

Adaptation to Changing Environments

School of Biosciences

College of Life and Environmental Sciences

Details

Code 22393

Level of study Third/Final year

Credit value 20

Semester 2

Module description

Since its inception, life on earth has had to adapt to changing environmental conditions - this represents a driving force of evolution. This module examines how organisms detect and respond to changes in their environment, and reviews the different behavioural, physiological and molecular mechanisms underpinning environmental (stress) adaptation. Understanding these organism-environment interactions forms the very foundations of ecology. Research on insects in particular, has fundamental applications in controlling agricultural pests and vectors of disease, as well as optimising ecosystem services such as pollination. These organisms are also excellent biological thermometers in modelling the potential impact of climate change.

Examples are provided from a range of organisms, but a specific focus is given to terrestrial invertebrates (insects) and plants. The term "environment" covers a broad spectrum of spatial scales, from changes occurring at the cellular level, to large scale geographic differences between major climatic zones (polar, temperate and tropical). The process of "change", and adaptation to these changes, will in turn be discussed across a broad spectrum of timescales. These include: i) the requirement for rapid adaptation to potentially dramatic shifts in environmental conditions, e.g. when a parasite first enters its host; ii) longer-term changes and adaptations across seasonal timescales, e.g. hibernation/insect diapause, and finally iii) adaptation on an evolutionary timescale, e.g. the 'Red Queen' hypothesis, across scenarios of past environmental changes, and extending out to current predictive climate change models.

Teaching and learning methods

Lectures, grant applications, seminars