

Flight and Landing Behavior of Red Oak Borer, *Enaphalodes rufulus* (Haldeman) (Coleoptera: Cerambycidae)

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Introduction

Field tests were conducted in the Ozark-St Francis National Forest to evaluate flight and landing behavior of red oak borer, *Enaphalodes rufulus* (Haldeman). This native insect is normally at low population levels, however, it is being implicated as the major contributing factor in an oak decline event occurring in the Ozark-St. Francis National Forest in Northwest Arkansas, Figure 1.

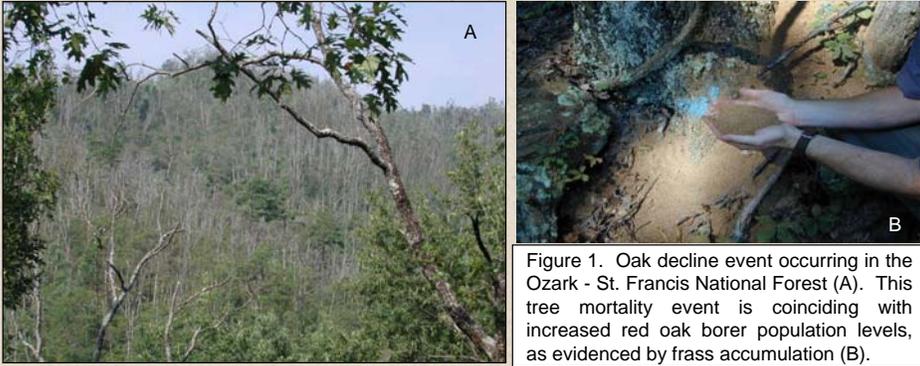


Figure 1. Oak decline event occurring in the Ozark - St. Francis National Forest (A). This tree mortality event is coinciding with increased red oak borer population levels, as evidenced by frass accumulation (B).

Methods

Passive flight intercept traps (IPM Technologies, Portland, OR) were hung at various levels up to the canopy to determine preferred flight height of adult red oak borers, Figure 2. Clear plexi-glass passive traps were attached to tree boles to assess landing preferences on different tree species and on a single tree species, Figure 3. Preferential landing on suitable host trees would indicate an attractant, chemical or visual, while landing on non-host trees would indicate a random flight and landing pattern with host evaluation occurring tactilely after landing. Northern red oak, *Quercus rubra* L., the tree species currently experiencing elevated mortality, was further assessed based on past red oak borer infestation levels.



Figure 2. Passive vertical flight intercept traps, IPM Tech, up to the tree canopy.



Figure 3. Plexiglass panel traps to determine preferential landing rates.

Results

Red oak borer peak emergence occurred in mid-July, Figure 4. Significantly more red oak borers were caught in traps > 6 m from the forest floor, Figure 5. Few beetles were caught in the plexiglass panel traps, Table 1.

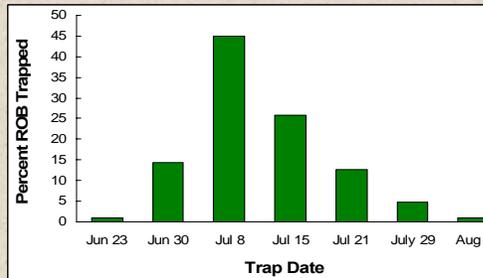


Figure 4. Red oak borers emerged over a 6 week period with peak emergence occurring in mid-July.

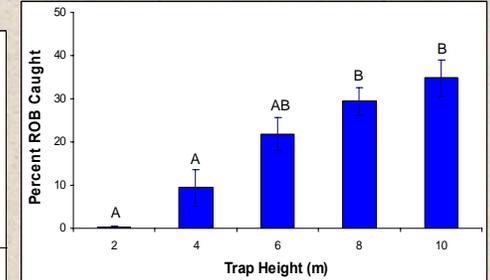


Figure 5. Vertical flight trap distribution by height. Bars are standard error. Heights with different letters are significantly different, Tukey HSD $p < 0.0001$.

Treatment	No. of Red Oak Borer
Tree Species:	
Northern Red Oak	3
Black Oak	3
White Oak	0
Hickory	9
Other	1
Infestation Level	
Class I	2
Class II	8
Class III	6

Table 1. Differential landing rates on plexiglass panel traps.

Discussion

Red oak borer emergence appears synchronous with emergence occurring every 2 years and with >45% occurring within a one week period in early July. Traps placed > 6 m above the forest floor caught significantly more insects. Beetles were observed on trees at lower levels, but may spend days in the canopy and fly from here to other trees. Differential landing rate data was inconclusive with too few insects caught. There did appear to be a trend in beetles landing on northern red oaks that had been previously infested, though.

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