

Canterbury lecturer gets to the top of Panamanian rainforest research

Dr Raphael Didham, a senior lecturer in the School of Biological Sciences, has just returned from five weeks in Panama where he participated in a massive international collaborative research project on insects of the tropical rainforest.

Dr Didham and his wife, Laura Fagan, who is an entomologist at Landcare Research, received funding for the project from the Royal Society of New Zealand's International Science and Technology Linkages Fund.

The goal of project IBISCA – Investigating the Biodiversity of Soil and Canopy Arthropods – is to study the vertical stratification of insects in tropical rainforests and to estimate how many species live in the tropical forest canopy. The project is funded by the US Smithsonian Tropical Research Institute in Panama, the international companies SolVin and Solvay, and by a host of other international funding agencies including the Global Canopy Programme, UK. The total cost of the project is estimated at upwards of 1 million Euro.

Dr Didham said that during the study, new discoveries were made everyday, and it was expected that more than 70% of some groups of insect species collected would be new to science. Although Dr Didham has worked in other tropical countries in the past, he said he was amazed by the “staggering diversity of insects” in Panama.

Ultimately, the IBISCA project will help scientists estimate “ballpark” figures for insect diversity in tropical forests.

Current estimates depend on the assumption that the number of insect species in the canopy represents almost two-thirds of all insect species. This assumption led researchers in the 1980s to suggest that as many as 30 million insect species might exist, but later work has challenged this estimate, suggesting that only 10% of insects live in the canopy.

Dr Didham says that researchers have been “nipping at the edges” of this topic for some time, but



Photos by Yves Basset and Laura Fagan.

The canopy balloon in action in Panama. The 400m³ single-person helium balloon allows the researcher to be almost neutrally bouyant and walk freely over the top of the rainforest canopy - tethered to a strong safety line. Inset: Dr Raphael Didham and Laura Fagan inside the Ikos after a long night-climb into the forest canopy to light-trap insects.

previous studies have not been robust enough to be widely generalised to all insect species.

To achieve a more acceptable sample size, IBISCA invited 33 entomologists from 15 countries (representing a large proportion of all tropical canopy entomologists in the world) to participate. They also chose a range of new technologies developed in the last five years to study the forest canopy including fixed canopy cranes, a giant helium balloon and a giant canopy raft.

The raft, constructed of plastic beams and netting and weighing more than three-quarters of a tonne, was flown into place by helicopter and fixed by professional climbers.

He and Ms Fagan also had a memorable night sleeping in hammocks 35m above the ground in a fixed tree house called the “Ikos”. The pair spent the night fighting off swarms of biting insects attracted to the tree house by the light trap attached to its roof.

Dr Didham said the hundreds of bites they received were a small sacrifice however, as the best moth sample of the entire study was caught that night.

After collection, all the samples were pooled and separated into 40

focal groups. Each group was then assigned to a pair of researchers with expertise in that taxonomic group for identification and analysis.

Dr Didham and Ms Fagan are responsible for the Order Diptera, or the flies. The collection includes the largest fly Dr Didham has ever seen – stretching as long as his palm and more than 2.5cm wide.

This project complements Dr Didham's current research programme in New Zealand, which focuses on fly species in the forest canopy.

Dr Didham and Ms Fagan plan to return to Panama in May 2004 and again in 2005 to continue with the project. Phase II in 2004 will investigate seasonal variation in the

vertical stratification of insects, and in 2005 a workshop will be held to discuss the results.

Also in 2005, the principal scientist for IBISCA, Yves Basset, will visit the University of Canterbury to share his knowledge of worldwide forest canopy research and technology, which Dr Didham believes will help inspire scientists here to co-ordinate various canopy research already under way in NZ.

“There is a growing awareness of the importance of forest canopies in NZ, and the University of Canterbury has more researchers on aspects of the forest canopy than any other university in the country.”

Laura Sessions



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