

# Saproxylic beetle species in logging residues: which are they and which residues do they use?

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Small-diameter wood is largely overlooked when considering substrates used by saproxylic insects. Large amounts of such wood have always been retained after felling, in the form of logging residues. However, recent interest in renewable energy sources has made the extraction of such logging residues profitable. If this continues, saproxylic insects will have less substrate in which to breed. To determine which species of saproxylic beetles (Coleoptera) may be affected, this study investigated the fauna of four tree genera (aspen, birch, oak and spruce), three diameter classes (1-15 cm) and two decay stages of logging residues in southern Sweden. The aim was to determine which species were present in the wood, and to describe their associations with different categories of residue. The beetles were collected by rearing them out from 794 wood samples. In total, 49 109 beetles were found, belonging to 160 species; of these 22 are, or used to be red listed in Sweden. Fifty-six of the species were sufficiently frequent to allow statistical analysis of their substrate associations and these are presented species-wise. Only four species exhibited no significant association with host tree species and only eight did not vary on the basis of decay stage. Species in more decayed wood were less specific with respect to tree species association. Thirty-five species displayed a significant relationship with diameter class. Species associated with the thinnest wood categories and with a preference for sun-exposure, for example three buprestids recorded here, are expected to be the most severely affected by the harvesting of logging residues.

Key words: Coleoptera, Bioenergy wood, FWD, Logging residues, Saproxylic, Slash, Substrate associations.

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## INTRODUCTION

The removal of dead wood has been identified as one major reason for forestry presenting a threat to many species (Esseen et al. 1997). This is because many thousands of species are saproxylic, i.e. they depend on dead wood for the successful completion of their life cycles (Siitonen 2001, deJong et al. 2004). Beetles (Coleoptera) is the most species rich group of saproxylic insects that has been reasonably well studied. Previous research is valuable when evaluating the effects of nature conservation measures. However, relatively

little research has focused on the fauna of small-diameter wood, because, until recently, such wood was not commercially interesting (Jonsell 2008). It was retained within the forest, so the species using it have not been regarded as suffering from any shortage of breeding substrate; conservationists have, therefore, generally overlooked it. This situation is now changing. Increasing concerns about global warming, resulting from combustion of fossil fuels, have opened up the market for renewable fuels; in Scandinavia, at least, these may largely consist of logging residues (Lundborg 1998). This will inevitably mean that the amount