University of Bristol and Natural History Museum: NERC-CASE PhD Studentship

Ecological constraints on evolution: a case study with Lake Malawi's 'prototype' cichlid fish

We seek a highly motivated and productive PhD student to work on a research project studying ecological and morphological diversity in Malawi cichlids. The cichlids of the African Great Lakes are among the most spectacular examples of rapid speciation and adaptive radiation. All were seeded from riverine ancestors, but surprisingly no detailed research has tested hypotheses regarding the environments and selective processes that constrain evolution in rivers, but promote radiation of specialist forms in lakes.

The aim of the PhD project is investigate why hundreds of cichlid fish species have evolved in the lake, but not in surrounding rivers. The proposed research will explore whether the nature of selection imposed by contrasting environments has influenced patterns and rates of evolution. The project will focus on the only cichlid fish in the radiation that is present in both rivers and the lake, *Astatotilapia calliptera* (=the 'prototype'), a species with known functional morphological differences (e.g. in tooth and jaw morphology) between populations.

The successful candidate will study habitat differences, ecomorphological specialisation, dispersal rates, and phylogenetic relationships of populations. Project aims are to:

- Determine if populations are subject to different ecologically-selective regimes, using information from population age- and size-frequency distributions in the field.
- Test whether rates of dispersal are greater along river systems than equivalent distances along lake shorelines, using information from microsatellite markers.
- Determine if lake and river populations differ in ecological specialization, using field samples, and common-garden experiments in controlled aquarium conditions.
- Test for parallel evolution of morphological and ecological forms using phylogenies reconstructed using Amplified Fragment Length Polymorphism markers.

Applicants should have a strong Honours degree and/or Masters in evolutionary biology, molecular ecology or related fields, as well as a broad interest in evolutionary ecology. You should be able to work on complex and demanding projects, and be enthusiastic about participating in extensive fieldwork in Africa. You must be eligible to receive NERC postgraduate funding (http://www.nerc.ac.uk/funding/available/postgrad/eligibility.asp).

This studentship will be an excellent opportunity for training in tropical fieldwork, quantitative genetics, morphometrics, ecological surveys, population genetics, experimental ecology and molecular phylogenetics. You will be based in the School of Biological Sciences, Bristol, with training at the Department of Zoology, NHM. The successful candidate will be supervised by Dr Martin Genner and Dr Jon Bridle (Bristol) and Dr Lukas Rüber (NHM). Enquires, including requests for further details, should be directed to Dr Martin Genner (m.genner@bristol.ac.uk). Applications should consist of a full CV, cover letter and the contact details of two academic referees. The closing date for applications is Friday 9th April 2010.