

The role of bark beetles as vectors in the colonisation of windthrown timber by fungi

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Recent wind and snow storm events in New Zealand affecting plantation forests of *Pinus radiata* have raised questions regarding the colonisation of fallen trees by sapstain fungi. These fungi are known to be spread by a multitude of factors including wind, rain splash, harvesting processes, and insect vectoring. Apart from the ecological interest in these interactions between fungi, plants and insects, sapstain fungi are also economically important because their hyphae discolour the sapwood and reduce the overall quality of the timber. In New Zealand we know that snapped trees accumulate sapstain and insect attack faster than trees that topple but remain rooted, and that the most common stain fungus affecting these trees is *Diplodia pinea*. Manipulative experiments were established to examine seasonal and regional variation in sapstain attack following windthrow, and to investigate the importance of bark beetles as vectors. A range of methods were implemented to assess the effects of bark beetles. Experimental billet logs were caged to exclude beetles, and subsequently analyse fungal attack in comparison with identical logs left exposed to beetles. Also, individual beetles were analysed to determine what fungal species may be associated with them. Finally, a novel application of DNA melt peak analysis was developed to investigate the fungal communities on beetle vectors at both inter-specific and intra-specific levels.

