

The role of olfactory and visual cues in host finding by pine bark beetles and wood borers

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The pine bark beetles *Hylastes ater* and *Hylurgus ligniperda* and the longhorn beetle *Arhopalus ferus* are economically important, invasive forest and timber insect pests of coniferous tree species. Accidentally introduced from Europe to New Zealand, these insects are abundant within plantation forests, making them good experimental systems for testing theory about insect host location. We conducted a large-scale trapping trial near Nelson to examine the extent such beetles use olfactory cues (e.g. monoterpenes emitted by conifers) and visual cues (e.g. the colour and silhouette of trees) to find host material. Our aim was to provide new information on attractant and repellent stimuli to improve the understanding of host selection in such insects, refine monitoring methods, and to devise new tools for the management of wood borers and bark beetles. The results of the trial indicated significant effects of both visual and olfactory cues for all three species. The highest trap catch was to black (host mimicking) and red panel flight-intercept traps, containing attractant (α -pinene and ethanol) and the lowest in clear or white traps without visual host stimuli or attractants. Candidate repellent, green leaf volatiles, when present on traps with attractant, significantly reduced catches of *H. ater* and *H. ligniperda*, but had no significant effect on *A. ferus*. Non-host volatiles occurring in natural landscapes could have the potential to act as repellents, lowering pest outbreaks in more diverse vegetation compared to monocultures. Future research should explore the use of repellents from natural vegetation resources that could influence host finding in wood borers and bark beetles.

