



Agriculture & Horticulture
DEVELOPMENT BOARD



New Project

CP 73

The role of chemicals in location of
host plants by midge pests of UK
fruit crops

(HDC Studentship)

Project Number:	CP 73
Project Title:	The role of chemicals in location of host plants by midge pests of UK fruit crops (HDC Studentship)
Project Leader:	Professor David Hall, Natural Resources Institute
Contractor:	University of Greenwich
Industry Representative:	Tree Fruit Panel: Nigel Kitney Soft Fruit Panel: Tom Maynard
Start Date:	01/09/2010
End Date:	30/11/2013
Project Cost:	£64,650

Project Summary:

Species of gall midge (Diptera: Cecidomyiidae) are important pests of many horticultural crops and often very difficult to control by conventional means. We have made considerable progress in identification of female sex pheromones in this group of insects, and these are now in use for monitoring populations of several pest species. However, the female-produced sex pheromones attract only males. Attractants for the females, particularly mated females, would potentially be far more valuable for both monitoring and control of the pests. There is good evidence in several species of midge that mated females are attracted to their host plants for oviposition by specific odours from the plants. Although this has been known for over 40 years in some cases, the chemicals responsible for this attraction have not yet been identified. Identification of these chemicals will provide a considerable chemical and biological challenge, but success will provide potential methods for interference with the laying of fertilised eggs on the host plant by the female midge which is a critical phase of the insect's life cycle. The results will also advance our knowledge of the remarkable ability of insects to find their host plants in terms of whether a few key chemicals are involved or whether they use specific blends of several more ubiquitous chemicals. This project will aim to identify the chemicals responsible for attraction of mated female midges to oviposition sites on their host crop for up to three species which are important pests of soft fruit and tree crops in the UK and where such attraction has been demonstrated previously. These are the raspberry cane midge, *Resseliella theobaldii*, the blackcurrant leaf midge, *Dasineura tetensii*, and the apple leaf midge, *D. mali*.

Aims & Objectives:

(i) Overall aim of the project

The overall aim of the project is to identify chemicals responsible for attraction of mated females of up to three species of midge to their host plants: the raspberry cane midge, *Resseliella theobaldii*, the blackcurrant leaf midge, *Dasineura tetensii*, and the apple leaf midge, *D. mali*. The three target species are important pests of horticultural crops and identification of these attractants would provide a basis for development of new approaches to monitoring and control of these pests that would be compatible with both conventional IPM and organic strategies. The results will also advance our knowledge of the remarkable ability of insects to find their host plants in terms of whether a few key chemicals are involved or whether they use specific blends of several more ubiquitous chemicals.

(ii) Specific objectives

For each species, the specific objectives will be as follows.

- Confirm attraction of mated females to host-plant volatiles by developing a suitable laboratory bioassay and/or behavioural studies in the field.
- Identify and synthesise components of the host-plant volatiles that elicit electroantennographic (EAG) responses from the antennae of the female midges.
- Define blends of these compounds that attract mated female midges in the laboratory and/or field.

Benefits to industry

- The work would result in the identification of female attractants for up to three important midge pests of fruit crops.
- Identification of female attractants would be a significant scientific breakthrough with implications for midge pests of a wide range of other horticultural crops
- These attractants could potentially be used for monitoring and/or control of their target pests, providing alternatives to pesticides

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