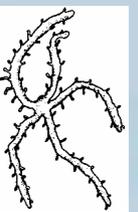




Western balsam bark beetle use of spruce-fir blowdown in Wyoming



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Introduction

Western balsam bark beetle (*Dryocoetes confusus* Swaine) attacks subalpine fir (*Abies lasiocarpa*) throughout western North America (Furniss and Carolin 1980). However, little is known about factors contributing to outbreaks of this species (McMillin et al. 2001). Tree blowdown is known to trigger outbreaks of certain bark beetles, such as spruce beetle (Schmid and Frye 1977), but has not been examined for western balsam bark beetle. This is despite observational studies having found outbreaks of this beetle adjacent to areas of tree blowdown (Figure 1).

Study Objectives

1. Does western balsam bark beetle successfully attack and produce brood in downed fir?
2. Do pheromone baits increase the number of brood in felled trees?
3. Does brood production vary by the location on the bole?
4. What is the life history of western balsam bark beetle in blowdown?

Answers to these questions should be applicable to many areas of the central and northern Rockies where there are extensive stands of predominantly subalpine fir, blowdown events have occurred and western bark beetle is present.



Figure 1. Subalpine fir mortality caused by western balsam bark beetle adjacent to area of blowdown on the Bighorn National Forest.

Methods and Materials

The studies were conducted on the Bighorn and Shoshone National Forests, Wyoming (Figure 2). The areas are characterized by mixed stands of SAF, Engelmann spruce and lodgepole pine.

1. Five trees were felled at each of four locations on both the Bighorn and Shoshone National Forests in early July 2001 (Figure 3).
2. At half of the locations the felled trees were baited with ex-brevicommin and the other locations were not baited.
3. In September 2001 trees were sampled for the number of brood by life stage in 36 in² taken from the top and bottom aspect at DBH, mid-bole, and the upper crown.
4. The number of initial attacks were also recorded in 72 in² taken from the top and bottom aspect at DBH, mid-bole and upper crown.
5. Brood sampling will be repeated in the spring, summer, and fall 2002 to determine the life cycle of this beetle.



Figure 2. Locations of study sites (red shaded areas) on the Bighorn and Shoshone National Forests.



Figure 3. Felled fir susceptible to western balsam bark beetle attack.

Results

- Western balsam bark beetle attacked and brood are developing in the felled trees (Figures 4 – 11).
- Most of the brood in felled trees were in the larval stage (Figure 4) or egg and larval stages (Figure 5).
- Pheromones did not increase the number of brood in felled trees (Figures 8 – 11).
- The mid-bole portion of felled trees had more brood than lower or higher on the bole on the Shoshone National Forest (Figures 6), but there was no difference on the Bighorn National Forest (Figures 7).
- More brood were found on the bottom aspect of the felled trees than the top for both forests combined (Figure 10).
- Higher numbers of brood were found in the felled trees on the Shoshone than the Bighorn National Forests (Figures 4 – 11).

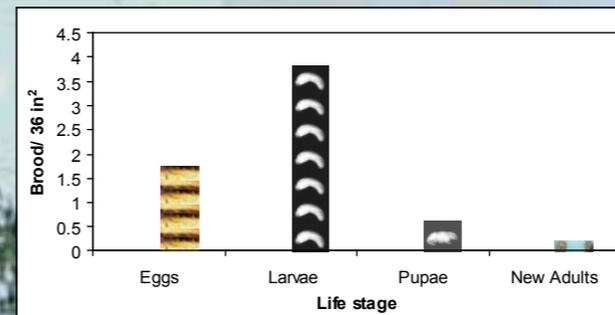


Figure 4. Life stage of western balsam bark beetle brood in felled trees on the Shoshone NF (September 2001).

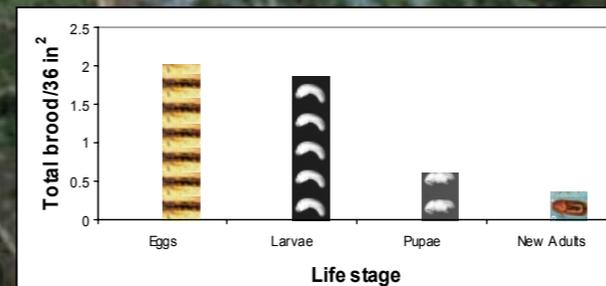


Figure 5. Life Stage of western balsam bark beetle brood in felled trees on the Bighorn National Forest.

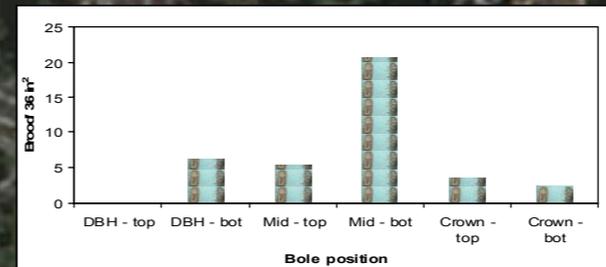


Figure 6. Western balsam bark beetle brood in felled fir on the Shoshone NF (Sept. 2001).

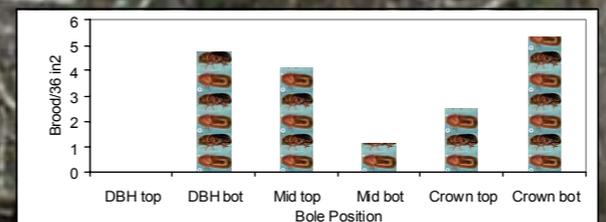


Figure 7. Western balsam bark beetle brood in felled fir on the Bighorn National Forest.

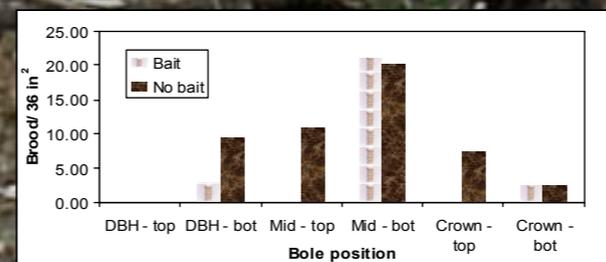


Figure 8. Western balsam bark beetle brood in baited vs. no bait felled fir on the Shoshone NF.

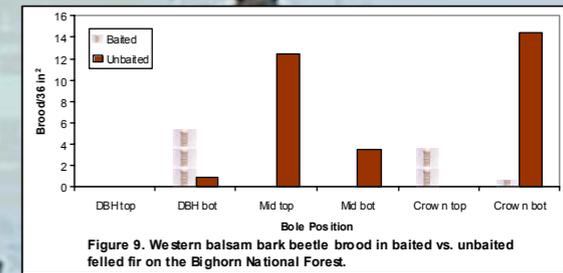


Figure 9. Western balsam bark beetle brood in baited vs. unbaited felled fir on the Bighorn National Forest.

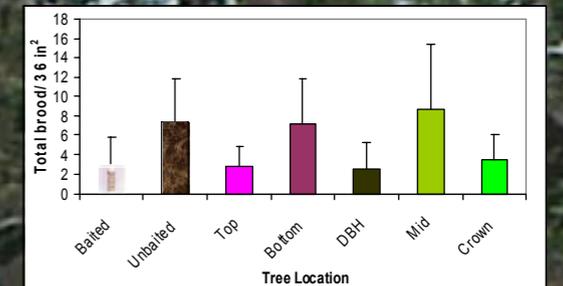


Figure 10. Total number of brood found in samples taken from different locations on felled fir.

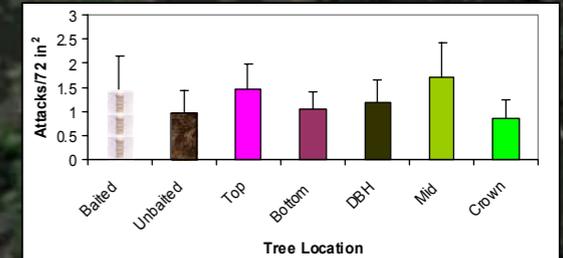


Figure 11. Number of attacks at different locations on felled fir (both forests combined).

Conclusions

- Based on the preliminary data, we conclude that western balsam bark beetle takes advantage of storm events that create downed host material.
- This suggests that prompt management of downed material is needed to reduce the likelihood of subsequent western balsam bark beetle outbreaks.
- Furthermore, intentional felled trees could possibly be used in a trap tree approach to reduce local populations of western balsam bark beetle similar to strategies used for spruce beetle.

Literature Cited

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