

# Exploitation of the sex pheromone of apple leaf midge *Dasineura mali* Kieffer (Diptera: Cecidomyiidae) for pest monitoring: 1. Development of lure and trap

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## Abstract

In previous work, the female sex pheromone of the apple leaf midge, *Dasineura mali* (Kieffer) (Diptera: Cecidomyiidae) was identified by us as (*Z*)-13-acetoxy-8-heptadecen-2-one. Only one enantiomer of the chiral compound was attractive to male midges but the racemic mixture was equally attractive. A series of replicated field experiments was carried out during 2004-2006 to develop an optimised pheromone trap system for monitoring populations of *D. mali* in commercial orchards. With rubber septa dispensers numbers of midges caught increased with increase in loading of pheromone over the range tested from 1 µg to 100 µg and a loading of 3 µg was found to be suitable for pest monitoring purposes. Polyethylene vial dispensers were unattractive during these tests. Release rate studies in the laboratory showed reasonably uniform release of pheromone from the septa for at least 574 days at 27°C and 8 km/h windspeed. With the vials there was a delay of 10 days before the start of release of pheromone under these conditions. Funnel, bottle, petri dish, delta and dish traps all caught midges, those with the larger catching surfaces being more sensitive. In practice, it was concluded that the standard delta trap is the best design for use by growers. The colour of the trap had no effect on attractiveness to *D. mali* males, but catches of non-target arthropods in red, green and black traps were significantly lower than in white, yellow or blue traps. The red traps are recommended for use by growers. Numbers of male midges caught were greatest in traps at ground level and decreased strongly with increasing height of trap deployment. A standard deployment height of 0.5 m was chosen. Males were attracted to traps over a distance of at least 50 m from an infested orchard. They showed a strong diurnal pattern of flight activity. Numbers caught rose steeply in the morning starting at 07:00 h (2 h after dawn), reached a peak at 09:00 h and steadily declined throughout the day thereafter. Conversely, numbers of ovipositing females were very low at 09:00 h but increased steadily, reaching a peak at 11:00 – 12:00 h and declining thereafter.

**Key words** : apple leaf curling midge, *Dasineura mali*, Cecidomyiidae, sex pheromone, trap, pest monitoring, (*Z*)-13-acetoxy-8-heptadecen-2-one