# Trapping Bronze Birch Borer
# *Agrilus anxius* (Gory)


Image: www.nyis.info/?action=eab_identification

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# Acknowledgements


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- My amazing technicians Mioara Scott and Dennis Hicks for help in everything.

# Host Species

- *Betula* spp. - except *Betula nigra*
- Varying degrees of susceptibility

*Betula pubescens* Downy Birch

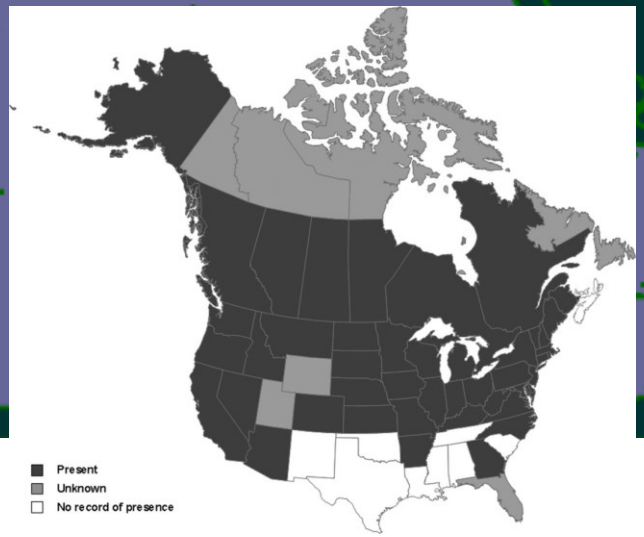
*Betula populifolia*
Gray Birch

*Betula pendula* European
White Birch

*Betula szechuanica*
Szechuan white birch

*Betula maximowicziana*
Monarch Birch

*Betula nigra*
river birch

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# Bronze Birch Borer

**Mating and Eggs**

**Larvae**

**Adults**

**Pupae**

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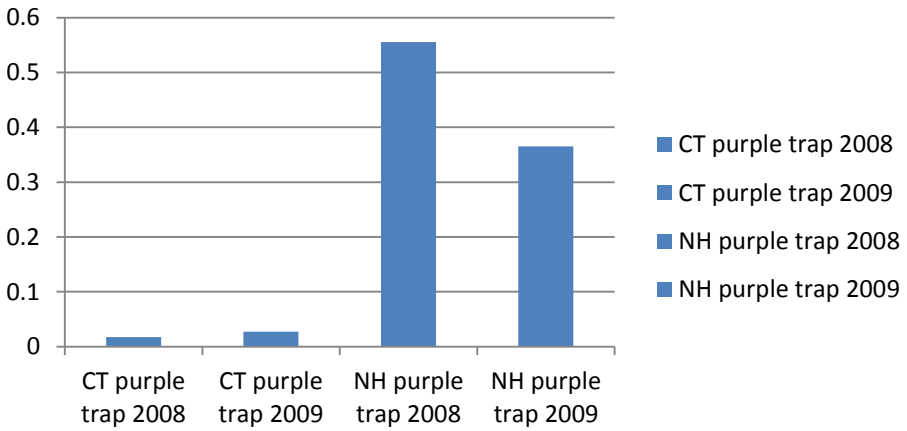
# Adult Biology

- Most adults emerge in June, but emergence can last all summer
- Adults feed for about 5 days before mating, the best foliage for feeding is not necessarily *Betula*
- Males and females meet on larval host trees
- Both males and females mate multiple times
- Adults live about 5 weeks

# Monitoring Options

- ‘purple prism traps’ developed for EAB, also catch Bronze Birch Borer

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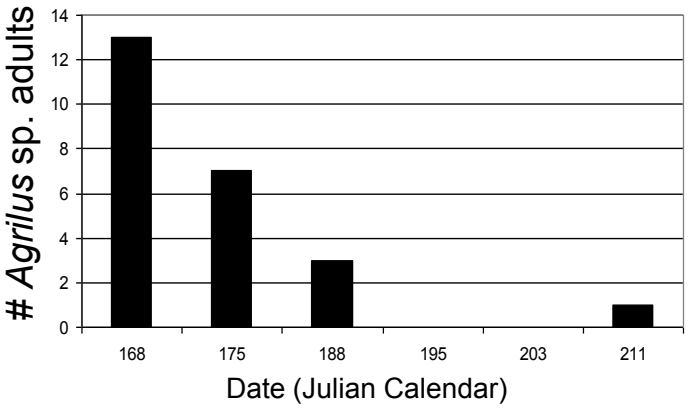
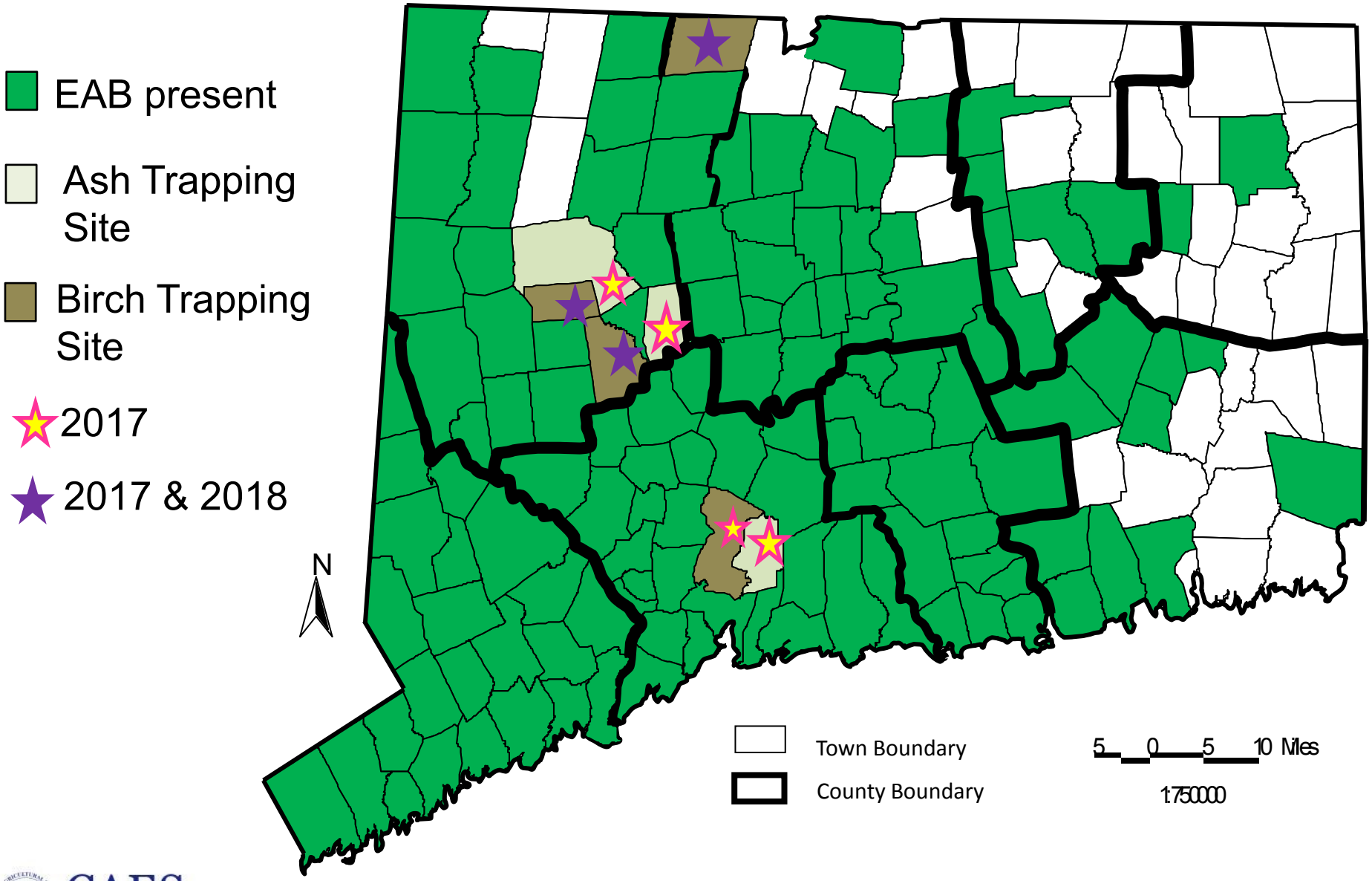
# Attraction to Stressed Trees

- 27 pairs of Jacquemontti birch, one girdled one control
- Sticky bands placed on both trees
- Checked weekly for beetles
- Purple traps hung in birch trees and/ or baited with birch kairomones likely effective




# Experimental Design

- 2017 (100 traps)
  - Ash and Birch
  - Girdled and non-Girdled (control)
  - Purple Prism Traps and Green Multi-funnel Traps
- 2018 (34)
  - Birch
  - Girdled (in 2017) and Control
  - Purple Prism Traps

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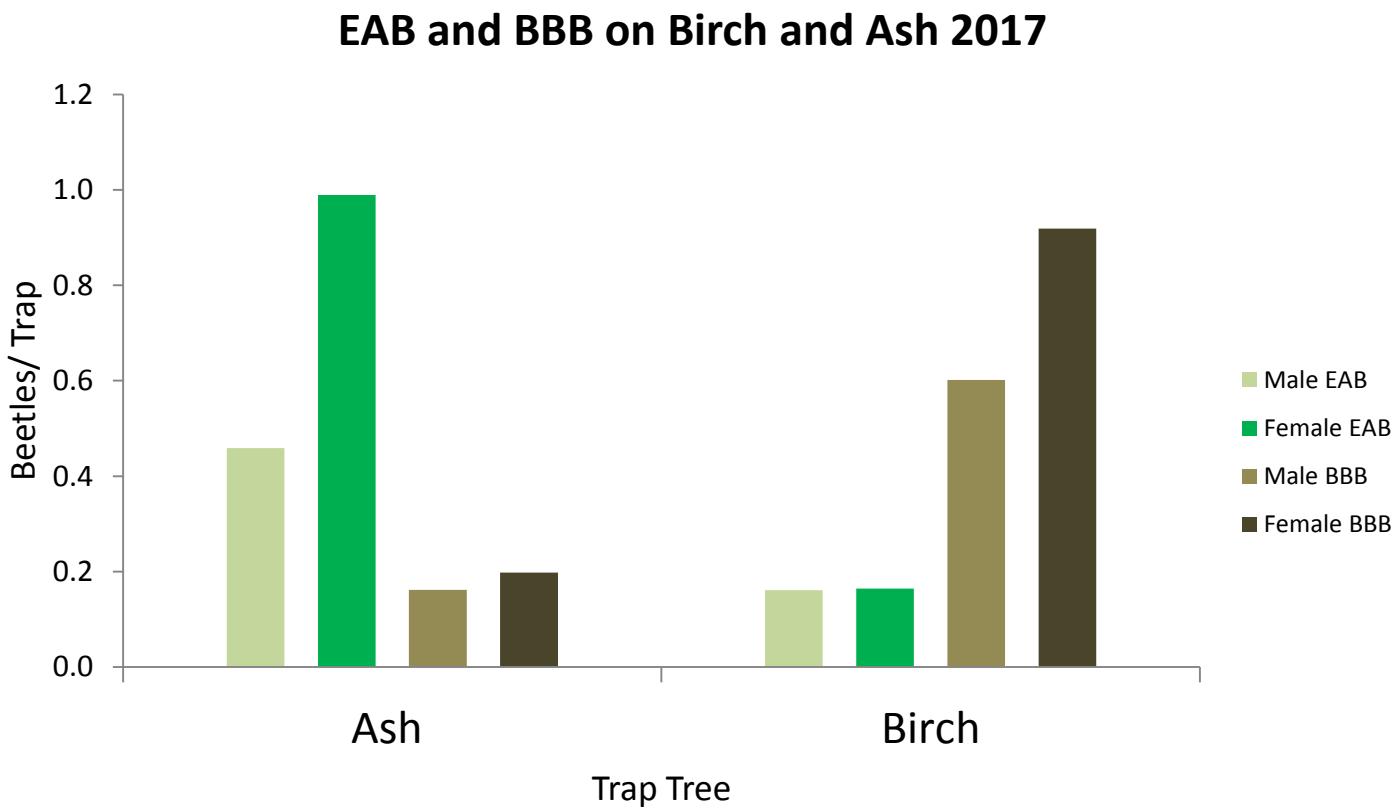
# Host Tree Fidelity




ASH: EAB > BBB $F_{1,91} = 112.37$, $P = 0.000$
BIRCH: BBB > EAB $F_{1,94} = 37.486$, $P = 0.000$

Total of 14 / 779 BBB captured on Ash
Total of 4 / 541 EAB captured on Birch

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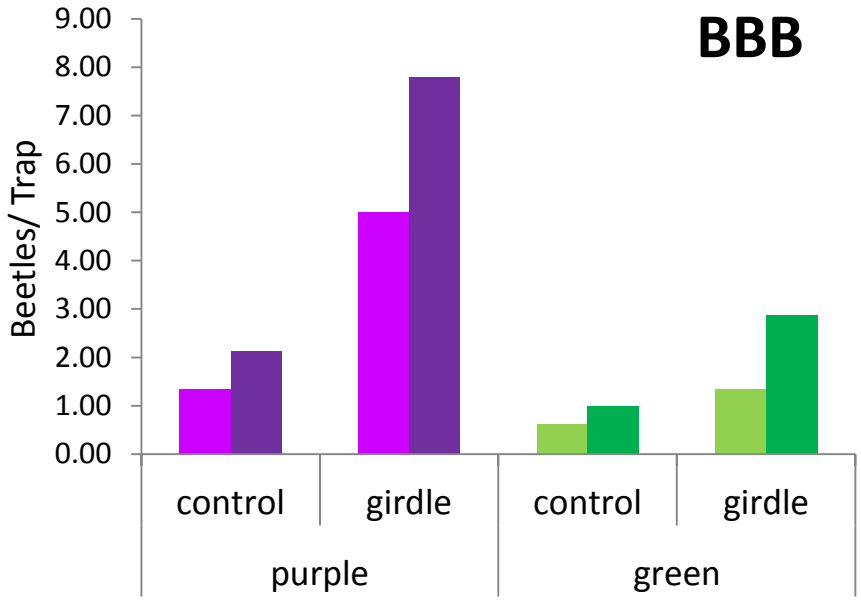
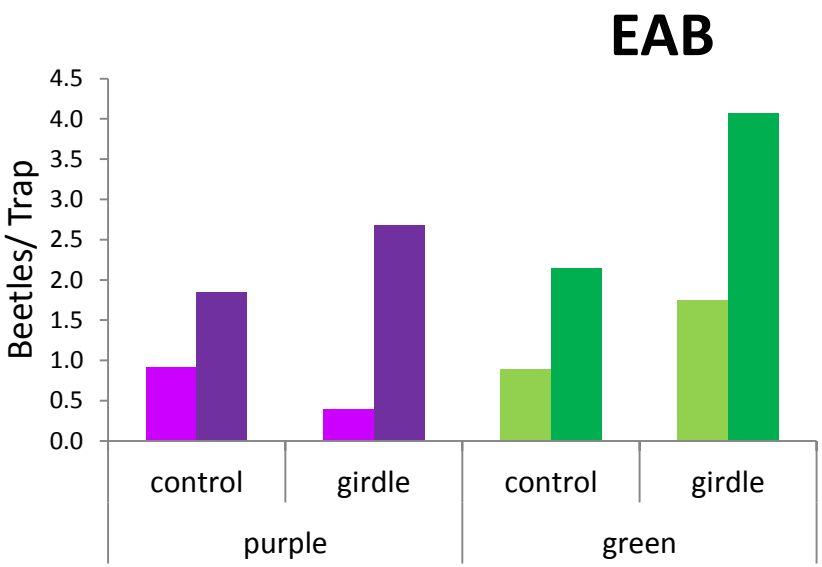
# 2017 Trapping Results




Girdle > Control $F_{1,74} = 26.083$, $P = 0.000$
Purple = Green, $F_{1,74} = 0.529$, $P = 0.469$

Girdle = Control $F_{1,44} = 0.967$, $P = 0.331$
Purple = Green, $F_{1,74} = 1.041$, $P = 0.313$

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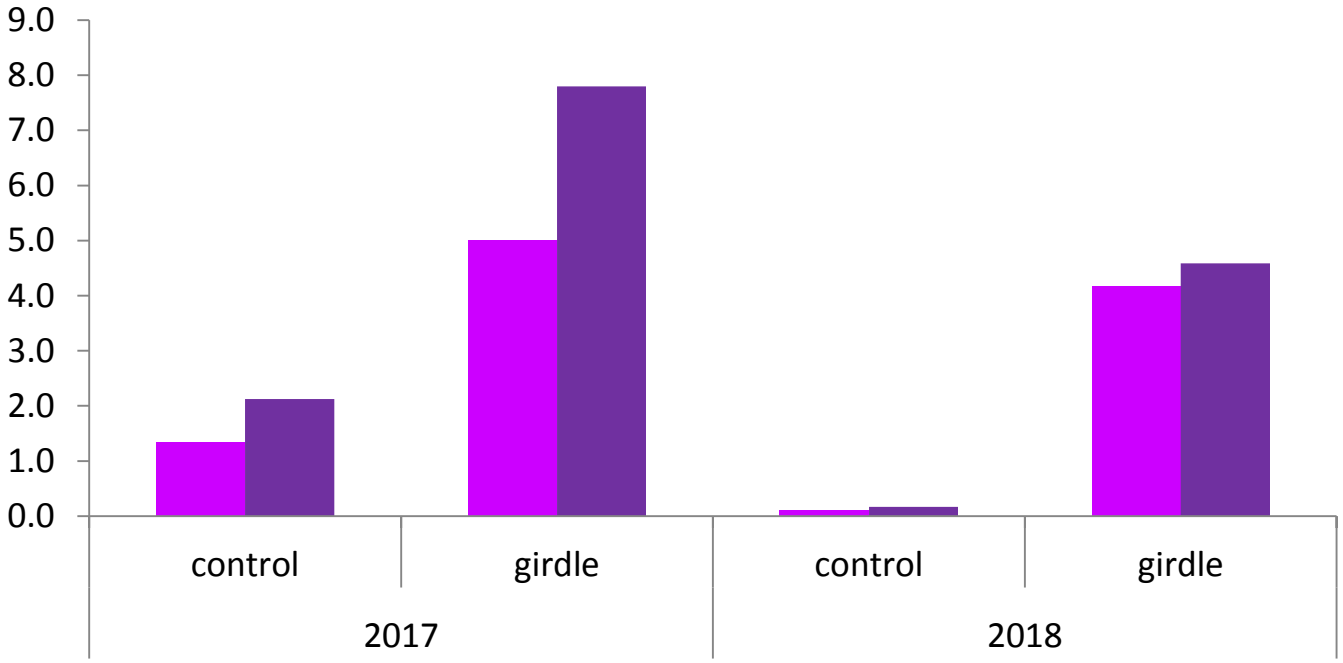
# 2017 vs. 2018
# 1st vs. 2nd year of girdling




Girdle > Control, $F_{1,52} = 17.883$, $P = 0.000$
2017 > 2018 $F_{1,52} = 4.902$, $P = 0.031$
Treatment * Year, $F_{1,52} = 3.898$, $P = 0.054$

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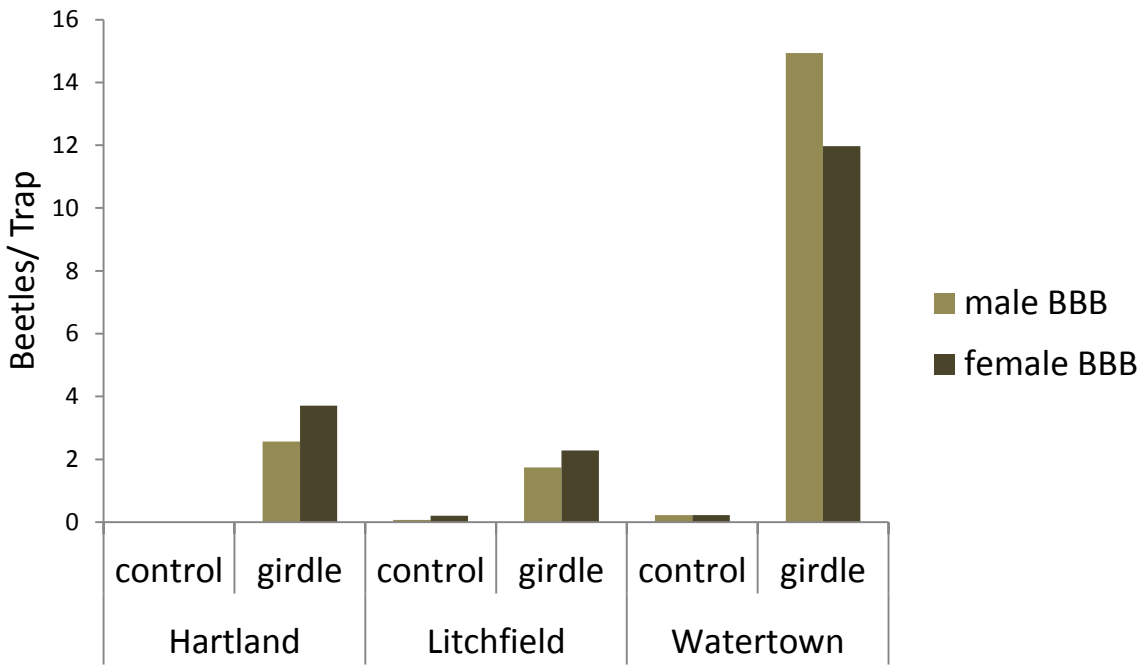
# Low vs High Prevalence of BBB




Sites Differ $F_{3,74} = 15.131$, $P = 0.000$
Girdle > Control, $F_{1,74} = 26.083$, $P = 0.000$
Site * Treatment = $F_{3,74} = 0.529$, $P = 0.290$

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# Non-Target Buprestids

2017 – 992 non-targets collected
2018 – 506 non-targets collected
7 genera, 29 species

| | | Ash | | Birch | | | | |
|---|---|---|---|---|---|---|---|---|
| **Genus** | **species** | Control | Girdle | Control | | Girdle | | Grand Total |
| **Agrilus** | *arcuatus* | 1 | | | 1 | | 1 | 3 |
| | *bilineatus* | 74 | 52 | 151 | **165** | 125 | **304** | 871 |
| **17+** | *celti* | | | | 1 | | 2 | 3 |
| | *cephalicus* | 15 | 19 | | | | 1 | 35 |
| | *crataegi* | 4 | | | | | | 4 |
| | *egenus* | 1 | 1 | | | | | 3 |
| | *frosti* | | 1 | | | | | 1 |
| | *geminatus* | 3 | 1 | | | | 1 | 5 |
| | *lecontie* | 1 | | | 2 | | 2 | 5 |
| | *masculinus* | 3 | 9 | | 16 | | 5 | 33 |
| | *obsoletoguttatus* | 12 | 7 | | 7 | | 28 | 54 |
| | *otiusus* | 5 | 7 | | | | 1 | 13 |
| | *parvus* | | | | | | 3 | 3 |
| | *politus* | 3 | 3 | | 2 | | | 8 |
| | *putillus* | 18 | 13 | | 1 | | | 32 |
| | *quadriguttatus* | | | | 1 | | 1 | 2 |
| | *subcinctus* | 51 | 77 | | 5 | | | 133 |
| | spp | 43 | 41 | 32 | **2** | | 17 | 133 |
| **Anthaxia** | *viridifrons* | 28 | 33 | | 6 | | 4 | 71 |
| | *quercata* | 2 | | | 1 | | 1 | 4 |
| **Brachys** | *aerosus* | | | | 1 | | | 1 |
| | *ovatus* | 3 | | | | | 1 | 4 |
| **Chrysobothris** | *azurea* | | | | 2 | 2 | **2** | 4 |
| | *femorata* | 1 | 1 | 1 | **1** | 8 | **1** | 12 |
| | *sexsignata* | 2 | 1 | 1 | **3** | 10 | **4** | 21 |
| **Dicerca** | *caudata* | | | | 1 | | | 1 |
| | *divaricata* | | | 1 | **1** | 3 | **3** | 8 |
| | *lurida* | 1 | | | | | | 1 |
| **Phaneops** | *fulvoguttata* | | | 1 | **1** | | **1** | 3 |
| **Spectralia** | *gracilipes* | | | | 1 | | | 1 |

*Agrilus bilineatus*

*Agrilus subsinctus*

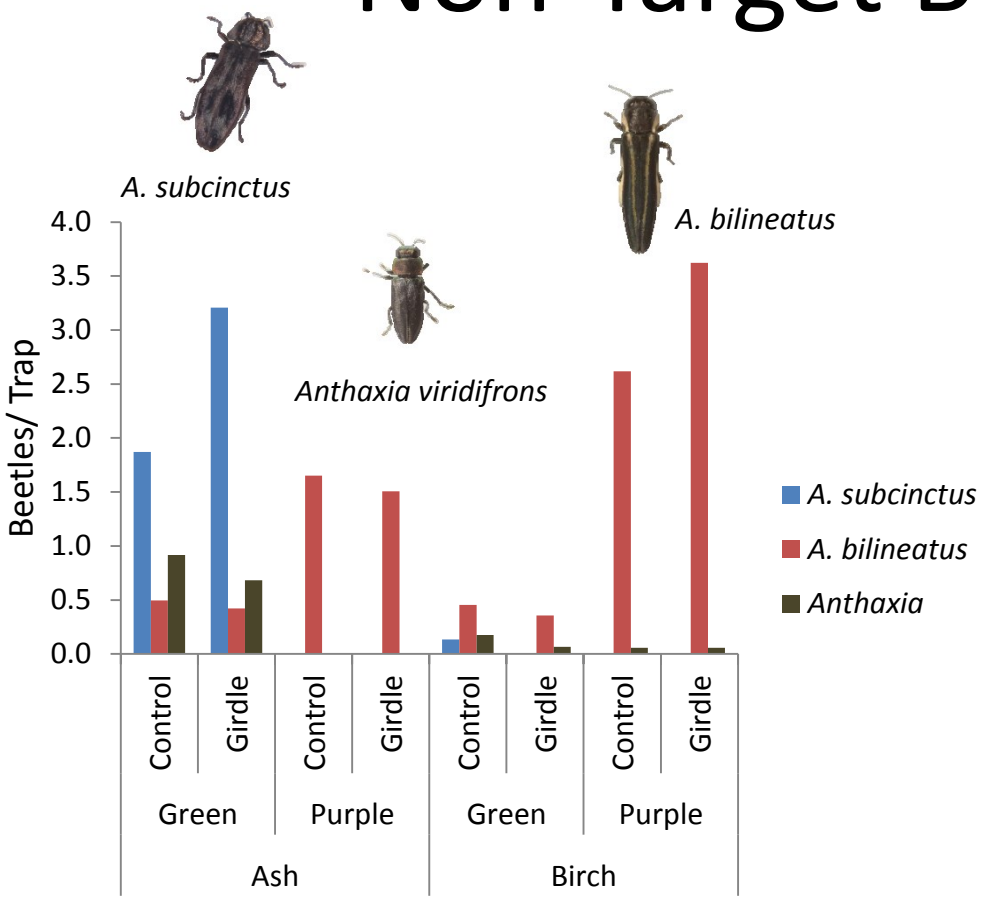
*Anthaxia viridifrons*

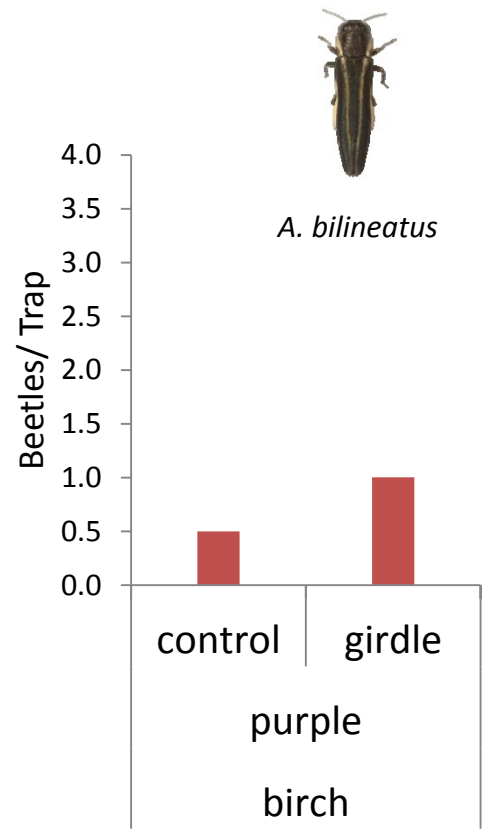
*Chrysobothris sexsignat*

*Dicerca divaricata*

*Phaenops fulvoguttata*

# Non-Target Buprestids




These 3 species were 682/ 992 of non-targets captured in 2017

A. *bilineatus* comprised 469/504 of non-targets captured in 2018

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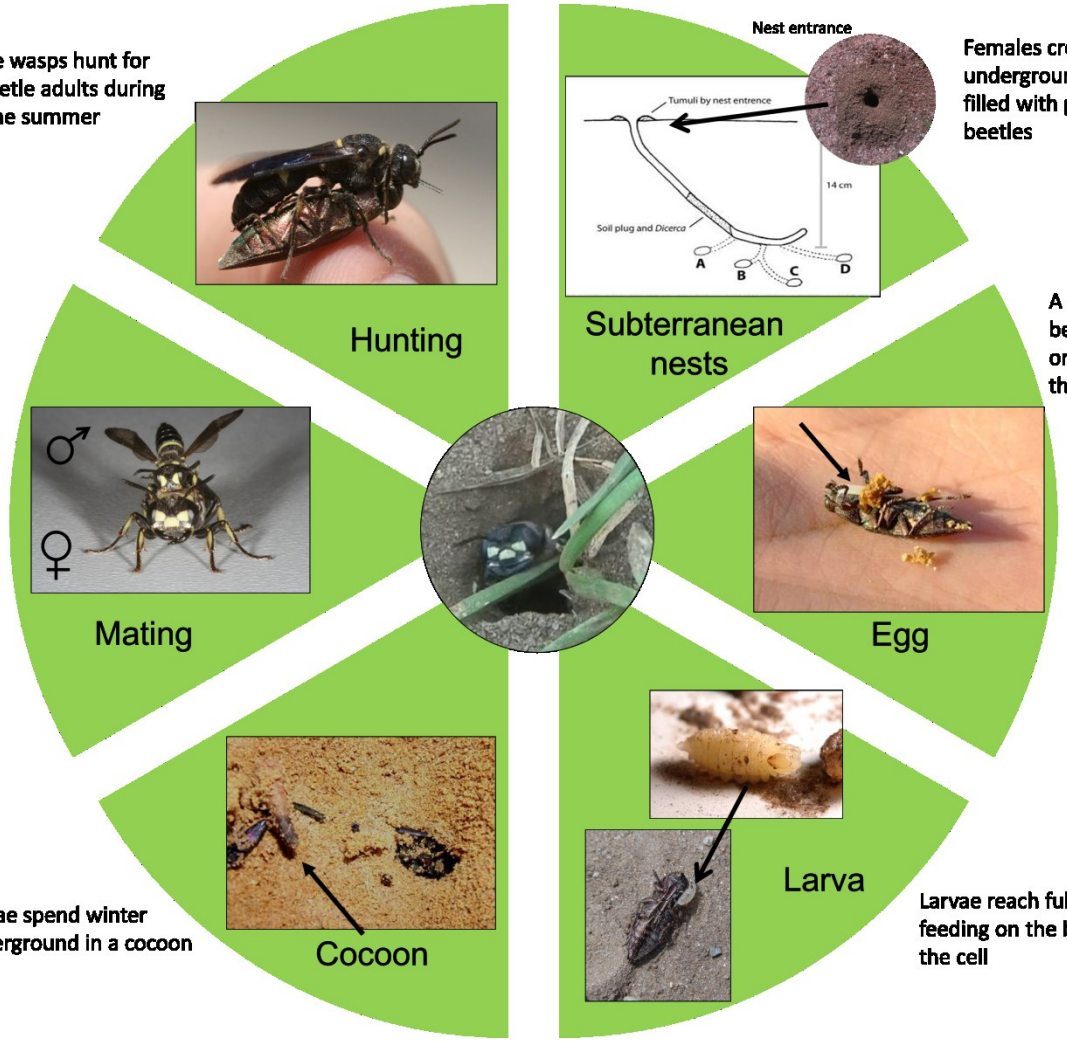
# Conclusions

- Host tree fidelity is high
- Girdling significantly increased the attractiveness of birch trees to BBB
- BBB didn't differentiate between 1st and 2nd year girdled trees.
- BBB did not significantly differentiate between green and purple traps
- EAB were captured equally often in green multi-funnel traps than in purple traps
- There was no significant difference between treatments for EAB. Perhaps due to background level of infestation
- Which trap color is better, depends on the target buprestid

# Another Option

- Biosurveillance – using a native wasp to detect an invasive beetle

# Smokey Winged Beetle Bandit Life Cycle

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# Biosurveillance

- Hunt / Gather

*Agrilus smaragdifrons*

- > 20, 000 beetles collected in CT, 72 species
- 17 new state records in CT, 56 in New England
- Initial EAB detection in CT & RI
- First detection of a non-native in the USA, *Agrilus smagardifrons*
- Active programs in CT, MA, RI, WI, MN, VT, NH, ME, LA, NC
- Amenable to citizen-scientists

# *Cerceris bupresticida*


Photo from Flickr Iyp-tala

Native to Europe, Africa and Northern Asia

Host List
14 Genera
38 species

Includes
*A. biguttatus* -Oak splendor beetle

*A. laticornis* – an oak borer

*A. sinuatus* – sinuate pear borer

*A. rosicdus* - threatened species in France

# Questions

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