

Effects of Habitat Selection and Trap Placement on Cerambycidae Captures in Early Detection Survey Traps

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Abstract

Two trapping studies were conducted during the 2009 season to test whether habitat type and trap placement had significant effects on Cerambycidae captures in semiochemical baited traps. In a habitat study, traps in recently thinned white pine forests captured significantly more Cerambycidae than traps in a hardwood dominated stand and a closed canopy forest. In a trap placement study, traps located in a closed canopy forest and traps along an edge captured significantly more Cerambycidae than traps located in an adjacent non-forested power line right-of-way. The results from both studies suggest selecting recently disturbed forests and placing traps either under a closed canopy or along a forest edge to maximize survey efforts.



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INTRODUCTION

Selecting a survey site and deciding where to place a trap in a site are important considerations for exotic species surveys and other semiochemical-based trapping efforts. As part of an ongoing effort to improve exotic species surveys (e.g. EDRR and CAPS), two studies were conducted to increase the knowledge on how habitat selection and trap placement influenced captures of Cerambycidae and bark beetles. However, only Cerambycidae results are presented.

Study objectives

1. Habitat Type: test the effects of four habitat types on total number and number of Cerambycidae species collected.
2. Trap Placement: test the effects of trap placement on total number and number of Cerambycidae species collected.

METHODS AND MATERIALS

Habitat Type:

- Four habitat treatments:
 - Closed canopy (pine dom. mixed forest) BA=32.7m²
 - Hardwood (maple, oak, aspen, beech)BA=25.3m²
 - Low density thinning (white pine) BA=16.2m²
 - High density thinning (white pine) BA= 9.5m²
- Each treatment consisted of eight 12-unit Lindgren funnel replicates baited with:
 - α -pinene
 - Ethanol
 - Ipsenol
 - Ipsdienol
 - Lanierone

Trap Placement:

- Three location treatments:
 - Forest: Closed canopy white pine dominated
 - Edge
 - Clearing: Power line right-of-way >20m from edge
- Each treatment consisted of ten panel intercept trap replicates baited with:
 - α -pinene
 - Etoh
- Statistics: data analyzed using PROC GLIMMIX

RESULTS

Habitat Type

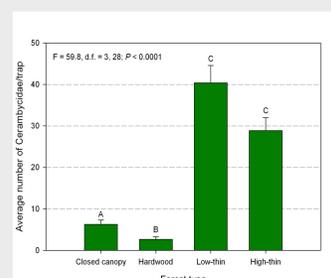


Figure 1. Average number of Cerambycidae captured in each habitat

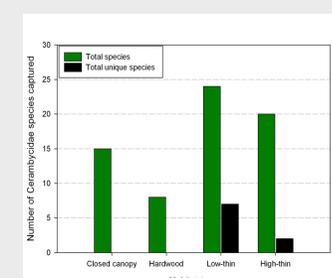
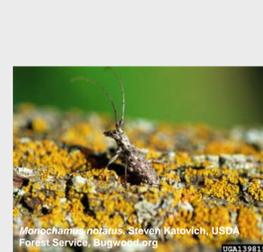


Figure 2. Total number of species and unique species of Cerambycidae captured in each habitat

Table 1. Mean (+/- SE) of three most commonly collect Cerambycidae by habitat type

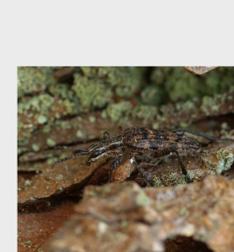
Species	Closed canopy	Hardwood	Low-thin	High -thin	P-value
<i>Monochamus notatus</i>	2.38 ± 0.68 ^{ab}	0.50 ± 0.26 ^b	5.13 ± 1.18 ^a	2.88 ± 0.77 ^a	0.0031
<i>Monochamus scutellatus</i>	0.37 ± 0.22 ^a	0.10 ± 0.11 ^a	6.71 ± 0.92 ^b	4.72 ± 0.77 ^b	< 0.0001
<i>Rhagium inquisitor</i>	0.13 ± 0.13 ^a	0.38 ± 0.22 ^a	9.75 ± 1.86 ^b	4.38 ± 1.00 ^b	< 0.0001



Monochamus notatus. Steven Katovich, USDA Forest Service, Bugwood.org [DOI:10.3119/54]



Monochamus scutellatus. William M. Ciesla, Forest Health Management International, Bugwood.org [DOI:10.3119/54]



Trap Placement

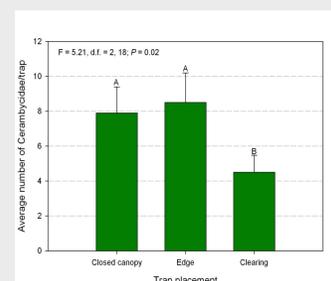


Figure 3. Average number of Cerambycidae captured at each trap placement

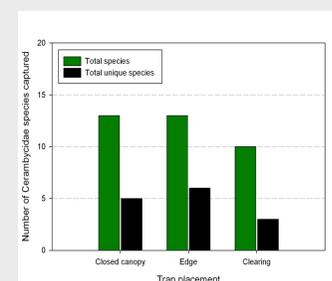


Figure 4. Total number of species and unique species of Cerambycidae captured at each trap placement

Discussion

Habitat Type:

- Traps in thinned white pine stands captured significantly more Cerambycidae than traps placed in the closed canopy or hardwood stands (Figure 1.)
- Seven unique species were collected in the low density thinning and two unique species were collected in the high density thinning. No unique species were collected in the hardwood or closed canopy sites (figure 2.)
- Background volatiles from recently disturbed forests did not affect trap apparency and may have facilitated increased trap catches, suggesting that these types of stands would be useful areas to survey

Trap Placement:

- Traps placed under a closed canopy and along a forest edge caught equal numbers of Cerambycidae, while traps in the clearing caught significantly fewer Cerambycidae than the other two treatments (Figure 3.)
- More unique species were captured in the closed canopy forest and along the edge compared to the clearing (Figure 4.)

Practical Implications

Habitat type: recently disturbed forest stands were superior to closed canopy forest and hardwood forests and should be considered as a preferred option for maximizing Cerambycidae catches in the Northeastern United States

Trap placement: traps placed within a forest and on the forest edge outperformed traps located in openings adjacent to forest and should be considered as a preferred option for maximizing Cerambycidae catches in the Northeastern United States

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