



Assessing the effects of NO_x and Ozone on volatile organic compound Signal Mediated InterActions of the silver Y moth (ANOSMIA)

Lead Supervisor: Robbie Girling, University of Reading, School of Agriculture, Policy and Development
Email: r.girling@reading.ac.uk

Co-supervisors: Christian Pfrang, Department of Chemistry, University of Reading; Ben Langford, Centre for Ecology and Hydrology; Eiko Nemitz, Centre for Ecology and Hydrology

An array of anthropogenic factors is responsible for continued declines in global biodiversity. The project will investigate how man-made diffuse air pollution can disrupt the vital airborne chemical signals that insects need to complete critical processes, such as mating or foraging for resources, and the ecological consequences.

This trans-disciplinary PhD will be the first study to link concepts and techniques from behavioural ecology, chemistry and atmospheric science to study how air pollution interacts with important odours used by insects for foraging (floral VOCs) and mating (pheromones). The studentship will focus on odour-mediated communication in the silver Y moth, using it as a model system to investigate signal disruption by the common air pollutants nitrogen oxides and ozone. It will investigate how these pollutants change the chemistry of key signalling compounds using Gas Chromatography–Mass Spectrometry. For the first time these changes will be visualised in real-time in the odour plumes that insects use to find resources by using Proton Transfer Reaction–Mass Spectrometry as part of wind-tunnel and field-based studies. Behavioural ecology techniques will provide unprecedented insight into the ecological impacts of odour disruption, utilising wind-tunnels to study its effects on moth orientation behaviour in odour plumes and field studies to investigate the effects on mating success.

The studentship will provide excellent and exceptionally diverse opportunities for training, enabling the student to develop skills on the boundaries between ecological, chemical and atmospheric sciences.

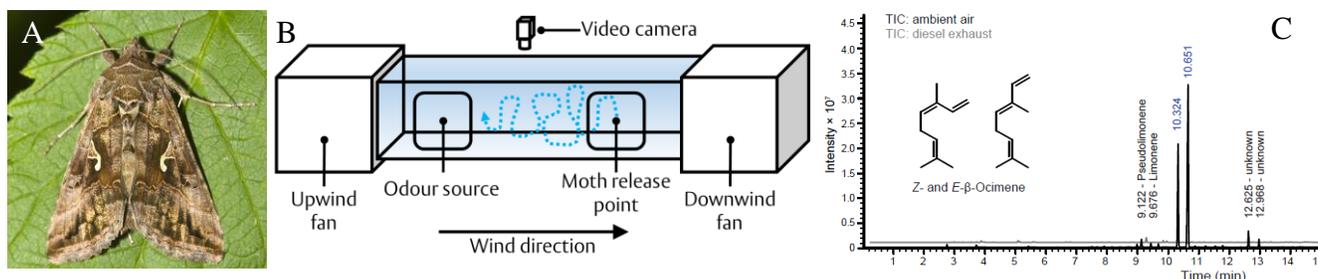


Fig 1. A Silver Y moth (*Autographa gamma*)*; **B** Typical wind tunnel used for moth flight behaviour experiments, blue dotted line indicates a moths upwind flight path; **C** Gas Chromatography–Mass Spectrometry analysis showing intensity of Z- and E-β-Ocimene in ambient air (black) and after 30 min exposure to diesel exhaust (grey) (see Lusebrink, Girling et al 2015, *J. Chem. Ecology*)

**Autographa gamma* by Olaf Leillinger is licensed under CC-BY-SA-2.5 and GNU FDL ©;

Training opportunities:

The project offers extensive training stints at the Centre for Ecology and Hydrology in Edinburgh. Training will be provided in Proton Transfer Reaction–Mass Spectrometry, Gas Chromatography–Mass Spectrometry, the use of wind-tunnels, behavioural/ecological assays as well as general laboratory and fieldwork skills.

Student profile:

This project would be suitable for students with a degree in the biological/ecological sciences who can demonstrate an understanding of chemistry or a student with a degree in chemistry and a strong knowledge of the biological/ecological sciences.

<http://www.reading.ac.uk/nercdtp>