

Evaluating the Push-Pull Management Strategy for Ambrosia Beetles in Eastern Apple Orchards

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Outline

- Current ambrosia beetle pests in apple
- Push-pull management design and cost
- Results of push-pull in NY, OH, and PA
- Next steps

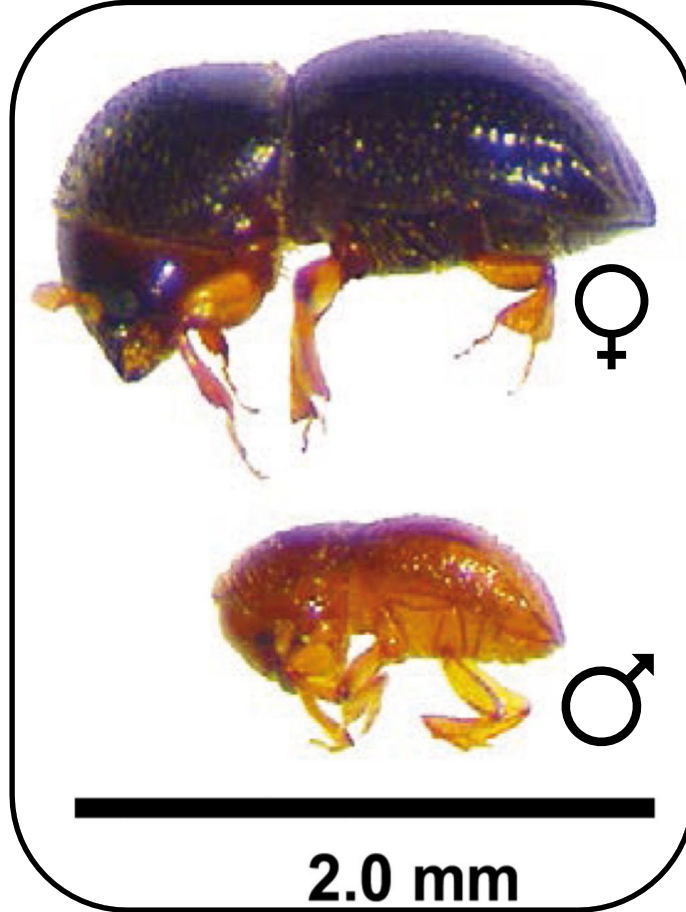
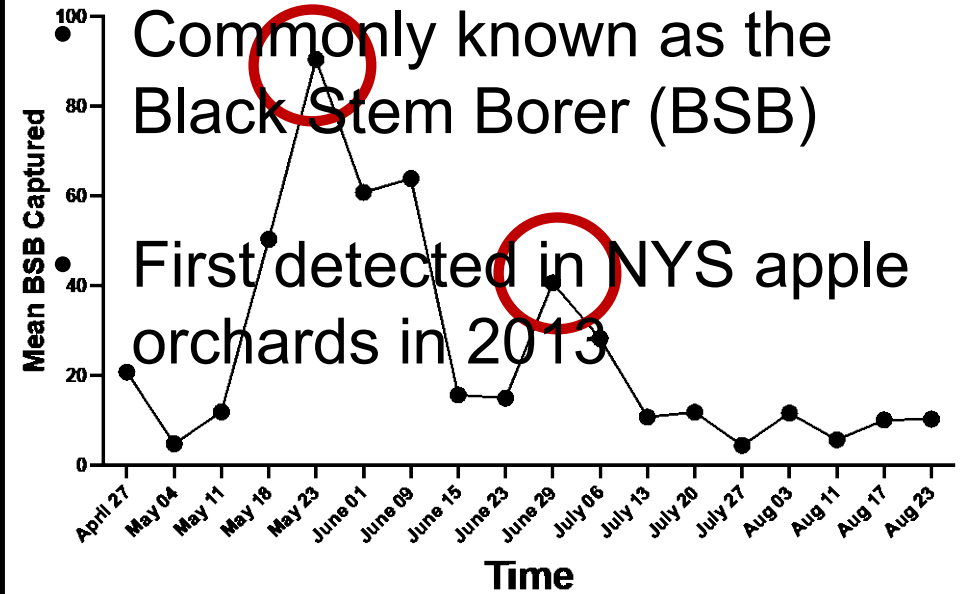


Photo by Betsy Anderson 2016, *Journal of Integrated Pest Management*

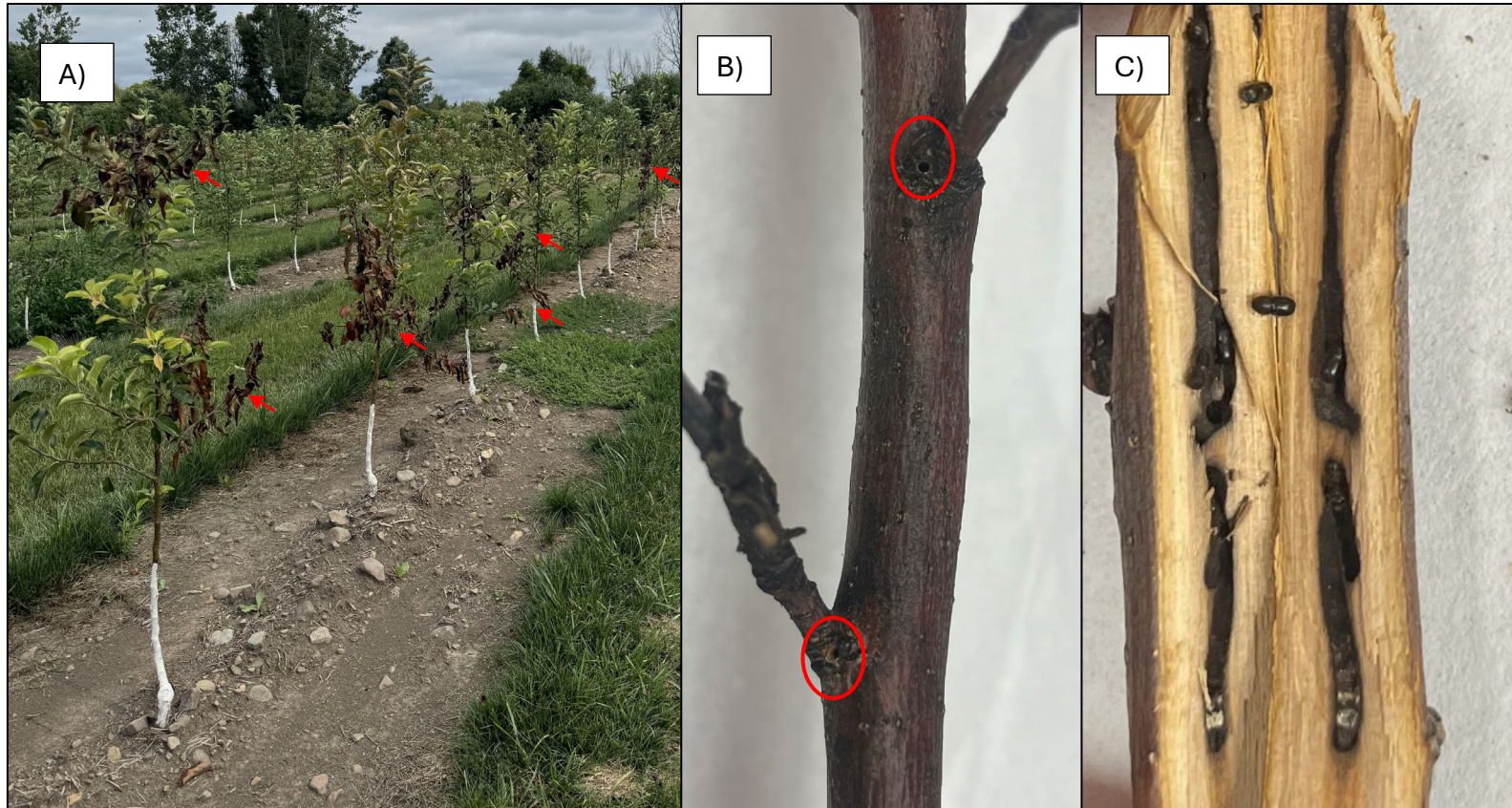
~~Xylosandrus germanus~~ NYS. 2023



<https://doi.org/10.11646/zootaxa.5506.2.6>
<http://zoobank.org/urn:lsid:zoobank.org:pub:497E4655-8462-4B2C-ADA3-1382EE9A8DD8>

**FIRST REPORT OF *ANISANDRUS MAICHE* (COLEOPTERA:
CURCULIONIDAE: SCOLYTINAE) INFESTING APPLE TREES**

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Overlap in response to semiochemicals across key pest species




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Attraction = 
Repellent = 

Xylosandrus germanus (BSB)

Ethanol 

Verbenone 

Anisandrus maiche

Ethanol 

Verbenone 

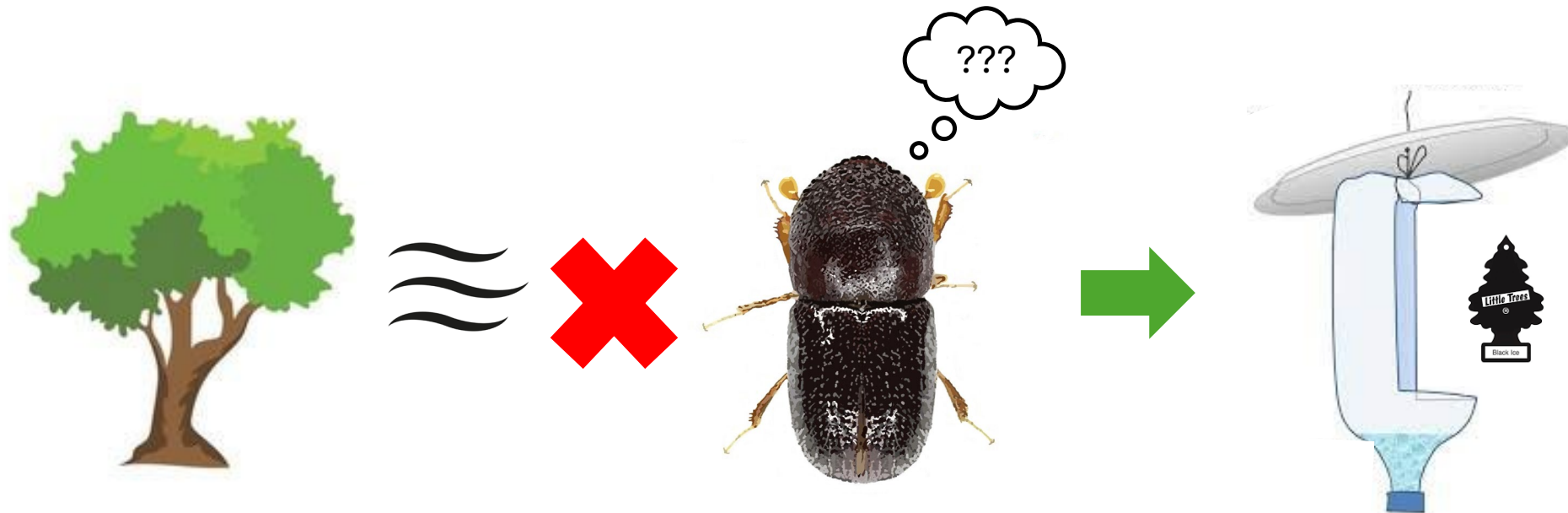
Xylosandrus crassiusculus

Ethanol 

Verbenone 

Population manipulation in apple orchards

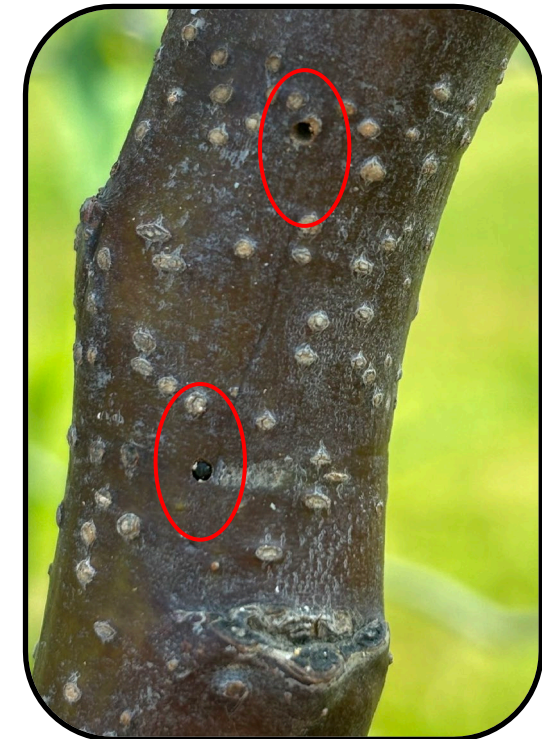
Can we deter ambrosia beetles from apple trees using verbenone and ethanol?



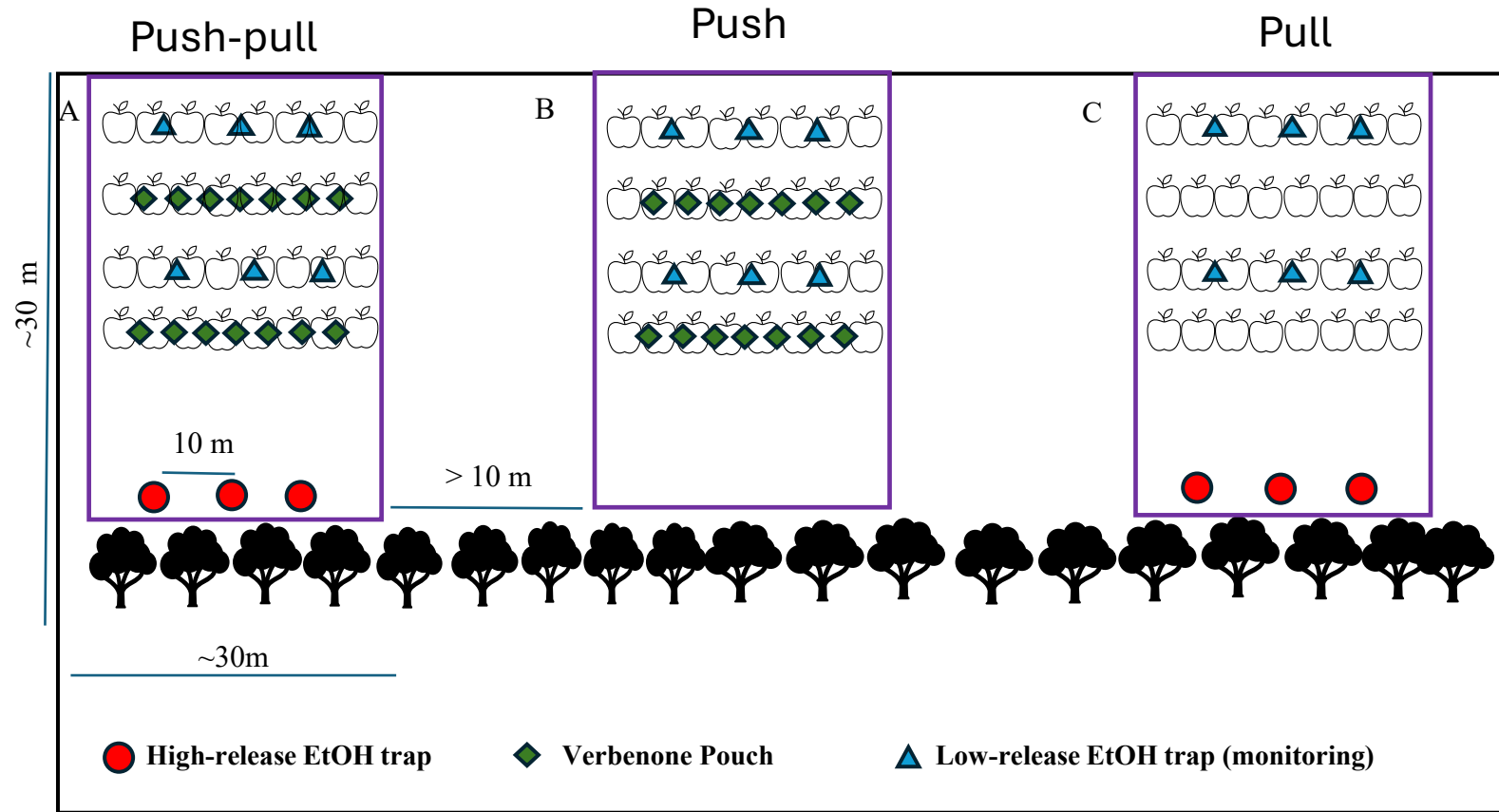
Ambrosia beetles immigrate into orchard from woodlot



Clear sticky trap baited with an Ethanol lure



Evaluating the Push-Pull Strategy in Eastern Apple Orchards

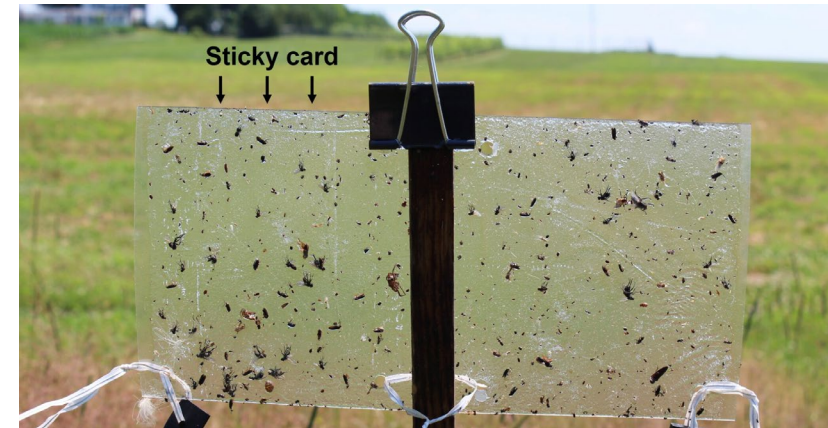


Components of push-pull system



Verbenone sachets

- 100 g of verbenone
- 15 sachets (\$147 USD)
- ¼-acre plots
- 8 weeks of coverage



Ethanol-baited monitoring traps

- Pherocon® stink bug stky traps
- 25 traps (\$82 USD)
- 1 trap per ¼ acre plot
- Replace traps weekly
- Lures 6-8 weeks

Deploying push-pull plots in the field





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Species	New York
<i>X. germanus</i>	1157
<i>A. maiche</i>	492
<i>X. crassiusculus</i>	59

Push and push-pull
combination reduce beetle
captures





Species	Ohio
<i>X. germanus</i>	2942
<i>A. maiche</i>	1597
<i>X. crassiusculus</i>	588

Push and push-pull
combination reduce beetle
captures





© R. Zampieri



Species	Pennsylvania
<i>X. germanus</i>	580
<i>A. maiche</i>	144
<i>X. crassiusculus</i>	6216

Push-pull combination reduced
X. crassiusculus captures
- Population dependent



Trends and next steps

- Verbenone reduces ambrosia beetle activity without the need for ethanol traps
- In high pest-pressure areas, ethanol traps + verbenone significantly reduce ambrosia beetle activity
- Currently SPLAT Verb requires a permit in NYS
- Conducting small scale trial in summer 2025
- Comparing sachets and SPLAT formulations
- Assessing verbenone to overcome attraction to stressed trees
 - May require the “pull” (ethanol) component



SPLAT Verbenone

- 700 g of verbenone
- 1 canister (\$122 USD)
- 1-acre plot
- 12-16 weeks of coverage
- State-by-state regulations
- Food-safe, biodegradable

Questions?



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