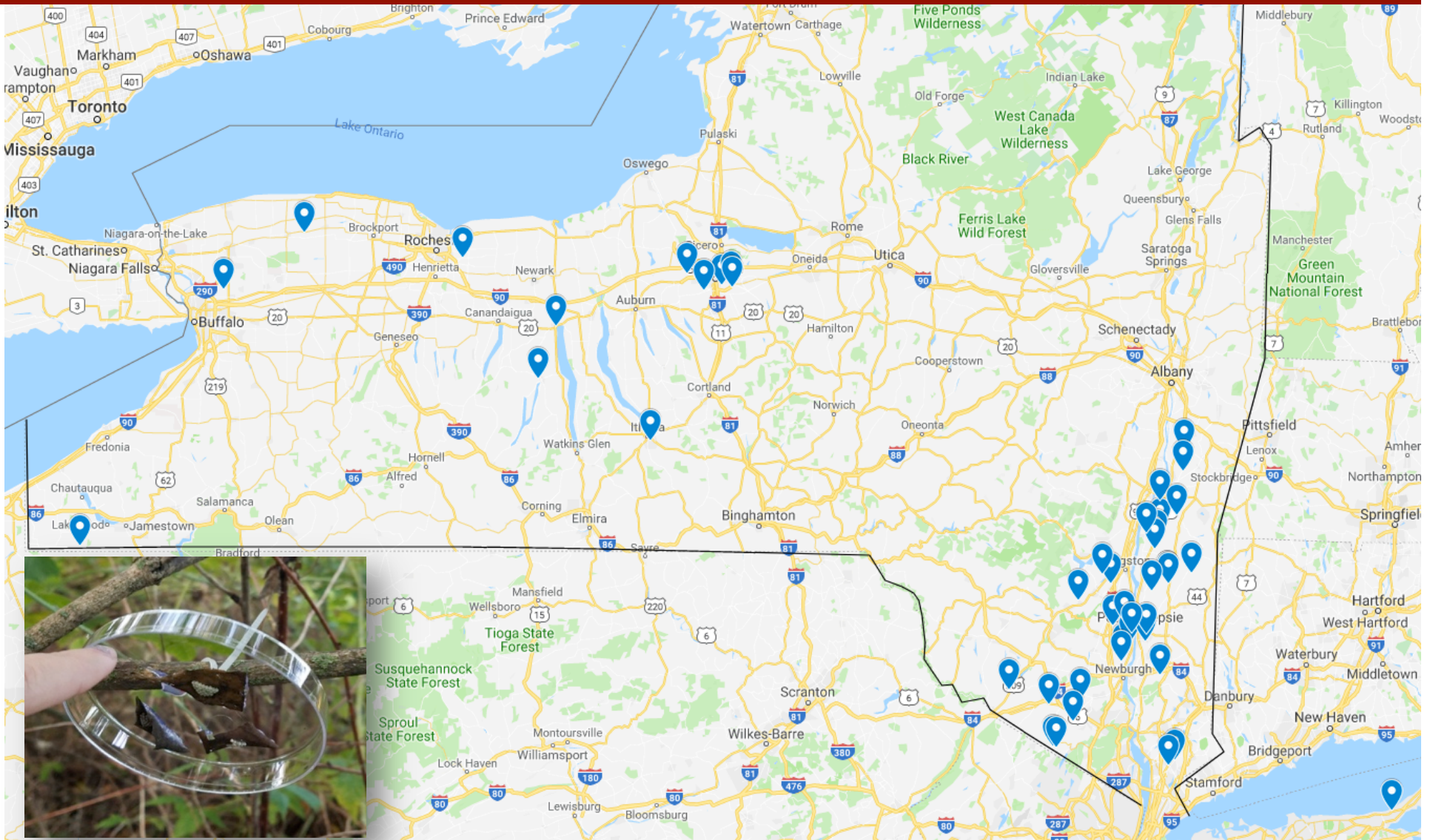
# Parasitoid Survey – Eastern NY Using Alpha Scent Cards

Poughkeepsie Farm Project  
7/6 - 8/27 2019



# Samurai Wasp Redistribution Sites 2017-2018

## Citizen Science (N=29), Agricultural (N=34)



# Conclusion

- BMSB may be unable to successfully in overwinter in colder NY climates in some years.  
T.j. winter survival closely parallels that of BMSB.
- Yet, BMSB is able to overwinter successfully in man made structures in Rural, Urban and Suburban sites, emerging to develop into damaging agricultural population in some years.
- **T.j. releases, made through Citizen Science participants** in Rural, Urban and Suburban sites may also provide warmer OW sites for T.j., providing higher levels of survival?



## Conclusion – 2019 Efforts

- Focus redistribution efforts of *T.japonicus* to **CS participants** in Rural, Urban and Suburban sites
- **Monitor representative release sites** to determine efficacy
  - BMSB presence using trapping; BMSB injury to crops
  - Monitor Samurai wasp employing yellow cards only
- Further develop **attract and kill strategies** along orchard
- Demo **spray drift field workshops to reduce drift** into woodland habitat using horizontal spay systems.





## Thanks to the staff at the HVRL for all their support:

Research Support Specialist I .....	Dana Acimovic
<i>Laboratory Technician</i> .....	Lydia Brown
<i>Research Assistant</i> .....	Christopher Leffelman
<i>Research Assistant</i> .....	Lucas Canino
<i>Farm Manager</i> .....	Albert Woelfersheim
<i>Administrative Assistant</i> .....	Erica Kane
<i>HRVL &amp; NEWA Weather Data</i> .....	Christopher Leffelman, Albert Woelfersheim

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ARDP - NYS Ag. & Mkts, NY Farm Viability Institute, NYS SCRI, NYS Orchards & Farmers

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