

## Research Project

### On the periphery: Does peripatric speciation promote rainforest diversity in east africa?

#### Third-party funded project

**Project title** On the periphery: Does peripatric speciation promote rainforest diversity in east africa?

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Speciation, or the process by which new species arise, is a fundamental topic in biology. Despite over a century of study it still remains relatively poorly understood, particularly in terms of the main mechanisms that determine how populations become reproductively isolated. With the advent of phylogenomics and fine scale spatial tools, such as Geographic Information System (GIS) data, we can now conduct comparative analyses into the main causal factors that drive speciation. In order to understand whether specific speciation patterns are pervasive in a system, analyses of independently derived species are necessary to see whether common patterns can be observed.

Amphibians have been used extensively to study the biogeographic and phylogenetic signals left by past speciation events and here we investigate whether the dispersal of a small number of peripheral individuals into a new habitat, has resulted in the origin of new species. The Eastern Arc Mountains (EAM) of Tanzania boast exceptional amphibian species richness, believed to be largely the result of repeated allopatric speciation through vicariance events. However, recent molecular studies have shown that some of the endemic montane rainforest taxa in this biodiversity hotspot are most closely related to widespread species in the adjacent lowlands and so whether these mountains act only as museums, harbouring refugial relicts of past habitat expansions and contractions, or whether they continue to promote speciation through colonization from surrounding lowland areas followed by adaptation and divergence is not yet clearly understood.

By applying ecological niche modelling and next-generation sequencing to characterize the spatial and genomic makeup of East African amphibians, we wish to investigate whether a low number of founder individuals from lowland species dispersing onto the rainforests of the EAM and adapting to new habitats has repeatedly promoted the formation of new species. The results of this study will have important implications for our understanding of how dispersal and adaptation can lead to speciation without vicariance events and why certain areas such as the EAM are more species rich than others. In turn the findings might highlight the importance of non-EAM regions for promoting speciation, as has been outlined in other regions of Africa (*sensu* Ecotones) and by implication that these areas also deserve attention in evolutionary and conservation studies for contributing to rainforest diversity.

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