Research in Virginia on the foraging ecology of *Trissolcus japonicus* as related to its surveillance

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USDA United States Department of Agriculture National Institute of Food and Agriculture
Specialty Crop Research Initiative

Collaborating Institutions

ars, NC State University, PennState, OSU Oregon State, University of Maryland, University of Georgia, Washington State University, Northeastern IPM Center, Cornell University, Utah State University, Rutgers University, The Ohio State University, University of Kentucky, UC Davis, University of Minnesota, Virginia Tech, Berkeley, Michigan State University, UC Riverside

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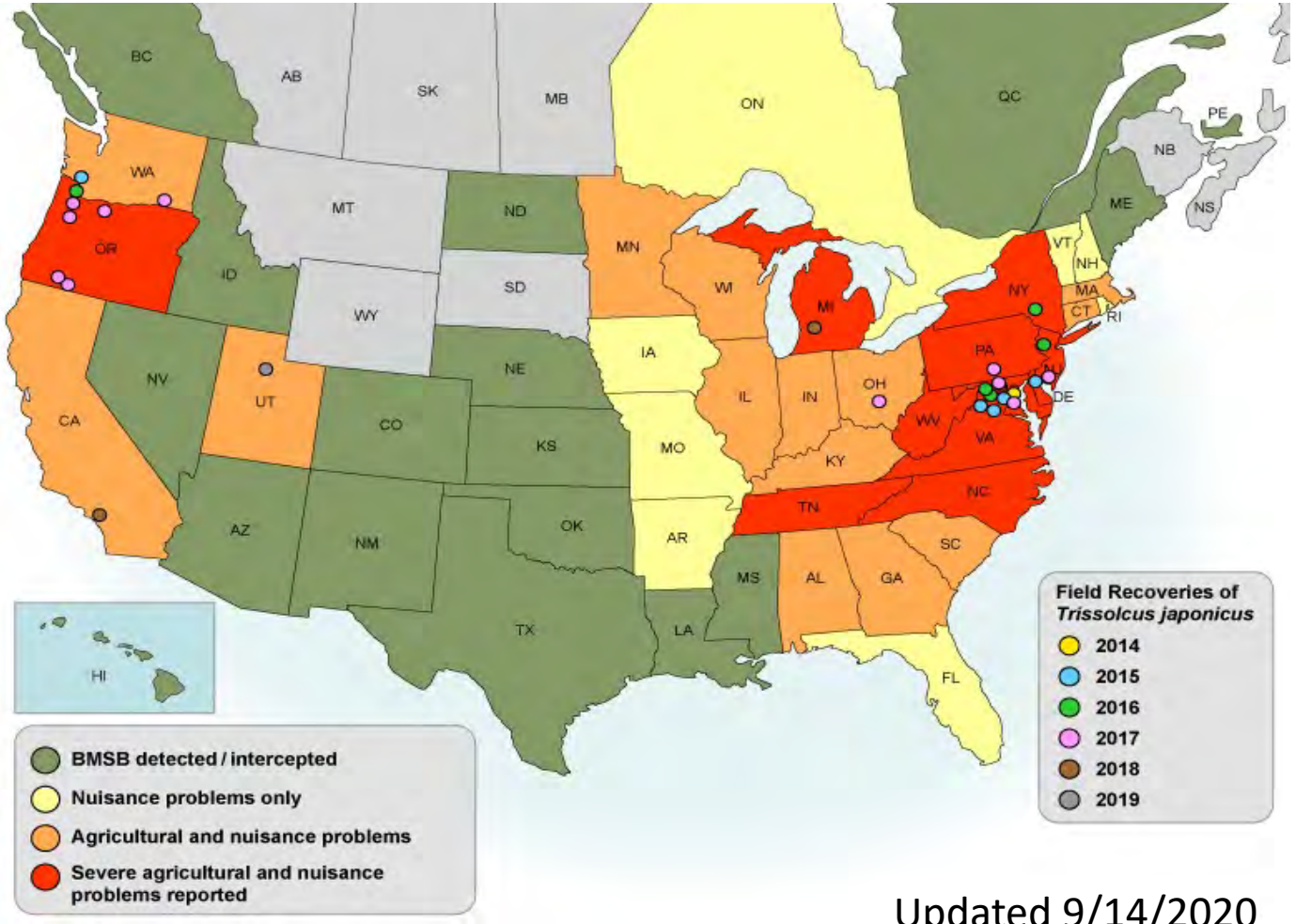
- 2014: 1st US detection in Beltsville, MD (sentinel eggs)
- 2015: 1st detection in Frederick Co., VA (sentinel eggs)
- 2015: Not detected elsewhere in VA by our lab (sentinel eggs)

New State reports annually, 2014 - 2019

"How to optimize the efficiency and effectiveness of *T. japonicus* surveillance efforts to track its current distribution, range expansion, and changes in abundance?"



Updated 9/14/2020

Our research objectives and timeline

2016 – 2017

Distribution of BMSB, its egg masses, and its parasitoids in the tree canopy

2016

1st *T. japonicus* detection via yellow sticky trap (Frederick Co., VA)

2017

Sampling methods comparison

2018 – 2019

Spatial and temporal effects (habitat, host plants, seasonal phenology)

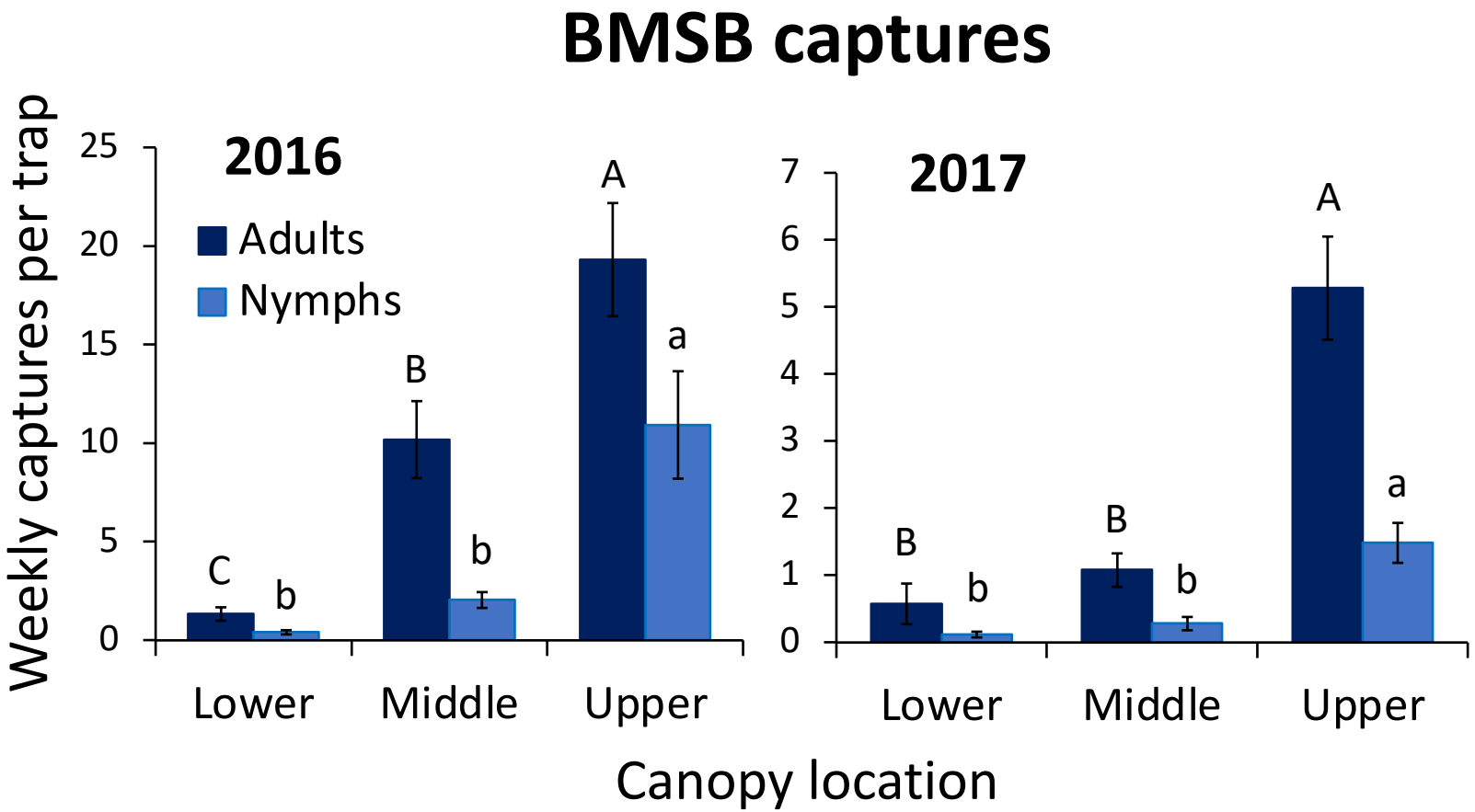
2019 – 2020

Effect of olfactory stimuli on BMSB egg masses and *T. japonicus* captures

2020

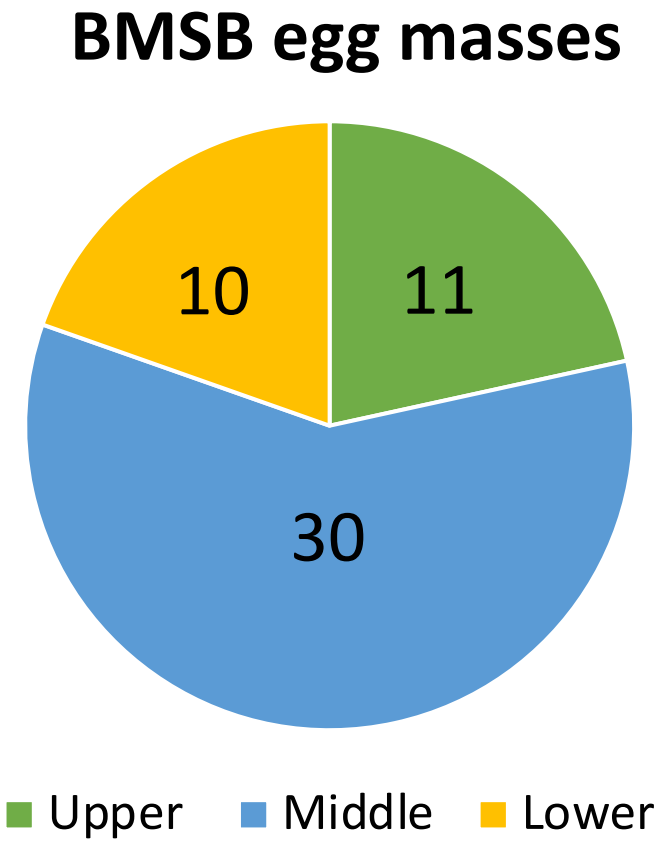
Effect of trap location on *T. japonicus* captures; relationship between captures of *T. japonicus* and BMSB

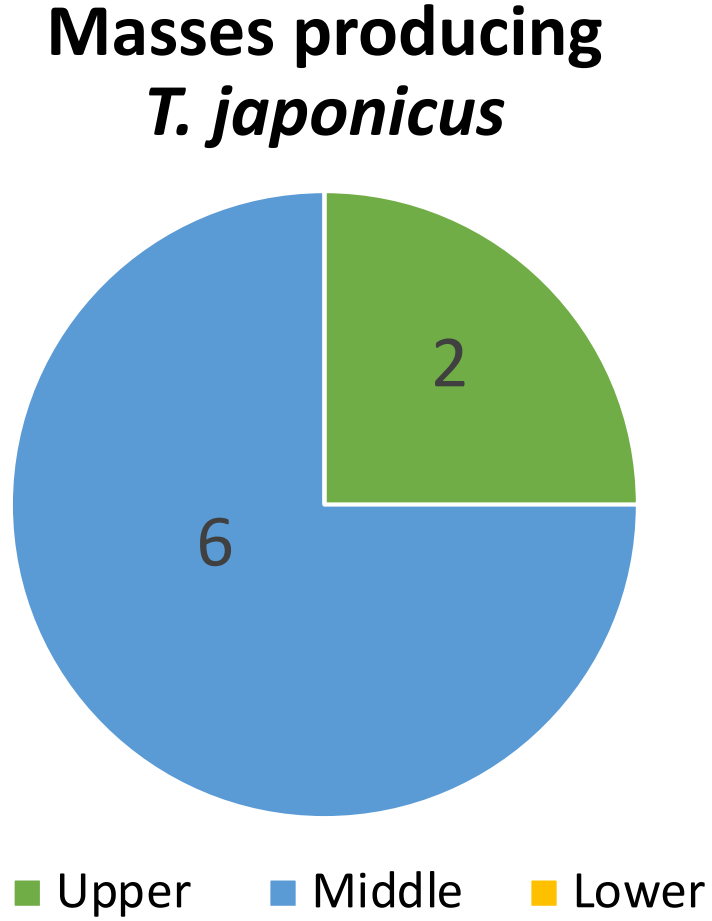
Distribution of BMSB, its egg masses, and its parasitoids in the host tree canopy



Quinn et al. Environ. Entomol. 2019

Distribution of BMSB, its egg masses, and its parasitoids in the host tree canopy

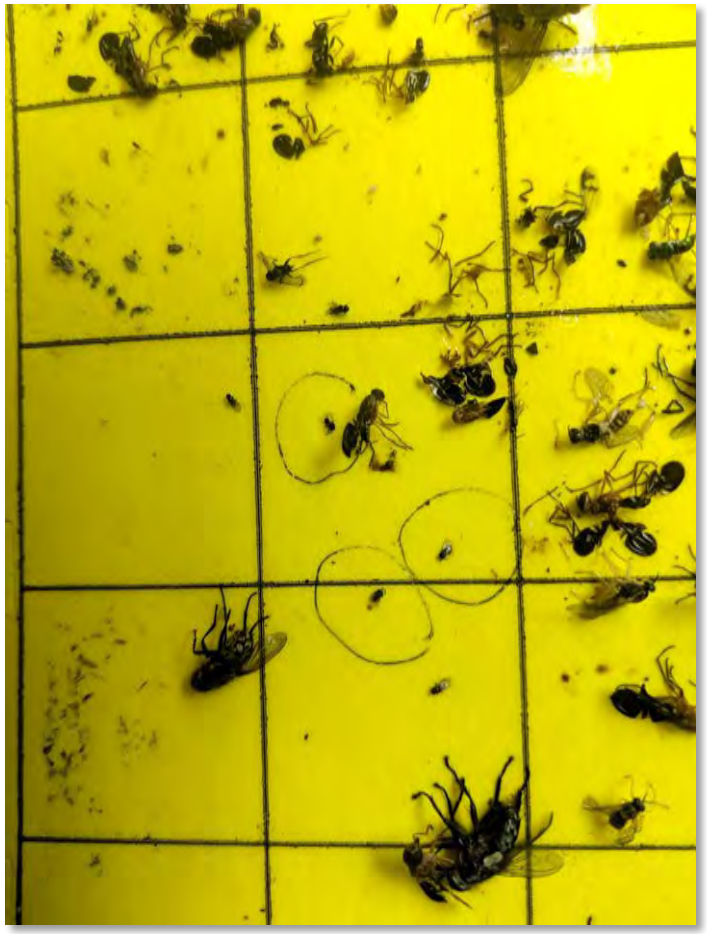




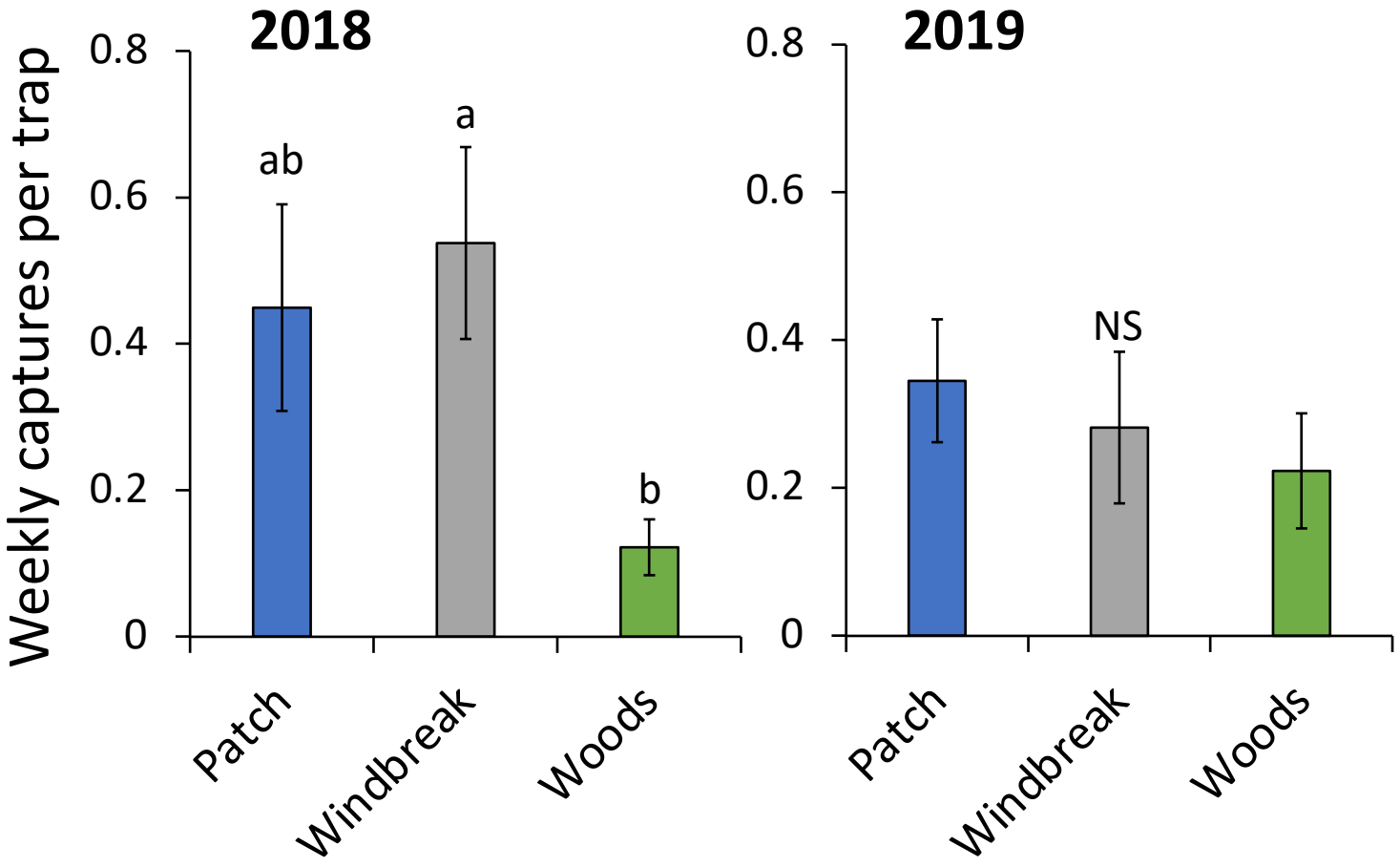
Quinn et al. Environ. Entomol. 2019

Backfolding yellow sticky traps deployed in the mid-canopy of host trees shown to be effective for sampling *T. japonicus*

Quinn et al. J. Econ. Entomol. 2019



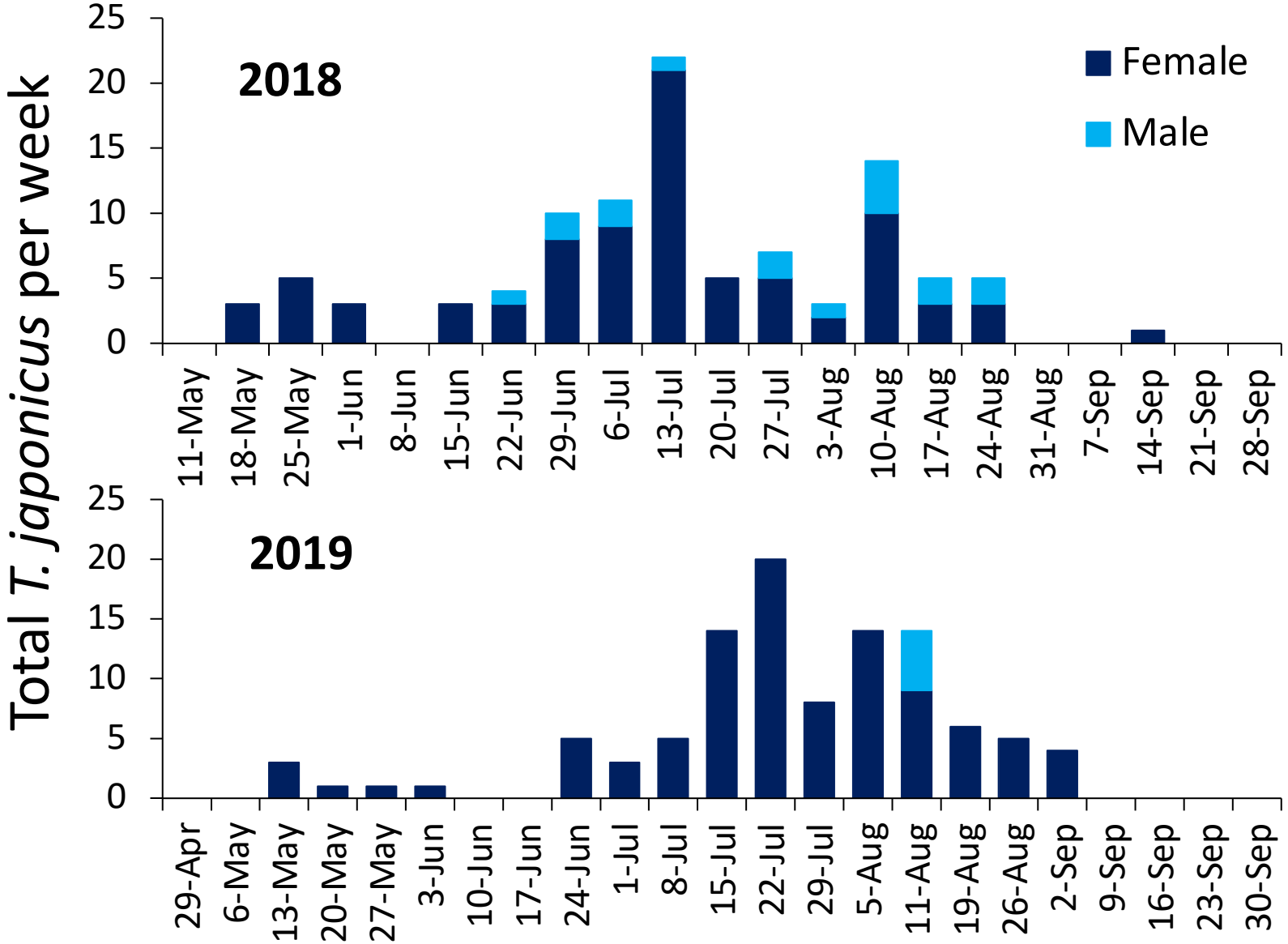
Habitat and host plant effects and seasonal phenology



Quinn et al. 2021. Insects, doi.org/10.3390/insects12020118

Seasonal captures of *T. japonicus*

Quinn et al. 2021. Insects, doi.org/10.3390/insects12020118



T. japonicus captures in paired tree hosts

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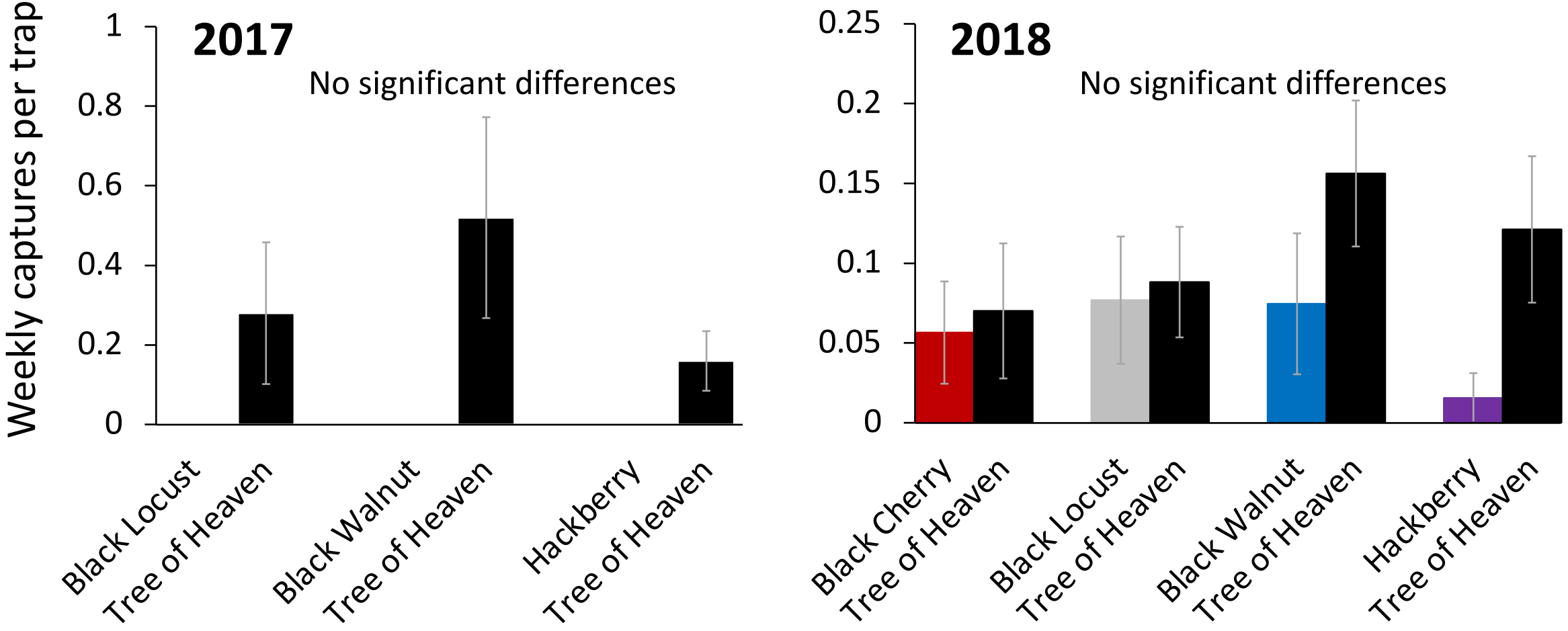
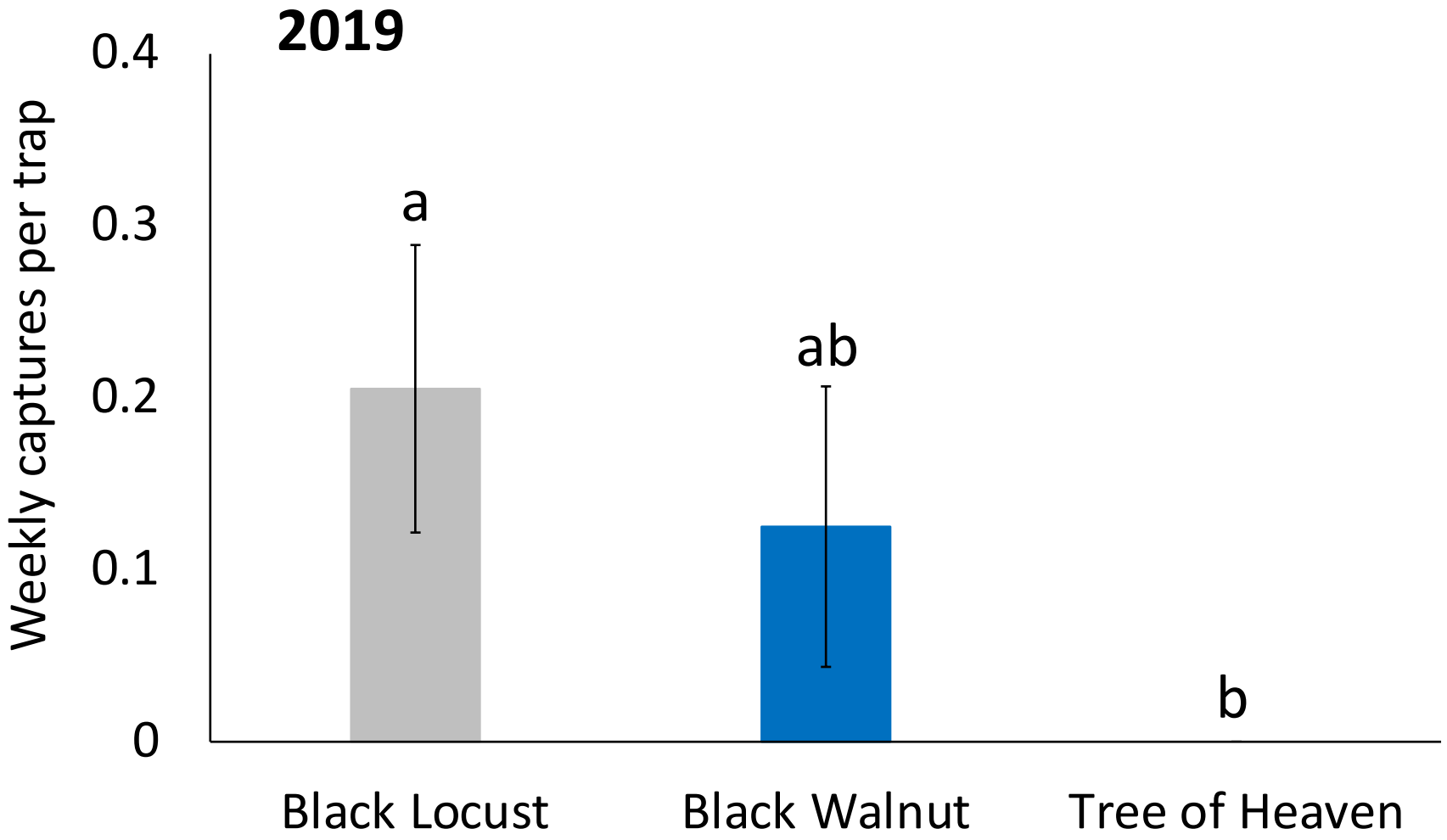


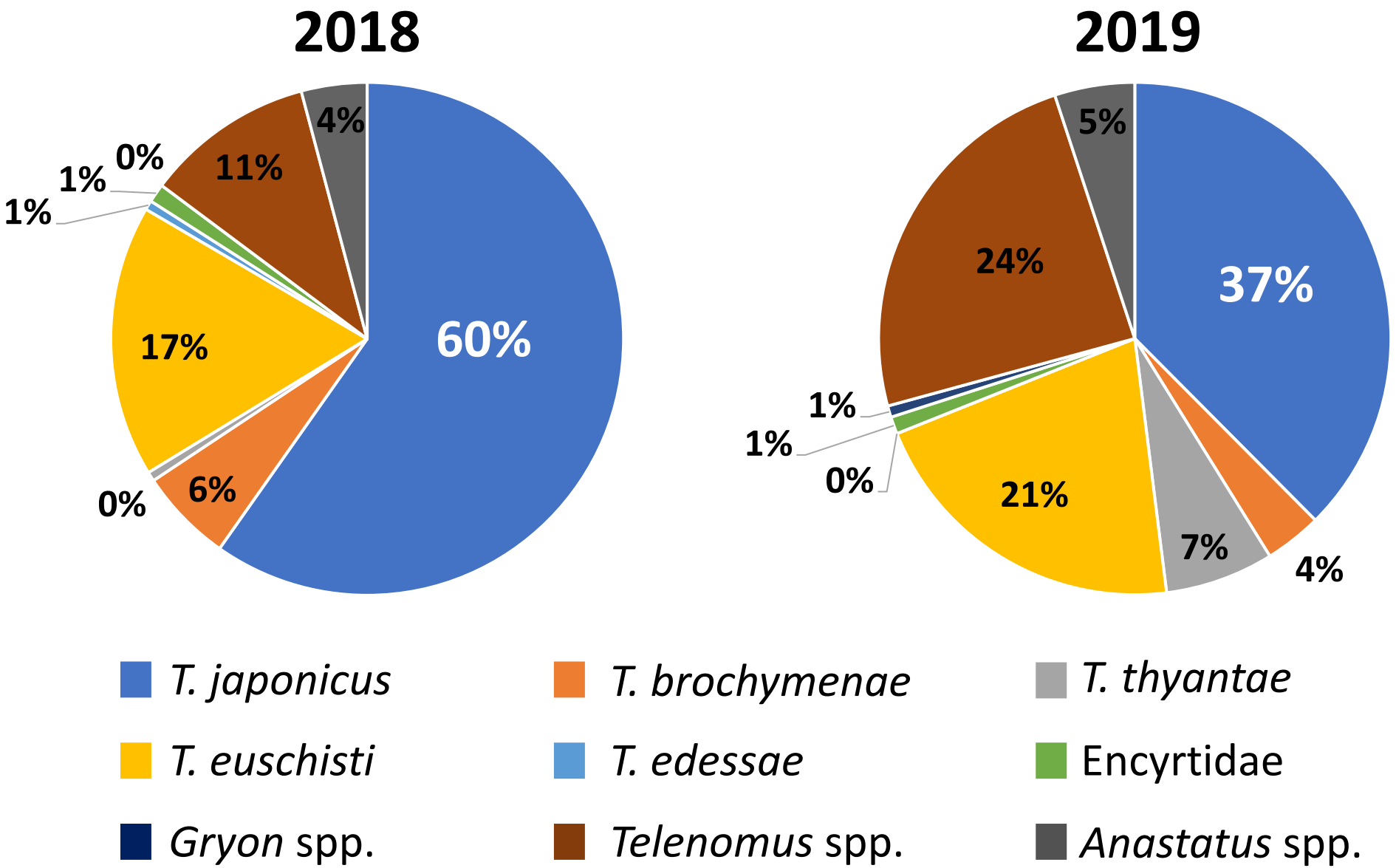
Quinn et al. 2021. Insects, doi.org/10.3390/insects12020118

T. japonicus captures in three tree hosts growing along a common windbreak



Quinn et al. 2021. Insects, doi.org/10.3390/insects12020118

H. halys parasitoids captured



Effect of olfactory stimuli on BMSB egg mass abundance and *T. japonicus* captures

1. Effect of pheromone lure on BMSB egg mass abundance

- Tree of heaven baited with BMSB Dual lure for two weeks
- Baited and unbaited trees felled and foliage assessed for egg masses

2. Effect of pheromone lure on *T. japonicus* captures

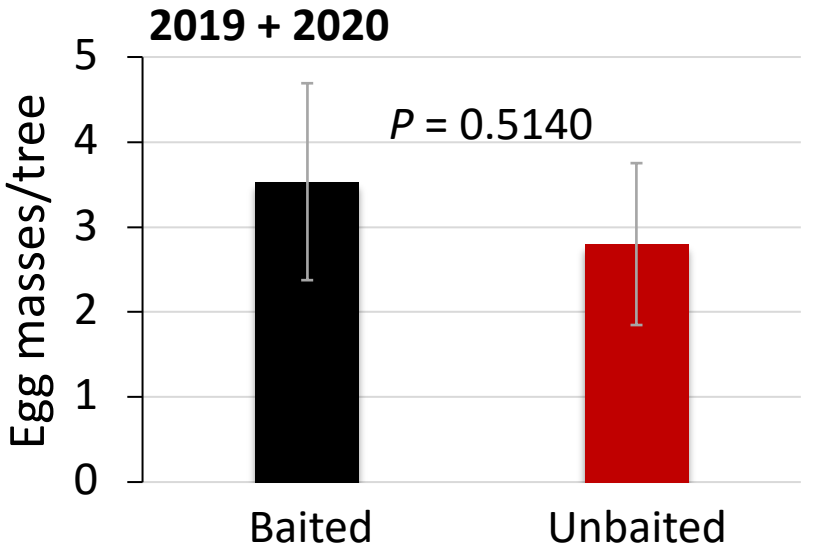
- Tree of heaven baited with BMSB Dual lure for two weeks
- Yellow sticky traps deployed in baited and unbaited trees

3. Effect of BMSB egg masses on *T. japonicus* captures

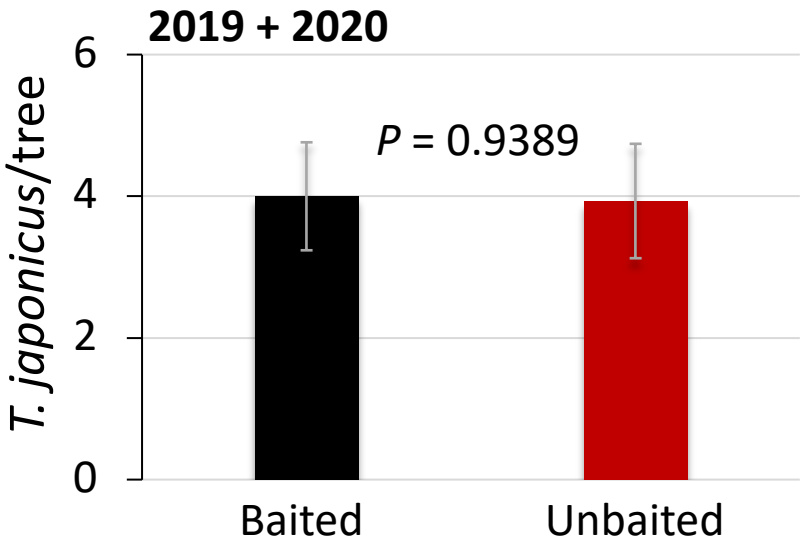
- Paired yellow sticky traps baited with fresh egg masses or leaf pieces

4. Effect of n-tridecane on *T. japonicus* captures

- Paired yellow sticky traps baited with n-tridecane or unbaited

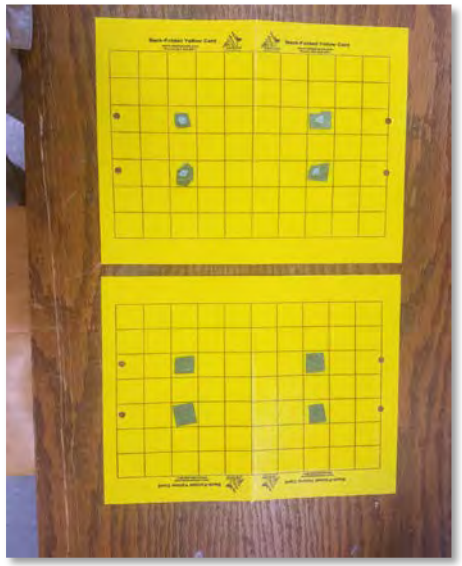


No effect of pheromone lure on egg mass abundance

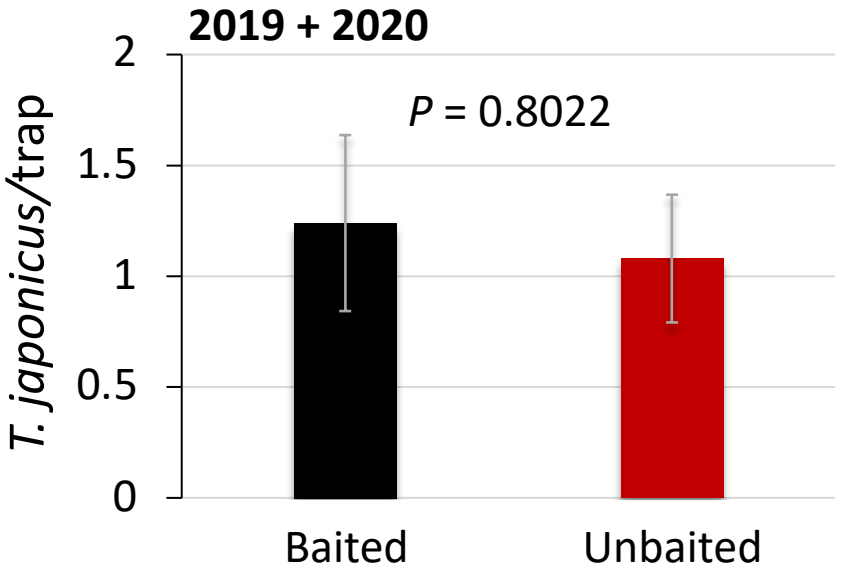


No effect of pheromone lure on *T. japonicus* captures

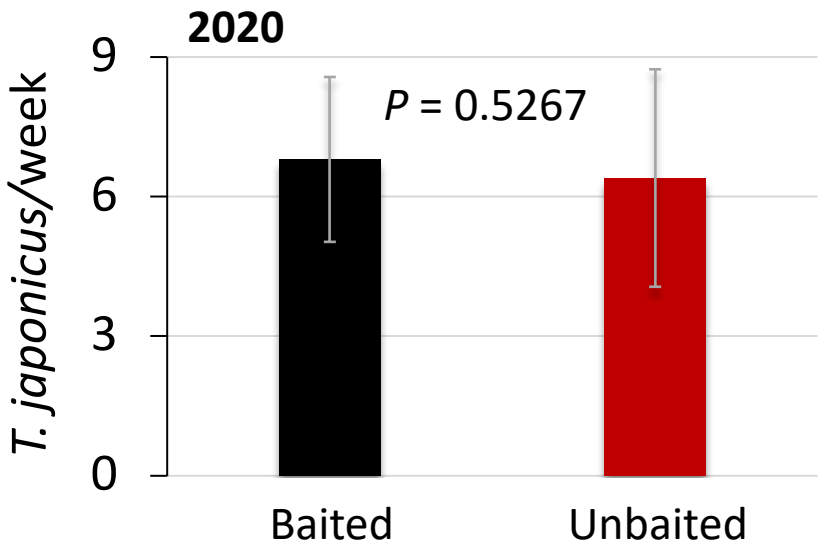
Dyer et al. unpublished



No effect of fresh egg masses on *T. japonicus* captures



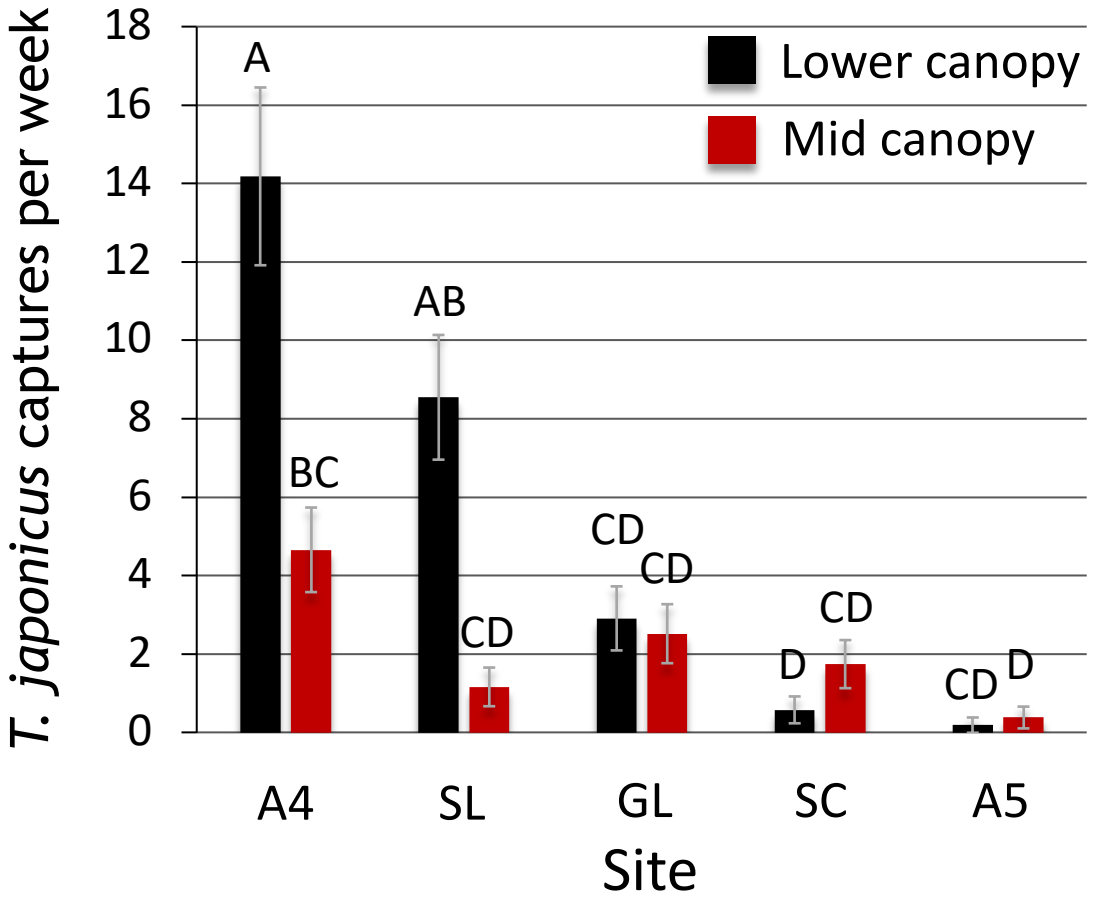
No effect of n-tridecane on *T. japonicus* captures



Dyer et al. unpublished

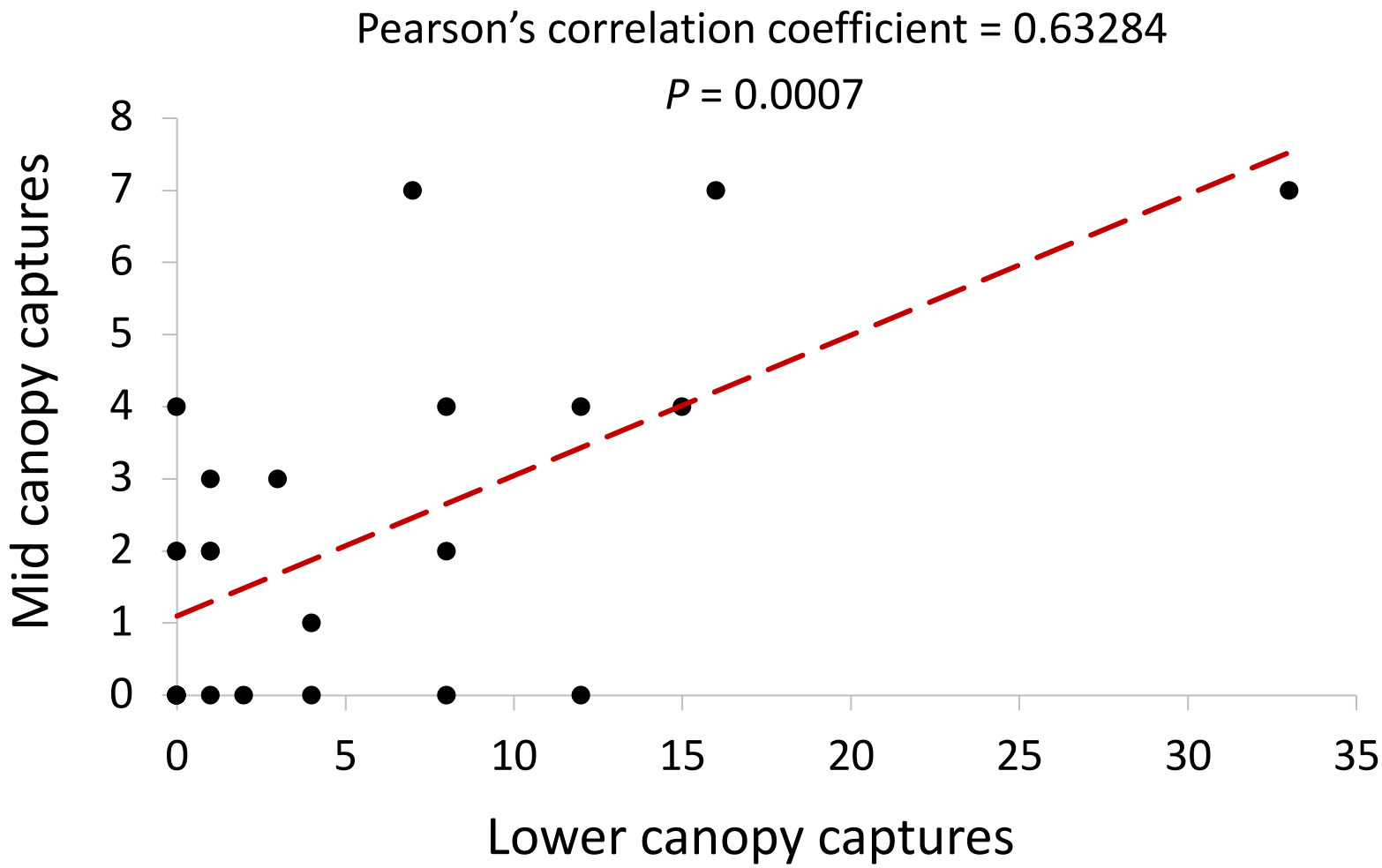
Is there an effect of trap location in the tree canopy on *T. japonicus* captures?

N = 190 *T. japonicus*; 68.9% female



Dyer et al. unpublished

Significant correlation between captures in lower and mid canopy



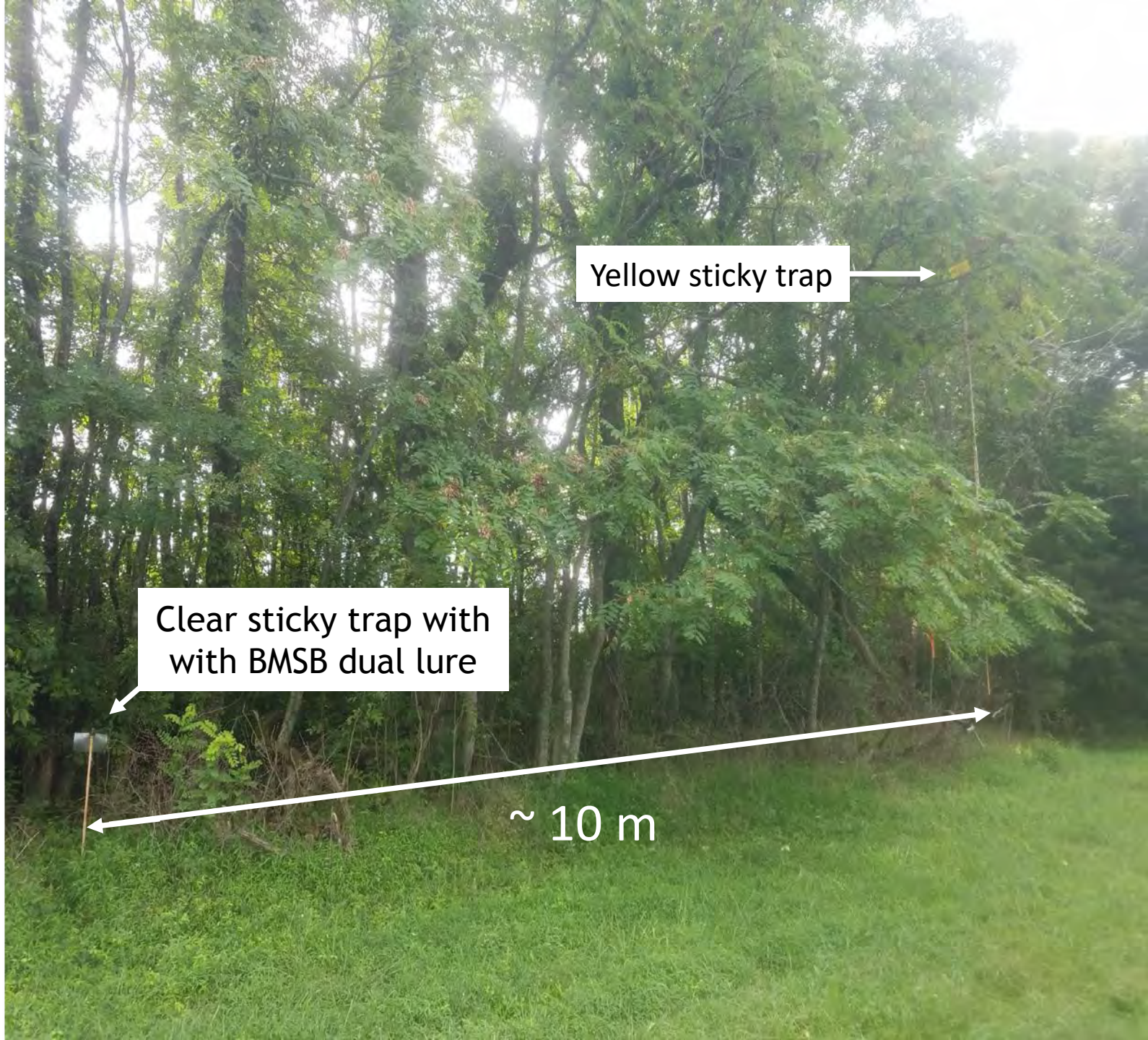
Dyer et al. unpublished

Is there an effect of trap location in the tree canopy on *T. japonicus* captures*?*

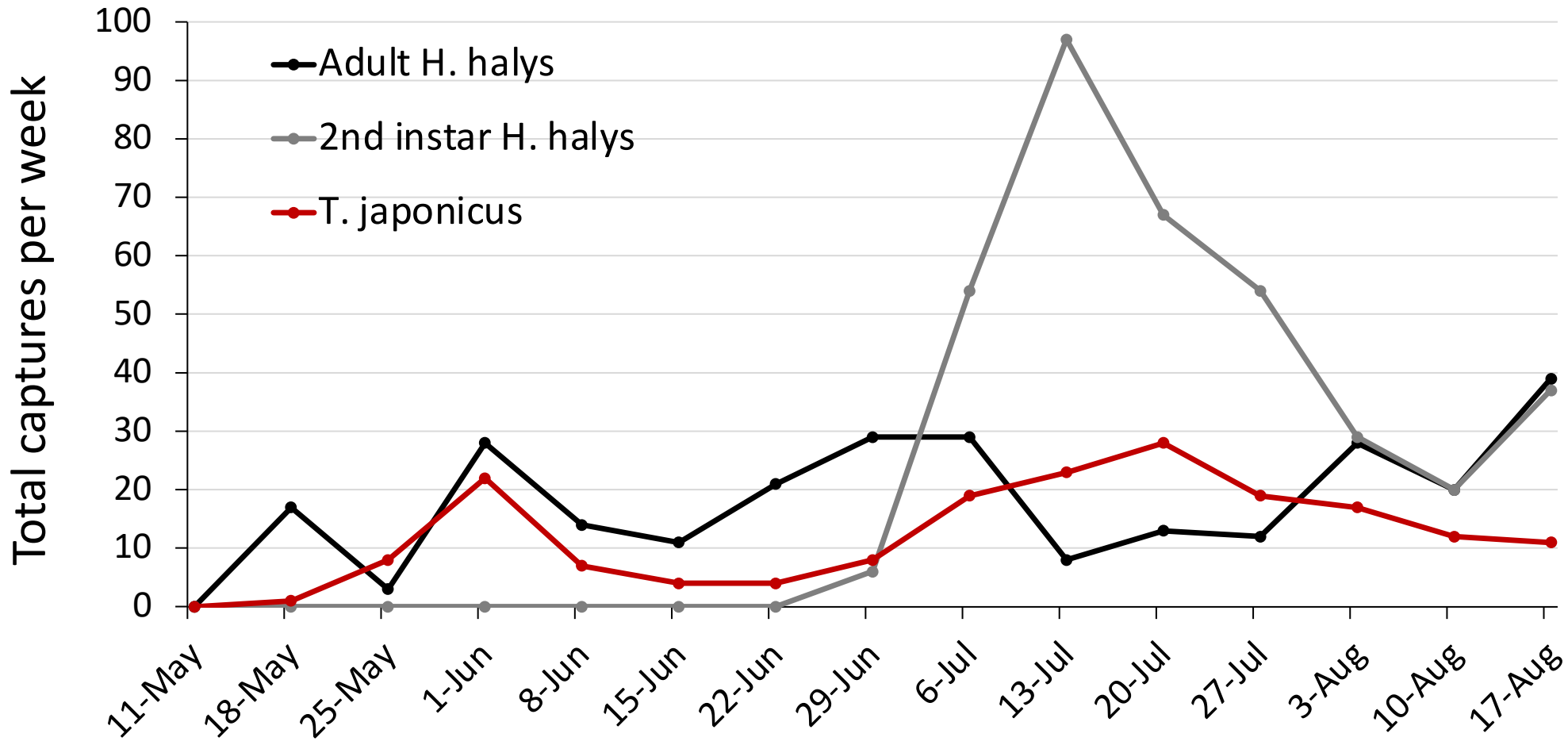
To be repeated in 2021

Are *H. halys* and *T. japonicus* captures correlated?

10 sites in Frederick Co., VA



Captures of *H. halys* adults and 2nd instars, and *T. japonicus*



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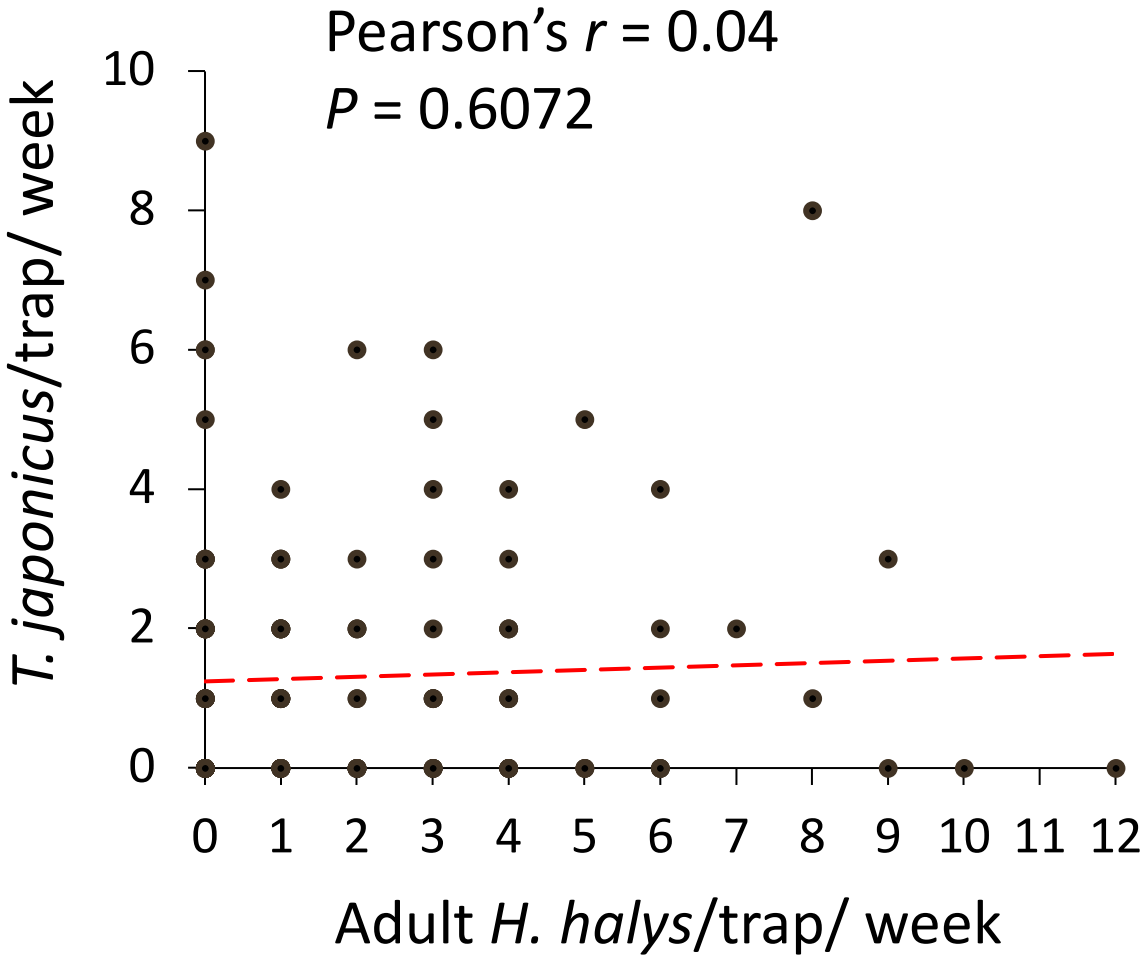
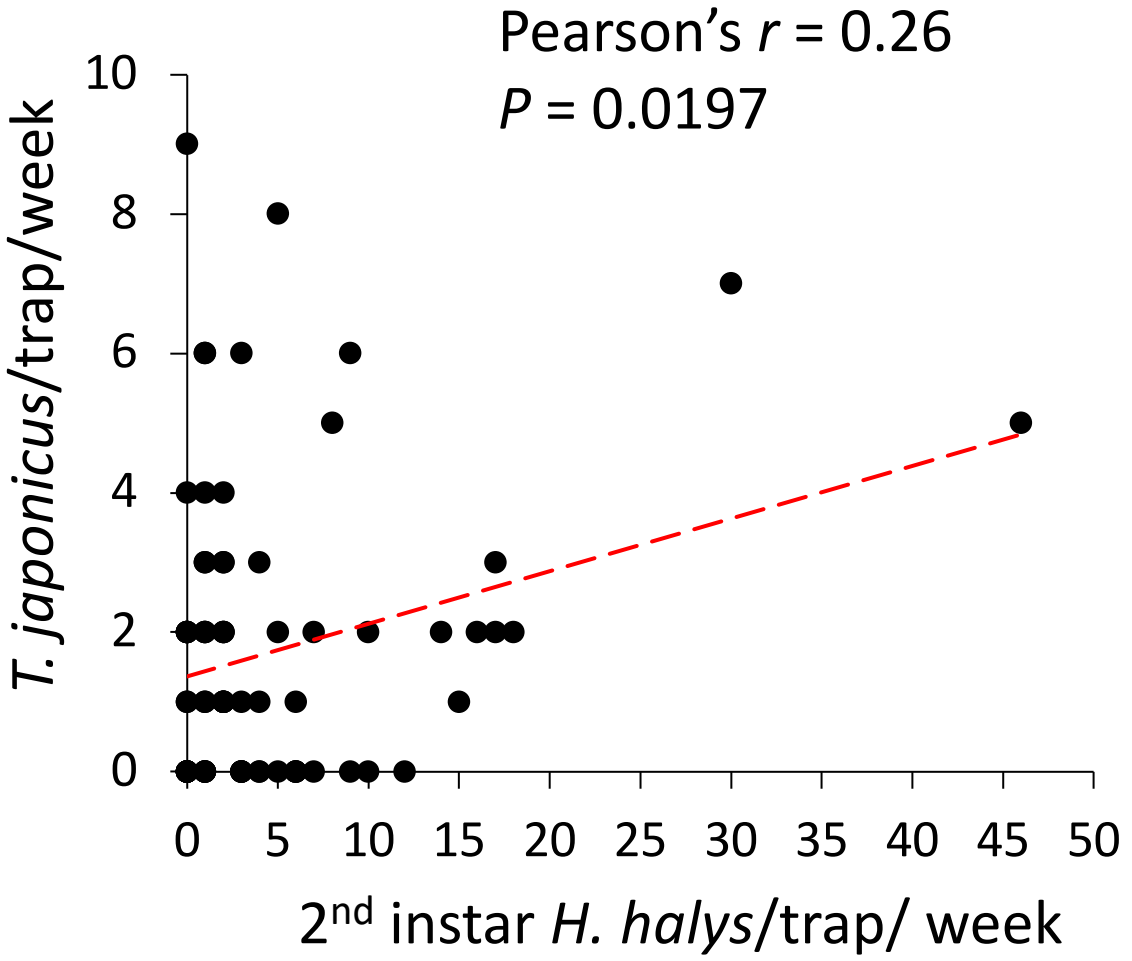
May 11 – Aug 17 (adults present)



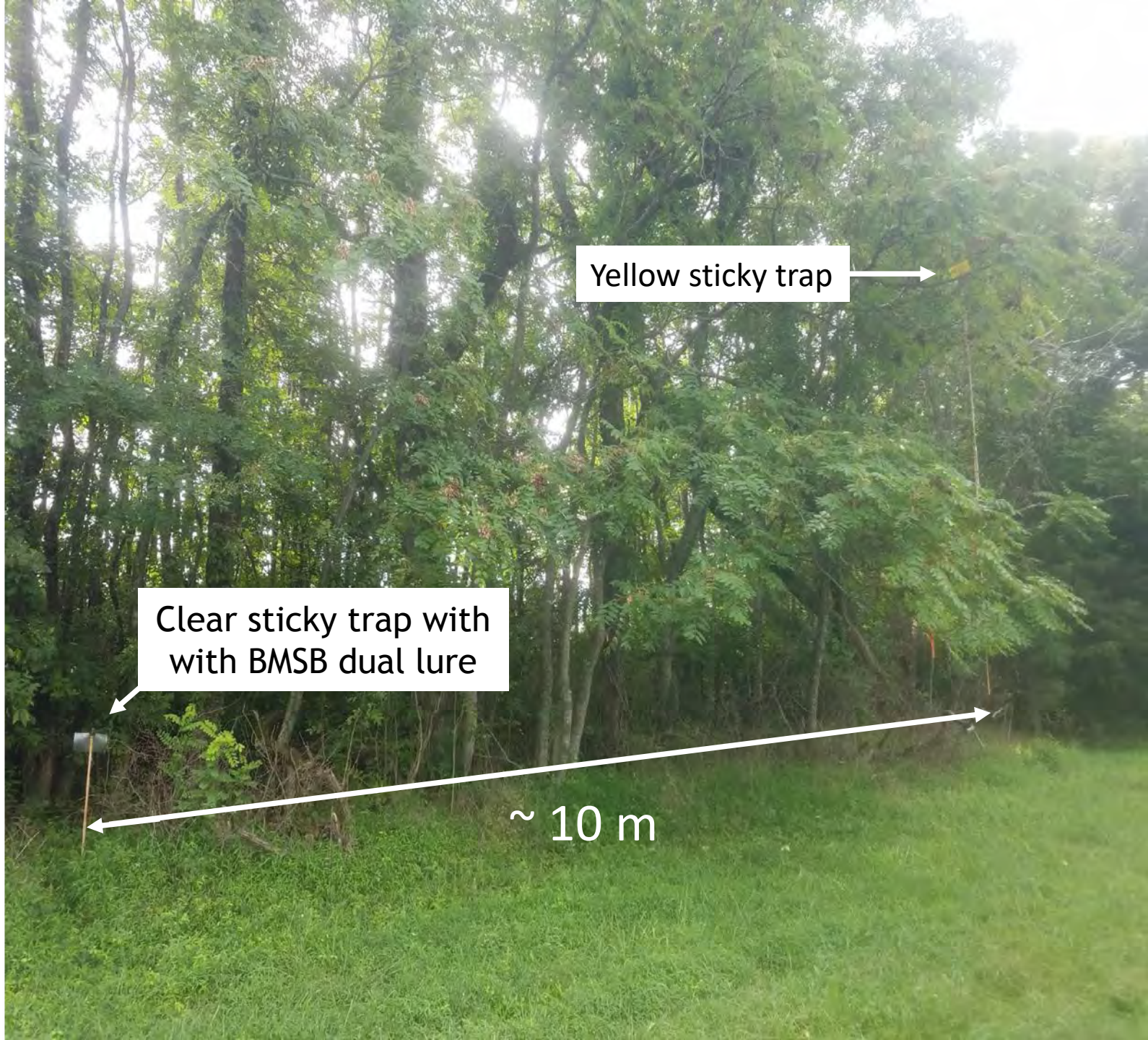
Jun 29 – Aug 17 (nymphs present)



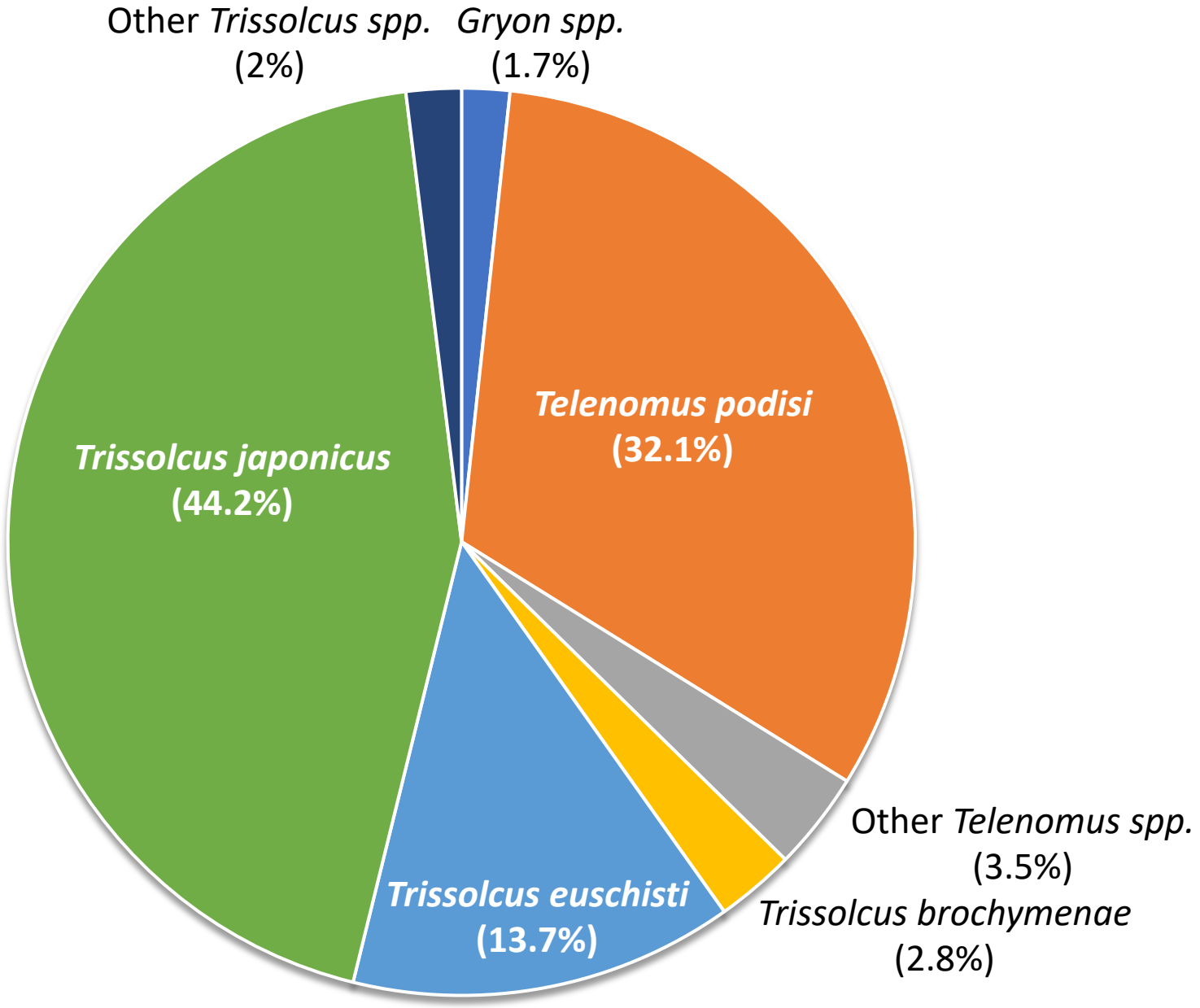
Dyer et al. unpublished

Are *H. halys* and *T. japonicus* captures correlated?

To be repeated in 2021 (15 – 20 sites)



- 1170 scelionids captured across all projects in 2020 (30 sampling sites in total)
- *T. japonicus* captured at all sampling sites in 2020



Dyer et al. unpublished

Additional support from:

1. VA Dept of Ag. and Cons. Services Specialty Crop Block Grants:
   301-15-161
   301-17-036
   301-18-021
   301-20-028
2. Southern SARE Graduate Student Grant Program: RD309-137/S001521

Thank You

It’s time for a few polling questions