

## **HM307: Factors affecting freshwater invertebrate communities in the cloud forests of Honduras**

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Cusuco National Park is a cloud forest park situated in the Merendon mountains region of Honduras. Covering 23,400 hectares up to 2,400 meters it is home to considerable biodiversity including 270 bird species, 93 reptile and amphibian species, 35 bat species, several charismatic large mammals and a massive diversity of invertebrates. Despite this the park, as with many other cloud forest parks in Central America, was declared a park not because of its biodiversity, but mainly because of its function in protecting river water quality in the headwaters of the catchment, this being the potable water source for several large urban areas including San Pedro Sula.

Most of our current models for stream nutrient dynamics, decomposition, and regulation of community structure have been derived from extensive and detailed research on lotic systems in temperate zones (Wantzen et al. 2006). To what extent these apply to neotropical systems is unclear. In terms of anthropogenic pressures temperate streams tend to be affected by channel modification and diffuse pollution (Wantzen et al. 2006). Diffuse pollution from agriculture has also been documented in the neotropics (Castillo et al. 2006) and like most areas on Earth neotropical streams are not unaffected by airborne contaminants (Standley & Sweeney 1995). However, Central American streams are more commonly affected by point sources such as municipal sewage and sediment usually associated with land-use change (Biggs et al. 2004, Mol & Ouboter 2004, Baptista et al. 2007).

The freshwater systems in the park are under increasing pressure from diffuse inputs arising from forest clearance for agricultural activity such as coffee production and from inputs from settlements. There is however very limited water quality monitoring, and any monitoring which does occur is limited to chemical and physical parameters which have been proven to be very limited in the information they provide as well as being relatively expensive, alone these are now generally considered unsatisfactory and are used only in support of ecological assessment in the EU (Free et al. 2006). The development of a biological water quality index was therefore considered of vital importance to the park.

We commenced sampling a wide range of rivers in 2009. These were chosen based on geomorphologic characteristics using a GIS (Geographic Information Systems) model. The methodology we have used for sampling macroinvertebrates is timed multihabitat kick samples with a 1mm mesh net. This is a standard method for sampling macroinvertebrate in many areas (Wallace et al. 1996, Whiles et al. 2000, Dickens & Graham 2002, Callanan et al. 2008). Further sampling was carried out in 2010 and 2011 as well as some experimental work in 2011 (microcosm experiments assessing the drift response of invertebrate communities to various pressures). Using the 2009 samples identified to family level we have tested some indices designed for use in other geographic areas to assess the potential for their use in Honduras with encouraging results. Work is currently underway on the samples from the experimental work in 2011.

While the families of aquatic invertebrates found in Central America are often similar to those found in other areas of the world at generic and specific level there can be stark differences and it is likely that many of the species found in Cusuco are new to science. Work is

currently underway on the Odonata (Dragonflies and Damselflies) adults of which have been identified by Dr. Merlijn and which are currently being matched to nymphs using genetic techniques. However huge amounts of work remain to be done on the aquatic systems of El Parque Nacional Cusuco most notably studies on taxonomy and the ecology of the macroinvertebrates (functional feeding groups, habitat preferences, life cycle amongst others) about which very little about is known. There is therefore huge scope for dissertation topics, which while challenging, will provide a real and valuable addition to the scientific knowledge base for freshwater systems in the neotropics.

### **Reading List:**

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