Envision Developing next generation leaders in environmental science

Competition Funded PhD Project

Adapting to extreme environments: hybridisation and the evolution of contemporary heavy metal tolerance

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Climate change, urbanisation and exploitation of natural resources increasingly alter the environment, posing significant challenges for plants and animals. For species to adapt to such fast paced change, they will either need to draw on new genetic variation, which is likely to emerge very slowly, or on existing standing variation, which is potentially very fast. Another possibility is that adaptive alleles will be acquired via hybridisation with closely related species, facilitating rapid adaptation through the re-use of existing adaptive variation. Repeated evolution of the same adaptive trait offers unique opportunities to investigate genetic underpinning of rapid adaptation, ultimately informing us about the extent to which evolutionary responses to a changing climate might be predictable.

This project will advance our knowledge of the ecological and genetic mechanisms underpinning multiple origins of adaptation to heavy metal contaminated soils in *Silene uniflora* (sea campion) and whether hybridisation has facilitated or hindered adaptation. Sea campion is a predominantly coastal species, native to the UK and Ireland. It has also colonised and adapted to contaminated, disused mines on at least three separate occasions in Wales, England and Ireland within the last 250 years. *Silene uniflora* also occurs in mainland Europe (Sweden, France and Spain) and it hybridises with its sister species, *S. vulgaris*, which has also evolved heavy metal tolerance in European sites. Training in laboratory techniques for High throughput DNA sequencing, statistical analysis in R, bioinformatics, genomics and adaptation genetics will be provided. Hosted in the vibrant Molecular Ecology and Fisheries Genetics Laboratory in Bangor (http://mefgl.bangor.ac.uk/index.php.en) the student will join a new team led by Alex Papadopulos (http://labadopulos.co.uk) researching the genetics and genomics of adaptation in plants.

See http://www.envision-dtp.org for further details about the ENVISION DTP program and how to apply. This studentship is in competition with other studentships; the projects with the best applicants will be successful.

Closing date for applications: 17/01/20.

For informal enquiries, please contact Alex Papadopulos (email – a.papadopulos@bangor.ac.uk, twitter – @Metallophyte)

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