



Investigation of Common Management Practices in Pecan (*Carya illinoensis*) Orchards Against Ambrosia Beetles (Scolytinae)



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Introduction

Pecans are one of Georgia's top ten commodities with a farm gate value of \$401M (Farm Gate Value 2017). Ambrosia beetles are wood-boring beetles that can cause damage to young pecan trees, resulting in tree death under severe infestations. However, these beetles do not feed directly on tree tissues but rather on fungi that they cultivate inside infested trees. It has been found that ambrosia beetle attacks are associated with stressed trees subjected to the following conditions: frost Damage, flooding, poor soil drainage, drought, and previous injury to tree (Ranger et al., 2010). In GA, the acreage of newly planted pecan trees are increasing (Wells , 2014), and more trees will be planted to replace orchards damaged by hurricanes. Thus, the number of potential vulnerable trees to ambrosia beetle attacks will increase. Pecan growers have existing cultural strategies in younger orchards that have anecdotally demonstrated effectiveness against ambrosia beetles. These tactics include painting with white latex paint, spraying insecticide right after painting the tree, covering with tree guard and spraying insecticide. However, none of these methods were tested for their effectiveness in the pecan system.

Objective

To evaluate common agricultural practices in pecan orchards for protection against ambrosia beetle attacks.

Methodology

- Twenty logs (~61 cm long, ~6.4 cm dia), were deployed 30-m apart, in Cook County, GA and Dodge County, GA along an edge of a wood line in a <5-yr-old pecan orchard in February – March 2020.
- Five different management treatments were compared:
 - 1.) logs painted with white latex paint (Fig. 1a)
 - 2) logs sprayed with insecticide at the time of painting (Fig. 1b)
 - 3.) logs sprayed with insecticide every 7 days (Fig. 1c)
 - 4.) Logs wrapped with a tree trunk protector (Fig. 1d)
 - 5.) a non-treated control log (Fig. 1e)
- Logs were sprayed with the pyrethroid, Brigade® 2EC (FMC Corp., Philadelphia, PA), with the active ingredient bifenthrin using the labelled rate.
- Study followed a randomized complete block design with four replicates of each treatment and data analyzed using ANOVA in JMP Ver. 15 (SAS Institute Inc.,)
- Each log had a 25.4 cm hole drilled from the top, filled weekly with 100 ml of JASCO denatured alcohol (W.M. Barr, Memphis, TN, Fig. 2), and covered with a rubber cork. The ethanol-baited logs served as surrogates for stressed trees.
- The logs were checked weekly for ambrosia beetle attacks represented by holes (Fig. 3) and toothpicks (Fig. 4).

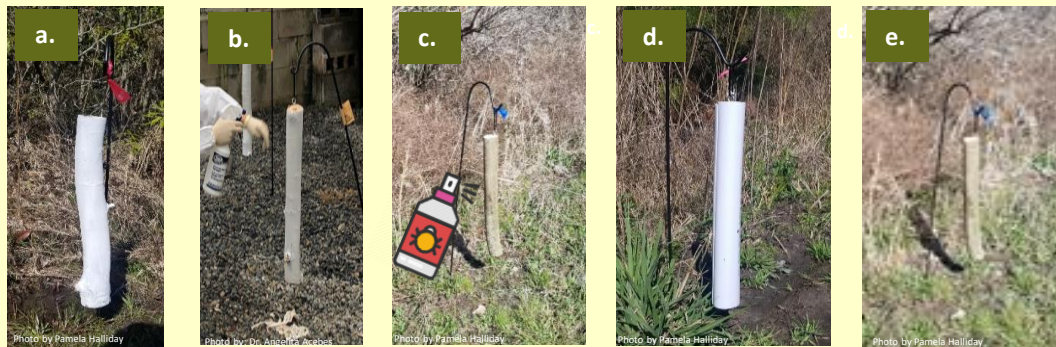


Figure 1. Different management treatments a. log painted in white latex paint, b. log painted and sprayed with Insecticide, c. log sprayed with insecticide, d. log wrapped with a trunk protector, e. control log

Results

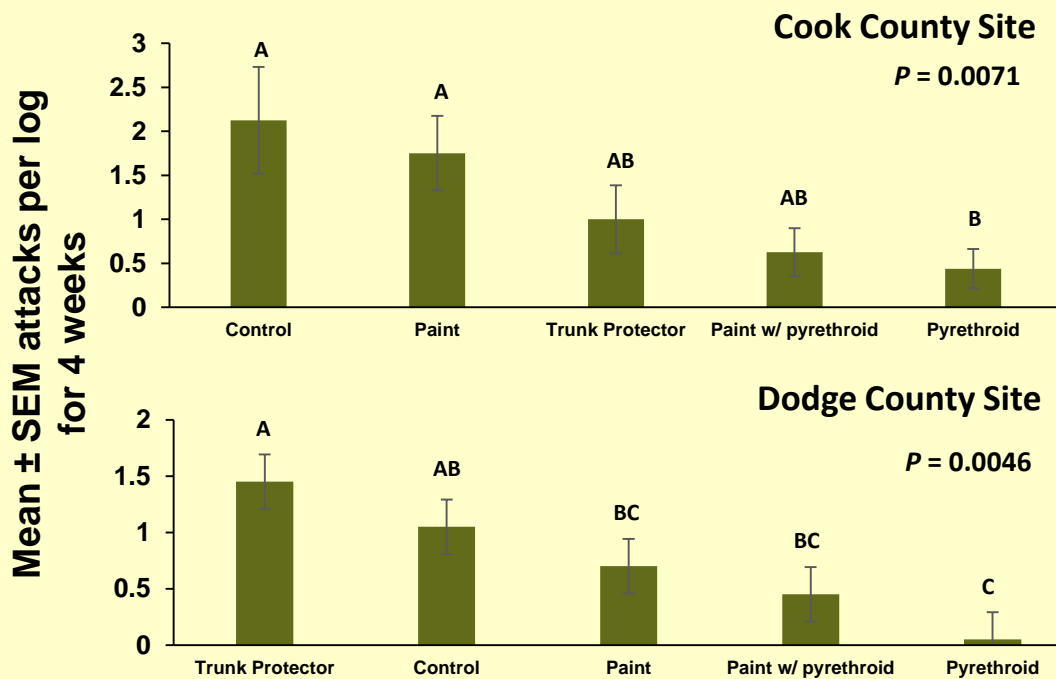


Figure 5. Weekly counts of attack on baited logs at the two study sites.

Result Highlights

- Pyrethroid-sprayed logs, either mixed with paint or sprayed every 7 days, incurred the least attacks (Fig. 5).
- Logs covered in tree protectors were attacked at the same rate as the non-treated control (Fig. 5).
- Painted logs had low or moderate efficacy in preventing attacks compared to other treatments (Fig. 5).
- A separate study done at another site in Cook Co, GA comparing painted logs to logs sprayed with insecticide showed similar results indicating pyrethroid-sprayed logs had lower attacks than painted logs.
- Over 95% of the attacks observed were holes.

Conclusions and Implications

- Among the common grower practices, spraying pyrethroid at an interval of 7 days is the best management strategy against ambrosia beetles in the pecan system.
- Since beetle attacks were observed under the tree protector, growers should remove the protector when scouting trees for ambrosia beetle attacks..
- Painting tree trunks with white latex paint, in and itself, did not provide adequate protection against ambrosia beetle attacks.
- When scouting for ambrosia beetle attacks, growers should be looking for holes as well as toothpicks (Fig 6). The toothpicks are easily dislodged from the trees by wind, rain or wildlife.
- Findings imply variable effectiveness of currently available options for growers although additional studies are needed to validate results.



Figure 6: Checking log for Ambrosia beetle attacks. Holes and toothpicks

References and Acknowledgements

Ranger, C. M., et al. 2010. Ability of stress-related volatiles to attract and induce attacks by *Xylosandrus germanus* and other ambrosia beetles. *Agr. Forest Entomol.* 12: 177-185.
 Wells, L. (2014). Pecan planting trends in Georgia. *HortTechnology*, 24(4), 475-479.

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Figure 2: Refilling log with denatured alcohol



Figure 3: Ambrosia Beetle hole on a painted log



Figure 4: Toothpicks on an attacked tree