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Chisholm fire beetle diversity Quicknote # 2

June 2003 *By: Tyler Cobb*

Is woody debris important for biodiversity?

In Canada, forest fires account for an average annual loss of 70 million m^3 of wood, which has an estimated value of $1 billion. Post-fire salvage logging is commonly used to recover some of this economic value, yet few guidelines exist for the management of this practice because little is known about the ecological consequences of altering early post-fire successional habitats. This study will examine the response of saproxylic beetle communities to post-fire salvage logging. Saproxylic beetles are associated with dead and decaying wood, and several such species are known to be attracted to forest fires. In northern Europe, removal of coarse woody debris from managed forests and active fire suppression practices have resulted in the loss of many saproxylic species. The ecological consequences (e.g. turnover of nutrients from dead trees) of this loss have yet to be determined. Our research has two main goals:

1. increase understanding of relationships between saproxylic beetle communities and specific parameters of woody debris such as total amount, level of decay, and burn intensity; and
2. provide informed recommendations for conserving this portion of boreal forest biodiversity through the management of woody debris during salvage operations.

To achieve these goals, we have initiated a stand-level experiment in the Chisholm-Slave Lake area (~300 km northwest of Edmonton, AB). Our study is focused on the the Chisholm fire, a large-scale wildfire (~120,000 ha) that occurred during the spring of 2001. This experiment is being conducted in both spruce-dominated and mixedwood forest cover types and compares the following five stand treatments: (1) GRN = green, control sites undisturbed by fire or harvesting in >100 years; (2) BRN = burned, sites affected by Chisholm fire; (3) HAR= harvested, sites that were clear-cut logged during 2001; (4) SAL = salvaged, sites that burned in the Chisholm fire and then were salvage logged in 2001; and (5) BAH = burned after harvest, sites that were clear-cut logged in 2001 and then burned in the Chisholm fire.

During the summer of 2002, we conducted detailed surveys of both coarse (>5cm diameter) and fine (<5cm diameter) woody debris and collected saproxylic beetles from all stand treatments. Beetles (>9,800 specimens) are currently being enumerated and at present 95 species have been identified. Preliminary analysis of fine woody debris data suggests strong differences in the amounts fine woody debris between treatments (Fig. 1). HAR sites had the largest amount of fine woody debris as a result of combining pre-harvest levels of twigs and branches with logging debris. However, the twigs and branches were apparently consumed by the fire in SAL sites and both types of fine woody debris were absent from BAH sites.

Figure 1

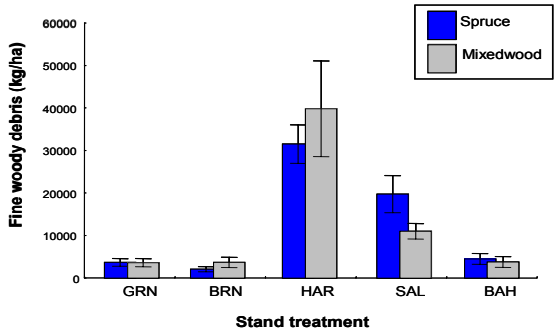
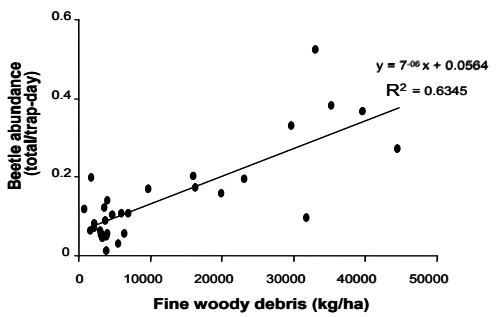


Figure 2



We also found a significant positive relationship between the amount of fine woody debris and the total abundance of beetles (Fig. 2) suggesting that the increase in fine woody debris may lead to an increase in overall beetle abundance. However, coarse measures like abundance ignore compositional changes so more detailed taxonomic work is now being conducted to determine whether fine woody debris is important for maintaining saproxylic beetle species composition and diversity.

For more information on this or other Chisholm fire beetle diversity Quicknotes, please contact: Tyler Cobb, University of Alberta, (780) 492-6920, tcobb@ualberta.ca, or visit www.fmf.ab.ca