

Effect of alpha-pinene and *cis*-pinonic acid on host-plant selection and feeding of *Hylobius abietis* on Scots pine

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The large pine weevil, *Hylobius abietis*, is an important pest of forest plantations. The adult weevils feed on young coniferous plants causing significant economic losses. Volatiles emitted by plants are known to influence the interactions between plants and other organisms, including insects. Scots pine, *Pinus sylvestris*, is an important emitter of the monoterpene alpha-pinene. In the atmosphere, alpha-pinene undergoes photo-oxidation leading to the production of *cis*-pinonic acid. Fine particles of *cis*-pinonic acid can be deposited on the plant's surface through precipitation. Alpha-pinene is known for its attractiveness to *H. abietis*, yet it is unknown whether this compound also promotes feeding of the weevil on the emitting Scots pine. Furthermore, the influence of *cis*-pinonic acid deposition on the surfaces of pine trees on the orientation and feeding of the weevil is unknown. The aim of this study was to investigate the effect of alpha-pinene and *cis*-pinonic acid on the behaviour of *H. abietis* on Scots pine. To determine host selection and feeding behaviour we used Scots pine stems treated with four different concentrations of both compounds. We used a multiple choice test between the test compound, a negative control (water) and a positive control (ethanol) to establish the weevil's first choice (for the first hour), and measured the total feeding damage after 48 hours. The results of the study suggest that higher concentrations of both chemical compounds repel the weevil, whereas lower concentrations are attractive. Alpha-pinene had no effect on feeding, but lower concentrations of *cis*-pinonic acid enhanced feeding of *H. abietis* on Scots pine. These results indicate that both compounds play important roles in mediating plant-insect interactions between weevils and their host-plants. Further studies are required to elucidate the critical concentrations at which behaviour changes from attractiveness to repellence and the ecological significance of these concentration changes under natural conditions.

