

**Project Title: River Deep, Mountain High: On the Search for Where Midges Aren't**

**Supervisors:** Marion England, Simon Carpenter

**Research group:** Entomology

**Project Summary:**

No livestock farm has been discovered to date in the UK that does not support populations of biting midges (*Culicoides*). In contrast, areas outside farms have received negligible trapping effort, which means we have only a very limited understanding of how *Culicoides* interact with wildlife, or disperse between farms. This student project will encompass trapping based at areas of known distance from livestock in order to examine this phenomenon.

**Details:**

The project will begin with the student examining a mosaic of alternative habitats at a large estate in Hampshire which offers diverse environments including areas of botanical monoculture, fallow land and woodland. Additionally, both organic and non-organic farming practices are used across the estate, providing an ideal opportunity to study the impact that these practices have on *Culicoides* density and diversity. All collected *Culicoides* will be identified morphologically to species level using a light microscope. Data from the estate will be compared to historical data (2006 to 2018) collected from livestock farms in the UK. This initial study will enable the student to become confident in characterizing landscape, *Culicoides* trapping and identification.

Having developed these skills, the student will select further landcover variables that might be relevant to *Culicoides* movement and presence using remotely sensed data and aerial photography. They will then create a stratified map to carry out trapping at these sites (which may potentially include urban and suburban areas; island habitats; mountains; lake- and sea-based trapping). The drivers of spatial distribution will be selected by the student with advice from the project supervisors. Trapping in these areas will be restricted to days suitable for *Culicoides* activity and also by accessibility. Taken together the project will provide both an interesting insight into midge distribution and also an attractive project that is highly likely to yield results.

All training will be provided by the project supervisors, including running of the light traps and taxonomic identification of *Culicoides*. Support in both of these areas will also be available from other members of the Entomology group. In addition to this project, the student will assist in the collection and processing of *Culicoides* specimens from the UK surveillance network. The student will also be involved in assisting with field work and data collection carried out by other members of the Entomology group, such as investigating larval breeding sites for *Culicoides* at zoos and identifying the potential role of donkeys in the risk of African horse sickness virus to the UK. The student will also assist a current PhD student with molecular identification of field-caught mosquitoes.

**References for Suggested Reading:**

- Carpenter, S., Wilson, A. and Mellor, P. (2009) *Culicoides* and the emergence of bluetongue virus in northern Europe. *Trends in Microbiology* 17(4) p. 172-178
- Carpenter, S. et al. (2009) An Assessment of *Culicoides* surveillance techniques in northern Europe: have we underestimated a potential bluetongue virus vector? *Journal of Applied Ecology* 45(4) p. 1237-1245
- Purse, B. et al. (2004) Modelling the distributions of *Culicoides* bluetongue virus vectors in Sicily in relation to satellite-derived climate variables. *Medical and Veterinary Entomology* 18(2) p. 90-101
- Sanders, C. et al. (2019) Long-term shifts in the seasonal abundance of adult *Culicoides* biting midges and their impact on potential arbovirus outbreaks. *Journal of Applied Ecology* 56(7) p. 1649-1660

**To Apply:**

Please email your CV (no more than two sides of A4) and a covering letter detailing why you would like to undertake the placement and the knowledge and skills that you will bring to the Institute to [yvonne.walsh@pirbright.ac.uk](mailto:yvonne.walsh@pirbright.ac.uk).

**Closing date to apply: 31.01.20**