

ESA Eastern Branch Meeting
March 15th, 2015

The spatial behavior of the
brown marmorated stink
bug (*Halyomorpha halys*)
in peach trees

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George Hamilton
Rutgers University



Insect movement on different scales



Insect movement on different scales

- Regional



Insect movement in the agricultural landscape



Terhune Orchards
Princeton, New Jersey

Insect movement in the agricultural landscape

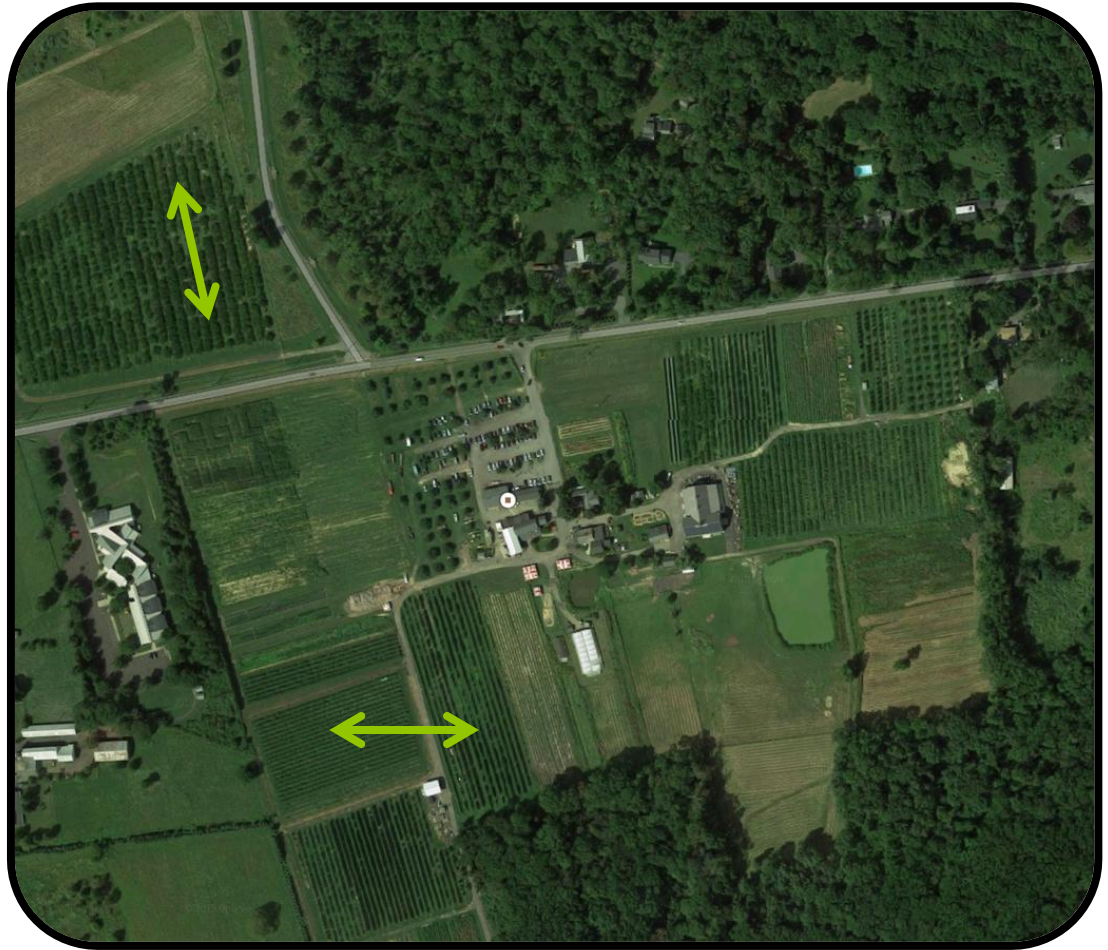
- Landscape



Terhune Orchards
Princeton, New Jersey

Insect movement in the agricultural landscape

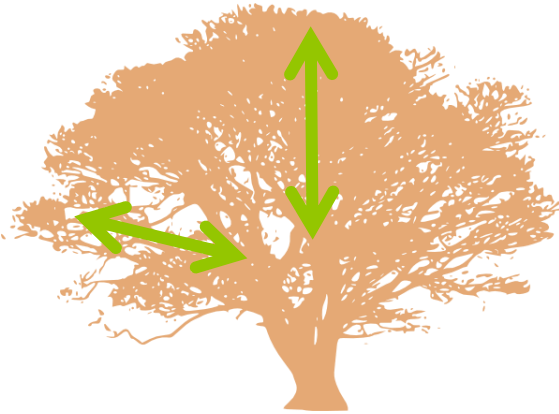
- Landscape
- Plant to plant



Terhune Orchards
Princeton, New Jersey

Insect movement in the agricultural landscape

- Landscape
- Plant to plant
- **Within plant**

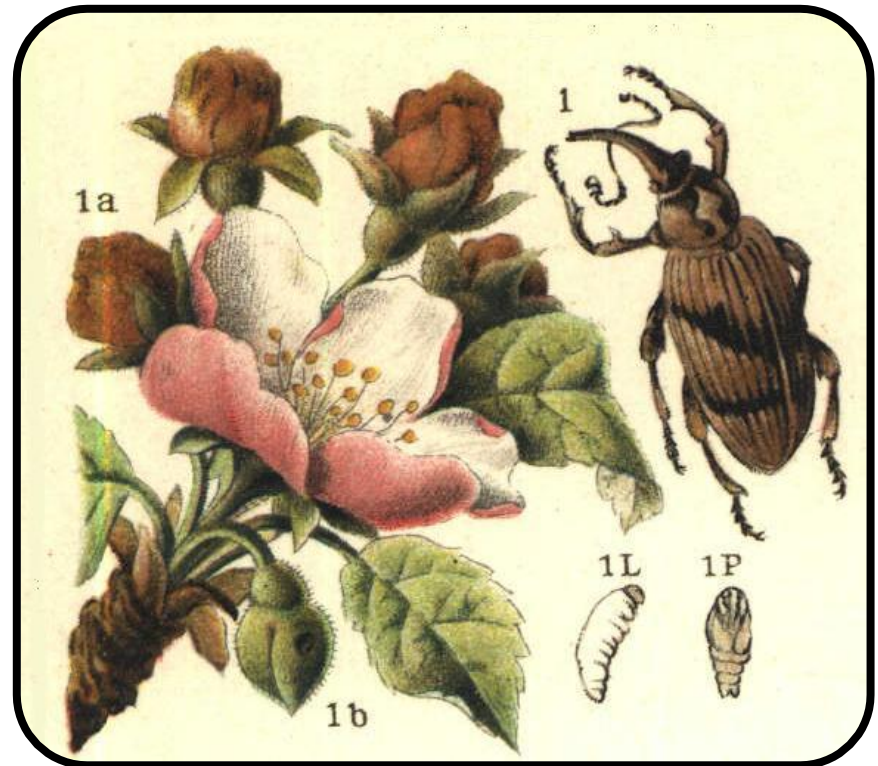


Terhune Orchards
Princeton, New Jersey

Within Plant Movement



● Microclimate



Apple blossom weevil
(*Anthonomus pomorum*) Linnaeus

Within Plant Movement



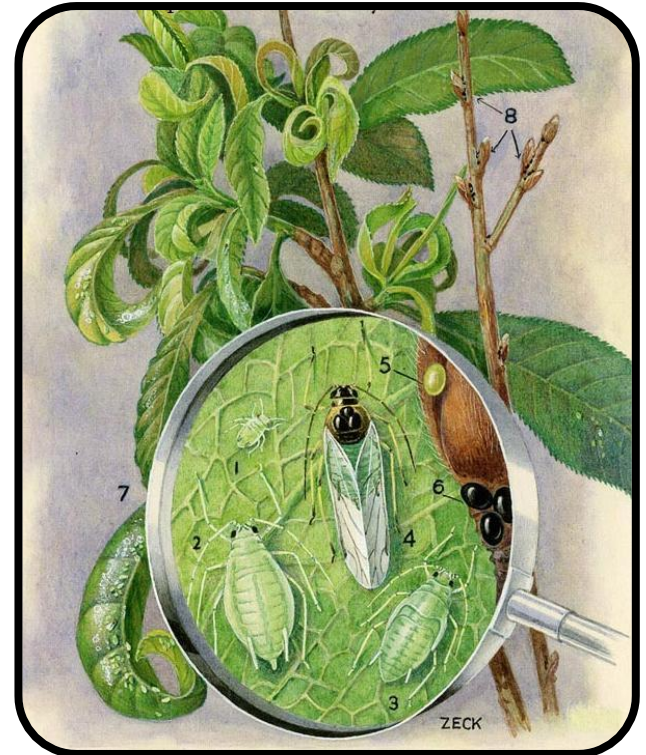
- Microclimate
- Reproduction

Lesser Peachtree Borer
(*Synanthedon pictipes*) Grote and Robinson

Within Plant Movement



- Microclimate
- Reproduction
- Feeding



Green Peach Aphid
(*Myzus persicae*) Sulzer

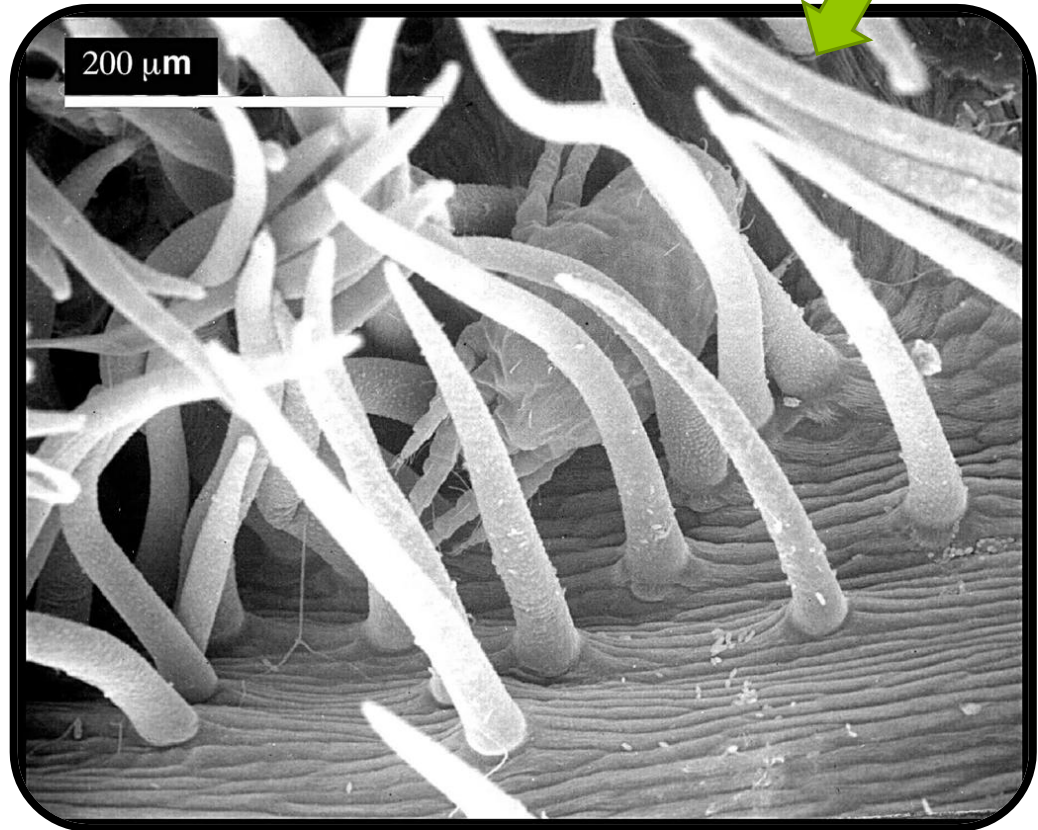
Within Plant Movement



(Amblyseius andersoni) Chant



Domatia



- Microclimate
- Reproduction
- Feeding
- Protection

Within Plant Movement



(Lepyronia quadrangularis) Say

- Microclimate
- Reproduction
- Feeding
- Protection
- Inter/intra specific competition



Meadow Froghopper
(Philaenus spumarius) Linnaeus

Temporal factors



Summer Fruit Tortrix

(*Adoxophyes orana*) Fischer von Röslerstamm

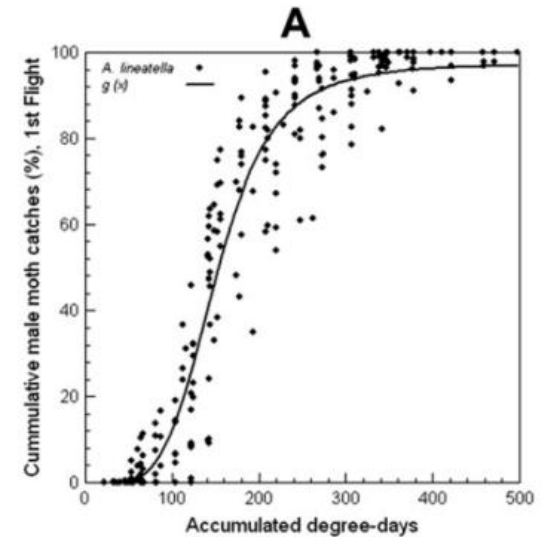
Oriental Fruit Moth

(*Grapholita molesta*) Busck



Generalized model for describing the cumulative catches for the first-flight of *A. lineatella* male moth.

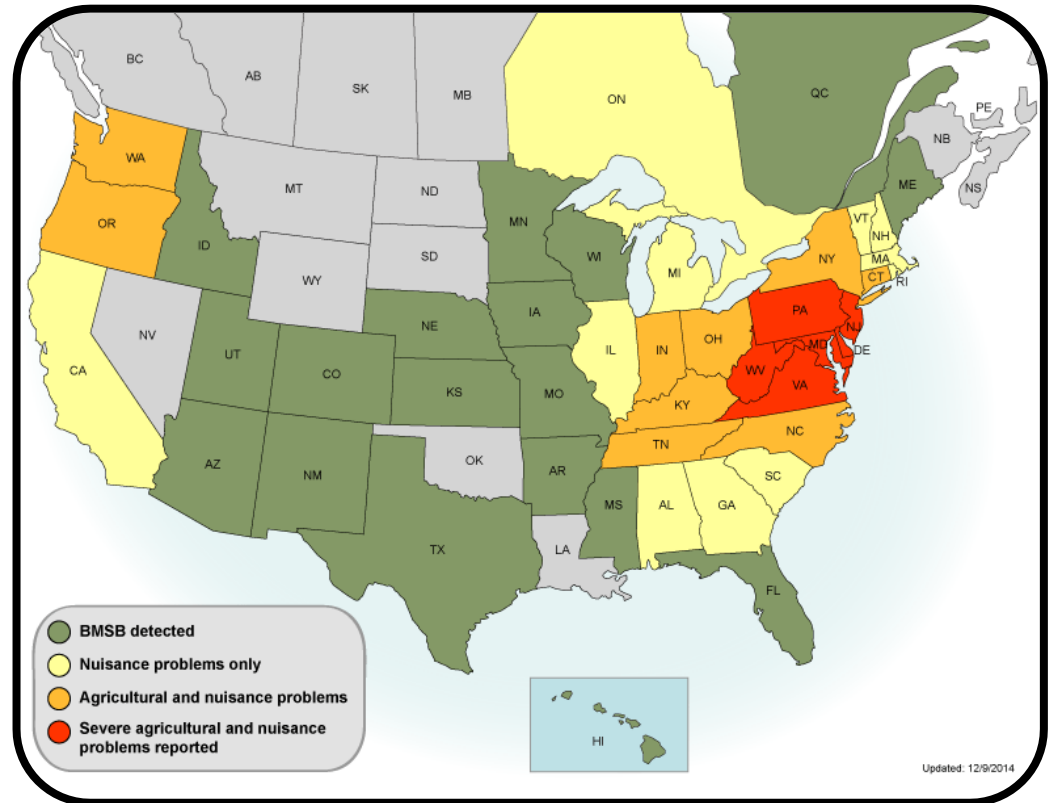
Figure from Damos & Savopoulou-Soultani, (2010)



Peach Twig Borer

(*Anarsia lineatella*) Zeller

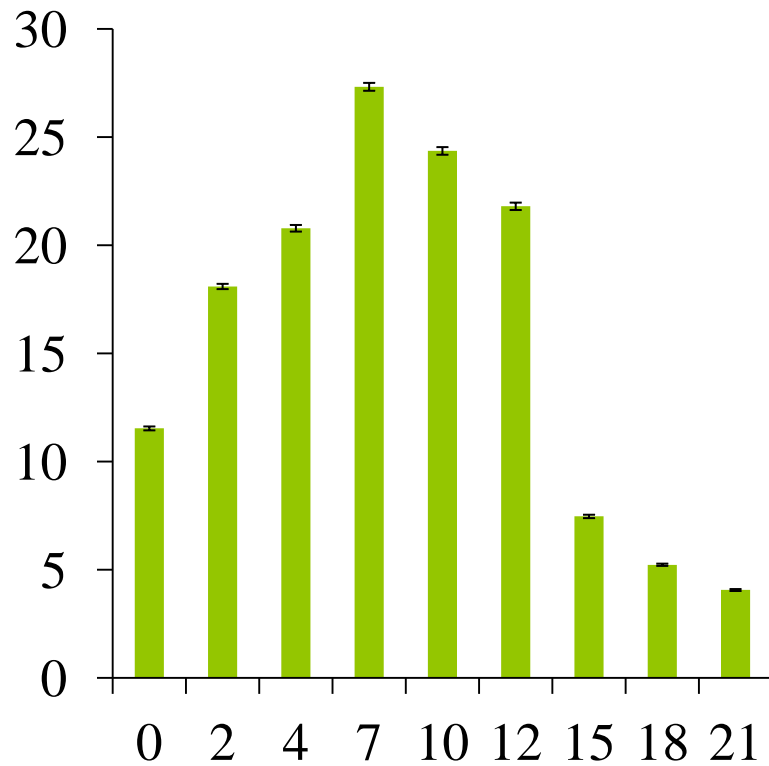
Halyomorpha halys Stål (BMSB)



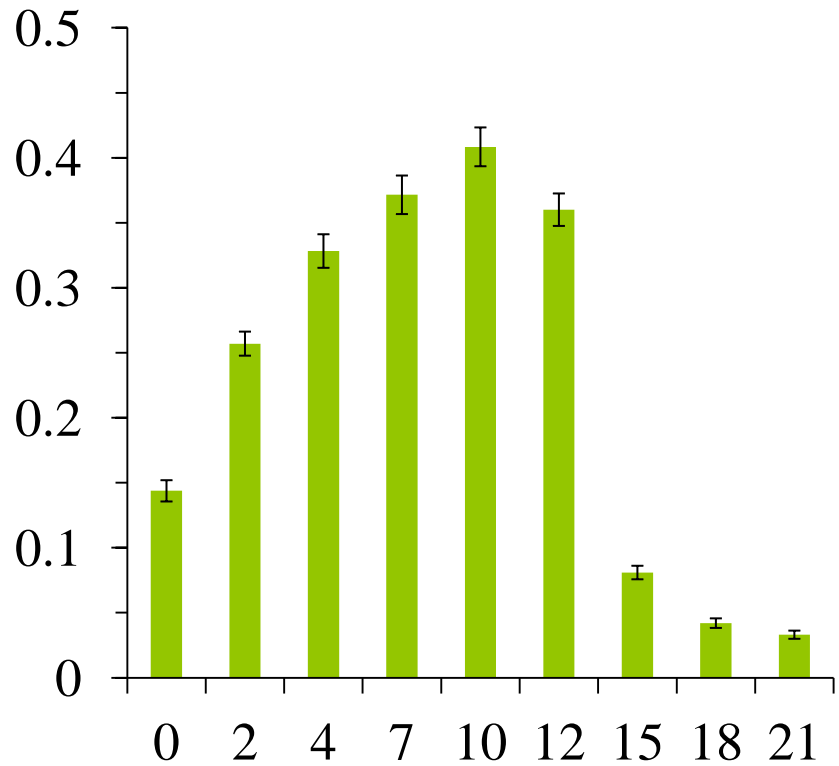
Leskey, T. (2014, 12 09). *Where is bmsb?*. Retrieved from <http://www.stopbmsb.org/where-is-bmsb/>

Change in observed abundance over time

Summer 2013: Nymphs



Summer 2014: Nymphs



Hours past sunrise

Research Topic: Average position by time of day

Objective: To characterize
the position of BMSB
within a peach tree over the
course of a 24 hour period.



Study Design: In-tree movement



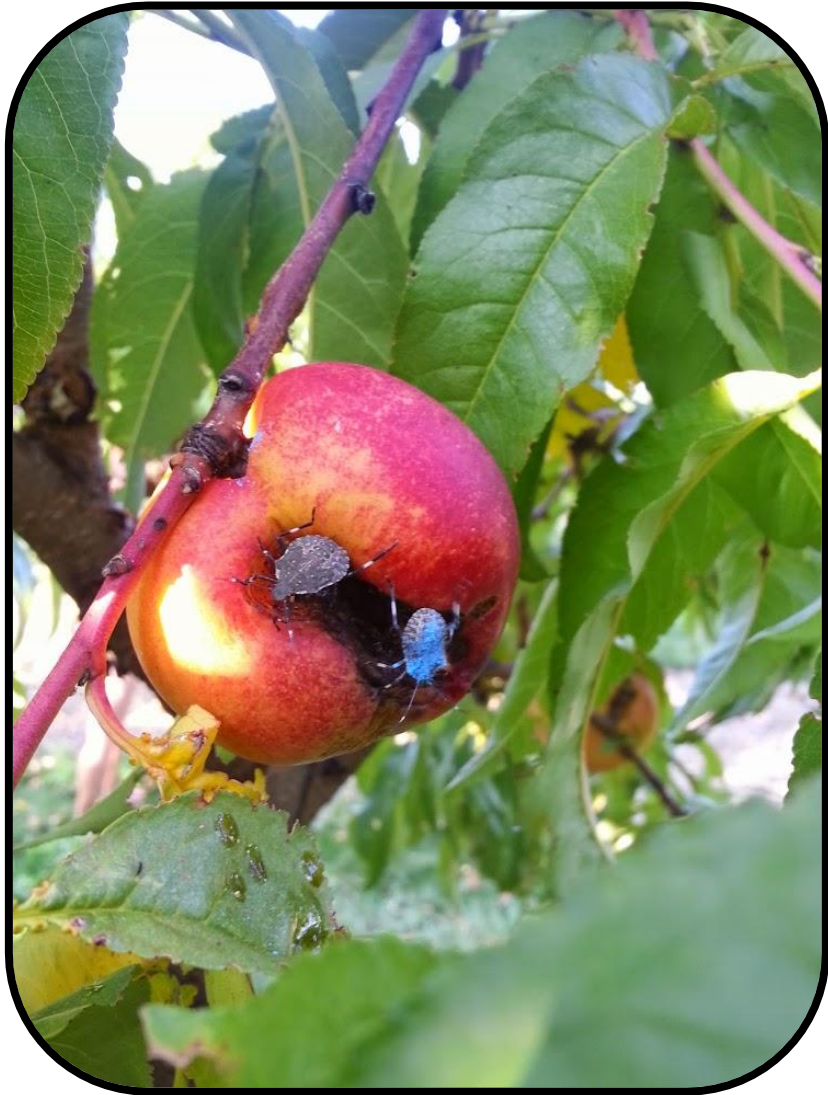
- Six minute visual counts were used as the method of detection.
- Data were collected once a week from June through August at 0, 2, 4, 7, 10, 12, 15, 18, and 21 hours past sunrise.
- Nymphs were marked with fluorescent powder when they were spotted.

Study Design: In-tree movement



- Black light flashlights were used to confirm previous marking.
- At night, 6 minute counts were broken into 4 minutes with one the UV flashlight followed by 2 minutes with that in addition to a white head lamp.

Study Design: In-tree movement



- Data were collected on:
 - If individuals were previously observed
 - Life stage
 - Surface observed on
 - Height observed at
- Other metrics were collected but will not be reported on in this talk.

Study Sites

Rutgers Agricultural Research
and Extension Center

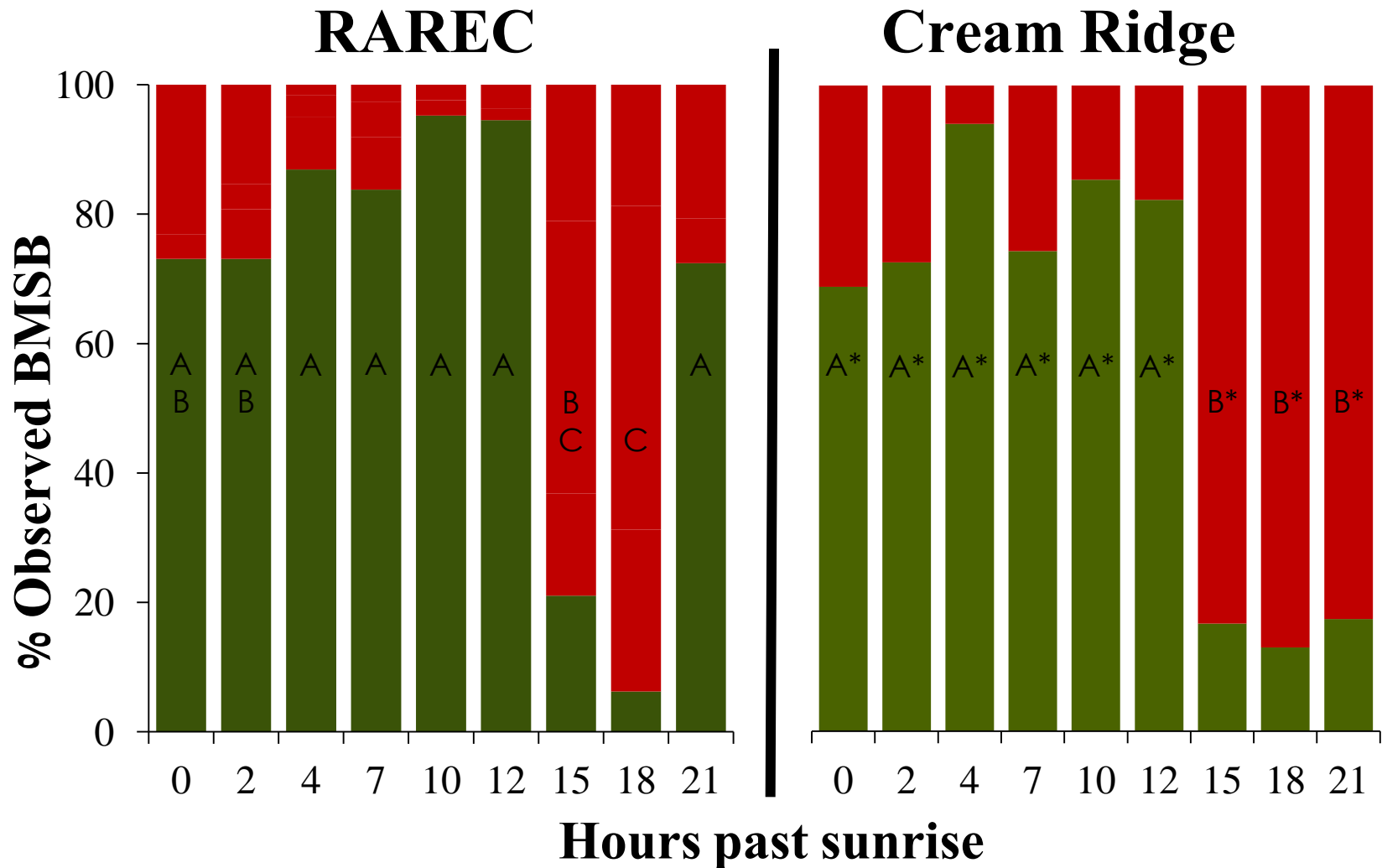


Rutgers Fruit and Ornamental
Research Extension Center



Results: Resampled individuals

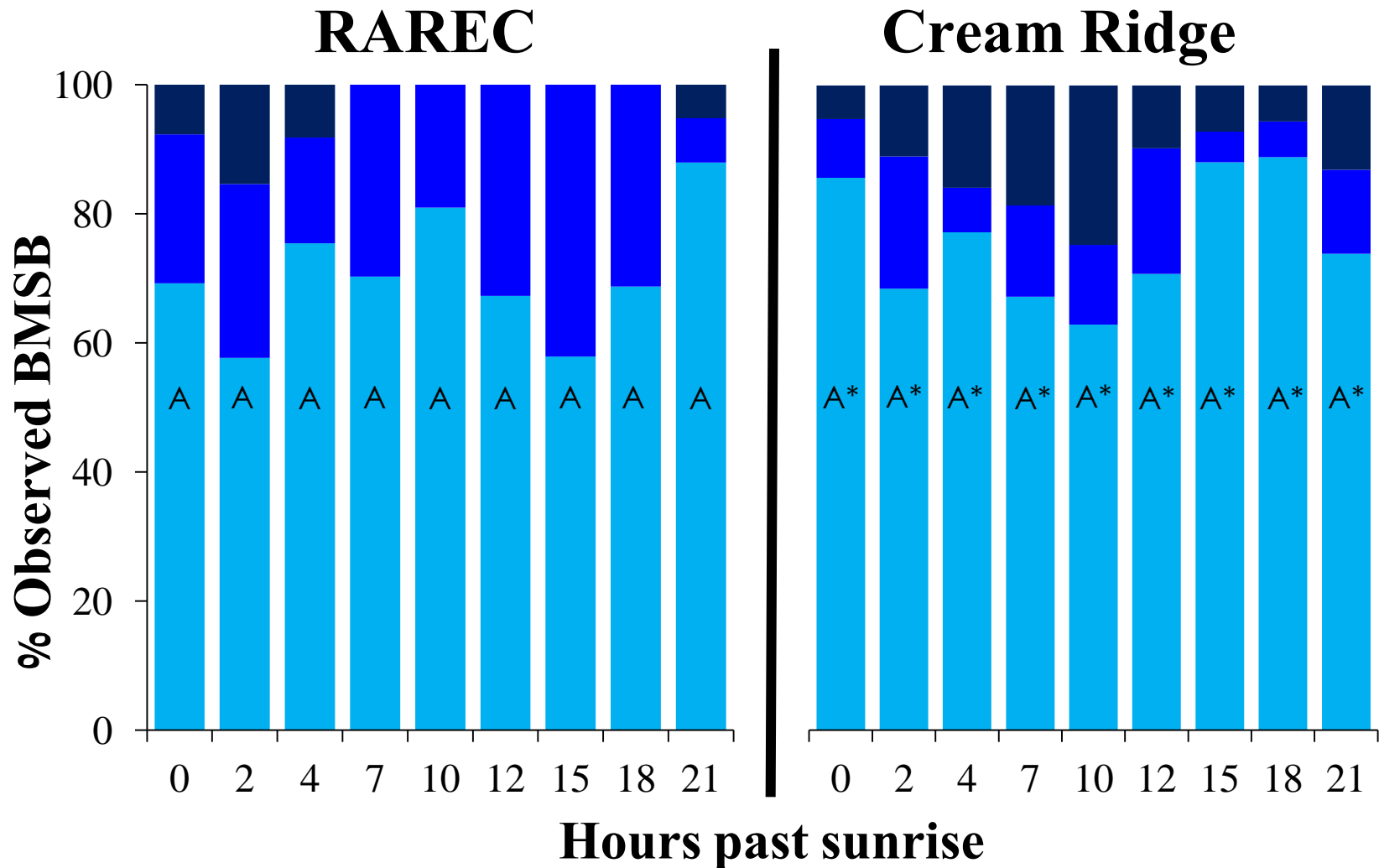
■ Previously observed
■ Not previously observed



Columns with the same letters are not significantly different at $p \leq 0.05$, Kruskal-Wallis MC

Results: Observed life stages

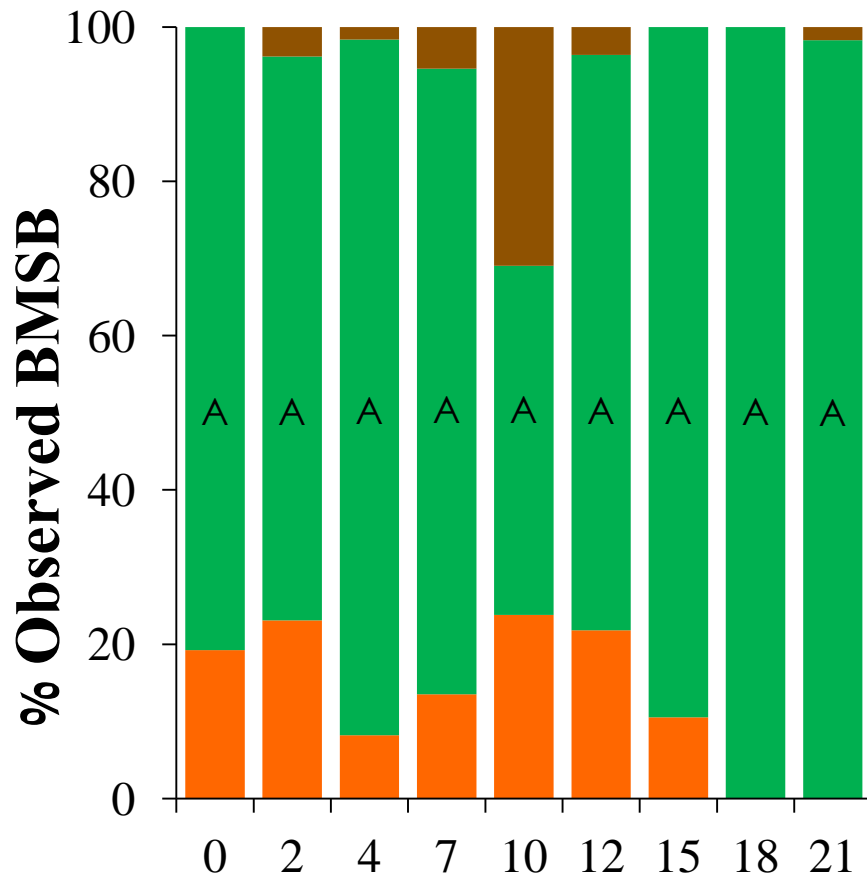
- Adults
- 4th & 5th instars
- 2nd & 3rd instars



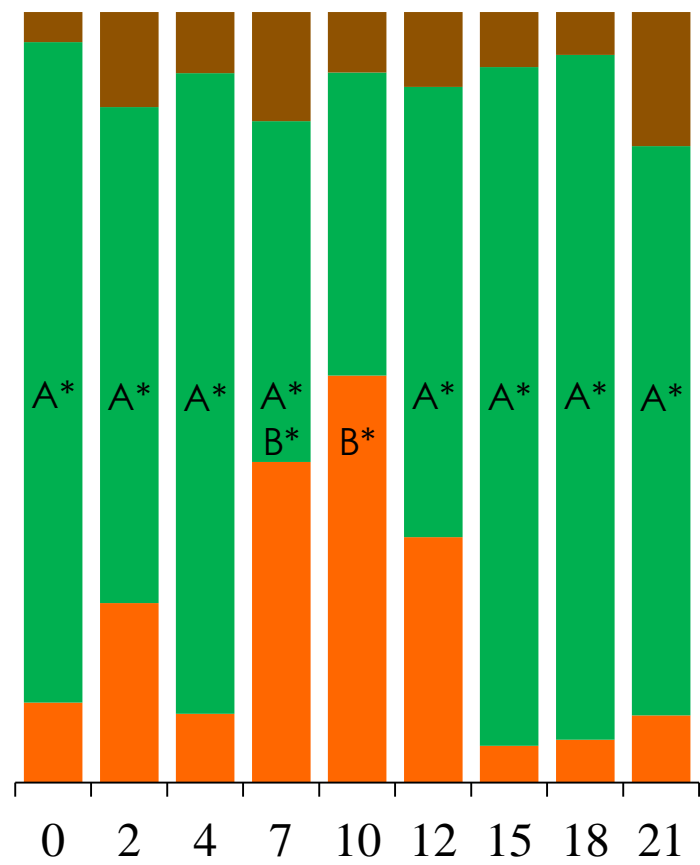
Columns with the same letters are not significantly different at $p \leq 0.05$, Kruskal-Wallis MC

Results:

Surface observed on RAREC



Cream Ridge



Hours past sunrise

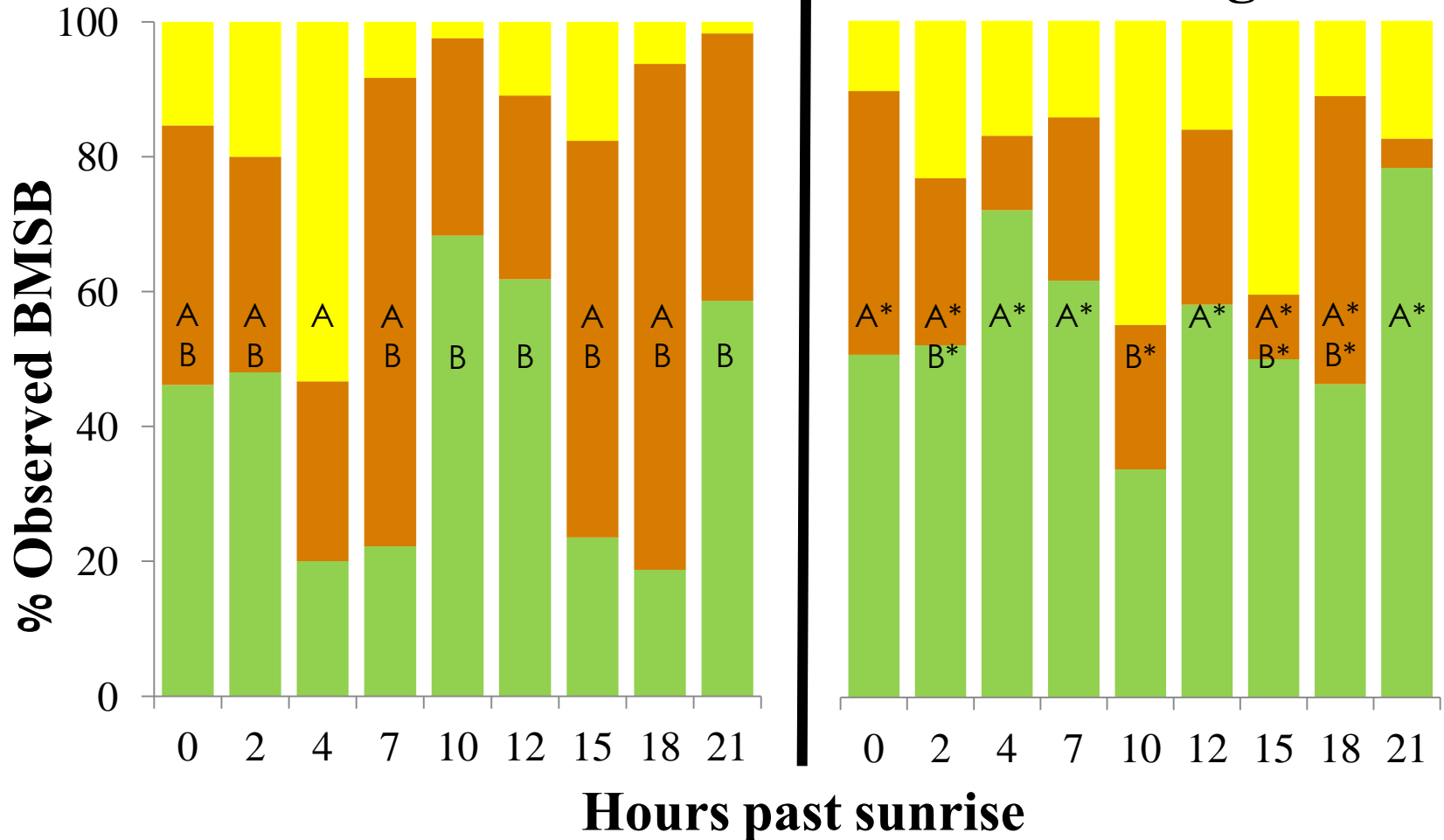
Columns with the same letters are not significantly different at $p \leq 0.05$, Kruskal-Wallis MC

Results: Observed height

Top
Middle
Bottom

RAREC

Cream Ridge



Columns with the same letters are not significantly different at $p \leq 0.05$, Kruskal-Wallis MC

Conclusions

- BMSB observed during the day had generally not been observed before.
- 2nd and 3rd instars are the most commonly observed instars at all times of the day.
- BMSB are most often found on peach leaves
 - Exception at mid-day?



- The average height of observed BMSB on a peach tree is slightly below the tree middle
 - Exception at mid-day?
- A larger sample size is needed to properly investigate these behavioral patterns.

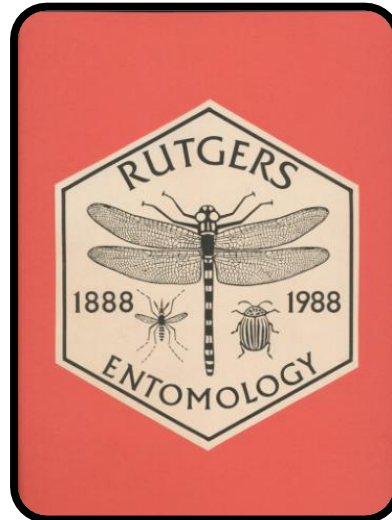
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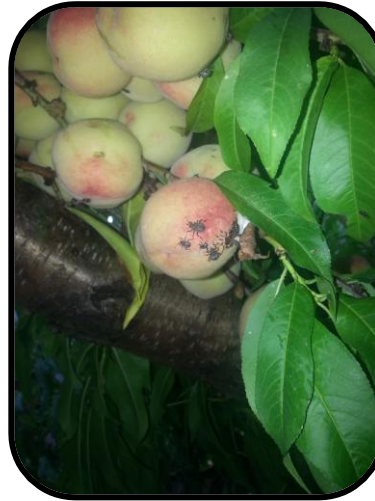
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- Gourab Das
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Questions?

Thank you!

