

MN326 Stream fish diversity and microhabitat utilization in Mahamavo, Madagascar

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Operation Wallacea has established an expedition to the forests near Mariarano in the northwestern dry forests of Madagascar. Past expeditions to this area have expanded and documented the numbers and distribution of a wide variety of vertebrates, including mammals, birds, amphibians and reptiles. Very little known however about the distribution of fishes in this region.

Large numbers of plants and animals are endemic in Madagascar (upwards of 80%) and until recently the ichthyofauna was thought to be of less interest than some other groups of vertebrates. More recent work has shown that the number of species of fish that are present are comparable to landmasses of similar size found elsewhere. Additionally, there are small radiations of endemic freshwater fishes. There has been a longstanding publication record regarding Madagascar fishes, but surprisingly little is known about the distribution and biology of freshwater fish in Madagascar.

As with many other biotic elements of Madagascar there are wide ranging threats. The primary threat for all the biota of Madagascar is deforestation and this effects the streams and rivers as well. Additionally diversion of water for irrigation of rice paddies, overfishing and the introduction of exotic fishes are greatly impacting native fishes. Given the relatively intact forest surrounding the rivers and streams near Mariarano, the impacts here might be expected to be less than in many parts of Madagascar and so documentation of the fishes that are present in this region would be of great interest as there may be more native fish present.

The primary surveys that will be conducted next summer are of several shallow-water braided streams and rivers that are in the vicinity of the Mariarano and Matsedroy camps. Our efforts will focus here because of the presence of Nile crocodiles in deeper water environments. We will use seining as a primary collection technique and small series of fishes will be preserved to assist in identification using keys and published literature that is available. Once a basic species inventory is conducted, focused seining efforts and counts will be used to determine the microhabitats in each stream that are utilized by each species as well as a determination of species that co-occur in microhabitats as well. We will also likely be measuring salinity and other basic stream parameters that might effect fish distributions as well. Seining surveys would provide opportunities for large numbers of students during a hot day to get in the water and help.

Many of the local people fish for sustenance. We are hoping to conduct interviews with fishermen as to the kinds and numbers of fish that are caught in deeper water habitats that are more tidal nearer to the coast. This combined approach should allow a fairly comprehensive snapshot of the fish diversity present.

This should be a very interesting project for the right dissertation student. We will need to work together on identifying the fish that are collected. This student should be comfortable in aquatic environments, familiar with the techniques involved in seining and able to organize groups of students into effective collecting teams.

A variety of references are included below, the two most critical Glaw and Vences (1994) [please note that the fish key is only present in the 2nd edition and not the 3rd edition that was published more recently] and Sparks and Stiassny (2003) which includes a complete species list for northwestern Madagascar.

Suggested Reading:

Benstead, De Rham, Gattolliat, Gibon, Loiselle, Sartori, Sparks and Stiassny (2003) *Conserving Madagascar's Freshwater Biodiversity*. *Bioscience* 53:1101-1111.

Coad (1998) *Expedition Field Techniques: Fishes*, 2nd edition. Geography Outdoors.

Glaw and Vences (1994) *A Fieldguide to the Amphibians and Reptiles of Madagascar, 2nd edition including mammals and freshwater fishes*. V&G.

Helfman, Collette, Facey and Bowen (2009) *The Diversity of Fishes: Biology, Evolution and Ecology, 2nd edition*. Wiley-Blackwell.

Moyle and Cech (2004) *Fishes: An Introduction to Ichthyology, 5th edition*. Prentice-Hall

Reinthal and Stiassny (1991) *The Freshwater Fishes of Madagascar: A Study of an Endangered Fauna with Recommendations for a Conservation Strategy*. *Conservation Biology* 5:231-242.

Sparks and Stiassny (2003) Chapter 9 *Fishes: Introduction to the Freshwater Fishes* pp. 849-863
In: *The Natural History of Madagascar* ed. Goodman and Benstead, University of Chicago Press.