MADAGASCAR DISSERTATION/THESIS PROJECT

MA54 - Edge effects, microclimate and thermal ecology of reptiles or birds in Mahamavo

Prepared by Dr Peter Long, University of Oxford

For more information contact:
Dr Heather Gilbert | Terrestrial research officer | heather.gilbert@opwall.ac.uk

Changes to forest habitat configuration, such as forest loss and fragmentation create greater amounts of forest edge habitat. It is important to understand the mechanisms whereby forest edges affect edge sensitive species in order to better plan forest management for biodiversity conservation. Forest edges may experience microclimatic effects such as increased temperature or light intensity, or decreased humidity. These abiotic effects may extend tens to hundreds of metres into the forest interior from the forest edge, depending on the environmental variable, the vegetation structure and weather conditions. In this project you will test how species of either birds or reptiles respond by habitat selection to microclimate variation caused by edge effects at fine spatial scales. You will participate in biodiversity surveys and draw upon our long-term monitoring dataset of forest structural properties in plots, and either reptile route data or bird point count data. For many years we have measured ambient temperature and humidity at the exact location and time of each biodiversity record (e.g. individual reptile). You will also be able to use data from a network of light, temp and humidity dataloggers deployed across the forest, as well as thermographic camera data if you wish to investigate patterns of thermal heterogeneity in habitats. Micrometerological software libraries (e.g. microclima) can also be used to estimate the landscape pattern of microclimate variation from directly received satellite data and meterological observations made in the field.

Suggested reading

* indicates particularly useful sources.

*Lehtinen, RM, JB Ramanamanjato, and JG Raveloarison (2003), 'Edge effects and extinction proneness in a herpetofauna from Madagascar', Biodivers. Conserv., 12 (7), 1357-70.

*Pfeifer, M, et al. (2017), 'Creation of forest edges has a global impact on forest vertebrates', Nature, 551 (7679), 187.

Barnagaud, Jean-Yves, et al. (2013), 'Species' thermal preferences affect forest bird communities along landscape and local scale habitat gradients', Ecography, 36 (11), 1218-26.

Jang, Woongsoon, et al. (2019), 'Avian Reporting Rates in Chugcheongnam Province, South Korea Depend on Distance from Forest Edge, Size of Trees, and Size of Forest Fragments', Forests, 10 (5),

Maseko, Mfundo S T, et al. (2019), 'High microhabitat heterogeneity drives high functional traits in forest birds in five protected forest areas in the urban mosaic of Durban, South Africa', Glob. Ecol. Conserv., 18

Metcalf, J, et al. (2005), 'Edge effect from paths on two chameleon species in Madagascar', Afr. J. Herpetol., 54 (1), 99-102.

Roels, Steven M, Melissa B Hannay, and Catherine A Lindell (2019), 'Recovery of bird activity and species richness in an early-stage tropical forest restoration', Avian Conserv. Ecol., 14 (1),

Rutt, Cameron L, et al. (2019), 'Examining the microclimate hypothesis in Amazonian birds: indirect tests of the 'visual constraints' mechanism', Oikos, 128 (6), 798-810.

Urbina-Cardona, J Nicolas, Mario Olivares-Perez, and Victor Hugo Reynoso (2006), 'Herpetofauna diversity and microenvironment correlates across a pasture-edge-interior ecotone in tropical rainforest fragments in the Los Tuxtlas Biosphere Reserve of Veracruz, Mexico', Biol. Conserv., 132 (1), 61-75.

Watson, JEM, RJ Whittaker, and TP Dawson (2004), 'Habitat structure and proximity to forest edge affect the abundance and distribution of forest-dependent birds in tropical coastal forests of southeastern Madagascar', Biol. Conserv., 120 (3), 311-27.