

The fundamental role of taxonomy and identification in the conservation of biodiversity and many traditional crops currently appears to be better recognized by Pacific Island regional organizations than it is by many westernized country governments. At a global level our need for specialized taxonomic expertise is increasing as a result of human development, climate change and the associated need for, effective biosecurity measures, pest management and assessment of our vulnerable

TAXONOMY IN CONSERVATION

Why do we need it?

by Gilianne Brodie & Posa Skelton

biodiversity. Despite these well acknowledged issues and increasing threat to our unique natural resources, support for taxonomy and taxonomic training has decreased substantially in most westernized countries over the last 20 years. This neglect is likely to have highly undesirable long-term consequences as taxonomy like many time-honoured disciplines is best learnt via practically based apprenticeships with experienced mentors.

The University of the South Pacific (USP), via its Institute of Applied Sciences, South Pacific Regional Herbarium facility and its Geography Department, has joined hands with the Secretariat of the Pacific Community's (SPC) Land Resources Division and the Secretariat of the Pacific Regional Environment Programme (SPREP) to address a shared need for increased taxonomic capacity in the Pacific Islands and to jointly promote much needed taxonomic capacity building particularly in the areas of human resource development and technical knowledge transfer. The resulting Pacific Island Taxonomic Partnership Network (PACINET) has been seed funded and guided by the above core organizations (USP, SPC, SPREP) but also forms part of the BioNET-INTERNATIONAL network for taxonomy. BioNET, an international not-for-profit organization dedicated to promoting taxonomy, is currently comprised of 12 sub-regions or LOOPs that bring together institutions from 115 countries in Africa, Asia & Oceania, the Caribbean and Latin America. With their recent education and training initiatives there is no doubt that the Pacific Islands sub-region PACINET and its core support organizations USP, SPC and SPREP are forging a Centre of Excellence and currently setting an international benchmark for other developing country regions to follow.

So what is taxonomy and how is it directly useful to Pacific Island people and their futures.

Taxonomy is the science of naming, identifying and classifying organisms. This can be in a formal setting such as describing new species or the comparative study of the evolutionary relationships between species. Pacific Islanders have over hundreds of years practiced their own vernacular taxonomy where they identify one species from the other based on the shape, colour, distribution (e.g. coastal versus mountain trees) and to some extent the taste and smell.

Traditional taxonomy has helped Pacific Island peoples to colonize and thrive on many of the islands. For example in the atoll of Tarawa, Kiribati, locals are able to distinguish between a very wide diversity of pandanus plants. This information can be linked to food analysis or environmental parameters to aid decision making and show which varieties are nutritionally rich in essential vitamins, which have lower nutritional value, and which are more resistant to salinity changes in light of



expected rises in sea level.

Nowadays in terms of economic development taxonomy is becoming invaluable. With an increased trade throughout the world, the transportation of many species from their native range to newer areas becomes a stark reality. Some of these hitchhiking species can bring disease to the new country or devastate the native environment. For example, invasive ants have colonized many Pacific Islands and in the Solomon Islands, some invasive ant (species) has become naturalized. While the effect of this to Solomon Island communities is not known, the economic implications

Top: Pacific Island entomologists during an SPC invasive ant taxonomy training workshop held at USP. **Above:** Postgraduate students and staff in the biodiversity and conservation research group at USP.



Above: Nutritionally important pandanus fruit comes in many different varieties in atoll states like Tawara – how can we ensure that this diversity which is much needed for human health, survives the environmental changes expected during global climate change?
Right: A threatened Fijian mangrove tree that is used for dying traditional handicrafts.

from trade opportunities are real.

Fast recognition and identification of invasive species is not only important to agriculture and biodiversity conservation but also to other vital economic pursuits such as tourism. For example, in Palau's famous rock islands the unique biodiversity of some inland lakes is currently threatened by an introduced species of anemone. Without the taxonomic knowledge to identify such pests quickly, long-term maintenance of our unique and valuable natural assets becomes unlikely. Our prized biologically diverse habitats such as forests and coral reefs are not only of importance to food generation and cultural activities but also in many locations an essential component of a successful or potential tourism industry. How are we to successfully manage these multiple use areas in light of increasing environmental pressures if we can not identify and in turn understand the life history of its components? How can we evaluate these components if we cannot distinguish between them?

To address the need for taxonomic capacity building a number initiatives have recently taken place that include specialized training of Pacific Islanders. For example, in partnership with NZ Landcare, the SPRH has been utilizing visiting overseas taxonomists to run intensive specialized identification training workshops. In the case of the invasive ants, SPC recently implemented a taxonomic training course with expert assistance from New Zealand Biosecurity and several other overseas taxonomists. This latter training course introduced new modern tools to assist "frontline" Pacific Island nationals to distinguish native ants from non-native species.

Several such user-friendly identification tools are currently being developed both overseas and in regional institutions such as the South Pacific Regional Herbarium. These web accessible tools use high quality visual materials such as photographs and drawings to make comparison of taxonomic features between native and introduced species easier, thus further assisting non-specialist and specialist users alike. Multimedia identification keys for several groups of plants and animals are now currently in production including ants, frogs, molluscs, trees and larval fish. Other keys relating more closely to Pacific Island agricultural problem solving, such as the quick identification of taro pests, have been available to the farming industry for some time (see <http://taropest.sci.qut.edu.au/>).

One key currently being developed at the South Pacific Regional Herbarium in Fiji relates to mangrove species a particularly important floral group because of its close linkage to coastal habitat destruction, traditional usage and an increasing important role in reducing the effects of coastal storm damage.

In recognition of the regional need for increased advanced education and research training in these environmental issues the University of the South Pacific has recently formalized a biodiversity and conservation research group. Postgraduate students within this group have been well supported by several organizations, such as Birdlife International and Massey University, and several students involved with this research group are undertaking taxonomic studies using modern molecular methods in combination with more traditional knowledge. In the future it is hoped that bioinformatics training can also be addressed in partnership with the Pacific Biodiversity Information Forum (PBIF) an organization which is heavily involved with SPREP's regional conservation programs and has contributed in-kind support to PACINET.

Students involved with USP and PACINET have also been provided with on-going mentoring and support from a wide variety of overseas scientists and taxonomists from the United Kingdom, United States of America, New Zealand and Australia. Several of these students have been involved with taxonomy in the context of natural product chemistry and the search for new pharmaceuticals. This area is known to have potential for huge long term financial benefits but it is all a pursuit for which correct identification, an understanding of evolutionary relationships and the collection of accurate field data are imperative.

PACINET and its core supporting organizations have come along way in beginning to address the well recognized global taxonomic impediment. However, now that a solid foundation has been established sustainable funding strategies will need to be found in order to ensure long term delivery of benefits and further strengthen regional self-reliance.

Further information about BioNET-PACINET can be found on the web at <http://www.pbif.org/PACINET/default> or by contacting Marika Tuiwawa of the South Pacific Regional Herbarium at tuiwawa_m@usp.ac.fj

