

# Identification of Female-produced Sex Pheromone of the Honey Locust Gall Midge, *Dasineura gleditchiae*, a New Urban Pest in Europe

**Béla Molnár · Zsolt Kárpáti · Gábor Szócs**

*Plant Protection Institute, Hungarian Academy of Sciences, H-1525, Budapest, P.O. Box 102, Hungary,*

**David R. Hall**

*Natural Resources Institute, University of Greenwich, Chatham Maritime, Kent ME4 4TB, UK*

**Abstract** The honey locust gall midge, *Dasineura gleditchiae* Osten Sacken, 1866 (Diptera: Cecidomyiidae) is the main pest of ornamental varieties of the honey locust tree, *Gleditsia triacanthos* L. in North America and is now becoming a pest of great concern in Europe. Female midges were observed to emerge in the early morning with their ovipositor exposed until they mated. Copulations lasted on average for  $19.64 \text{ sec} \pm 1.74 \text{ sec S.E.}$  ( $N = 25$ ). Volatiles were collected from virgin females in a closed-loop stripping apparatus and analyzed by gas chromatography (GC) coupled to electroantennographic (EAG) recording from the antenna of a male midge. A single EAG response was observed and this was assumed to be the major component of the female sex pheromone. The compound responsible was identified as (*Z*)-2-acetoxy-8-heptadecene by comparison of its mass spectrum and GC retention times with those of synthetic standards and by microreactions. This compound was synthesized and the separate enantiomers produced by kinetic resolution with lipase from *Candida antarctica*. Analysis of the natural compound on a cyclodextrin GC column indicated it was the *R*-enantiomer. In EAG dose-response measurements the *R*-enantiomer alone or in the racemic mixture evoked significant responses from the antennae of male *D. gleditchiae*, whereas the *S*-enantiomer did not. These findings were confirmed by field trapping tests in which the *R*-enantiomer attracted male *D. gleditchiae*. The racemic compound was equally attractive but the *S*-enantiomer was not attractive. Either the pure *R*-enantiomer or racemic (*Z*)-2-acetoxy-8-heptadecene, applied to red rubber septa in a dose range of 3-30  $\mu\text{g}$  constitute powerful baits in sticky traps for practical monitoring of the flight of *D. gleditchiae*.

**Key Words** Honey locust gall midge · *Dasineura gleditchiae* · Cecidomyiidae · chiral sex pheromone · enantiomers · (*Z*)-2-acetoxy-8-heptadecene · (*2R,8Z*)-2-acetoxy-8-heptadecene · *Gleditsia triacanthos* · ornamental tree