

PHILIPPINES

Project Title: Responses of the Herpetological and Mammalian Faunas of Negros Island, Philippines to Fragmentation of the Tropical Rain Forest

Study Leader: Dr. Ely Alcala, Siliman University Angelo King Center for Research and Environmental Management (SUAKREM), Philippines

This two-year project in Negros Island has two main activities: survey of mammals and herpetofauna habitat, and networking with community and local government. The following discussion is the partial results of the first year of project implementation on the survey of mammals and herpetofauna habitat.

The study area covers about 344 ha in the southwestern towns of Cauayan, Hinoba-an, and Sipalay in Negros Island, Negros Occidental. It is parceled out into nine fragments, all of which had been logged continuously between 1950 and 1980. A small reforestation area served as a control site. The eight remnants belong to the public forest and are probably the last remaining limestone (hardwood) forests on the Island. The remaining biodiversity in these forest fragments has been surviving there for about 20-30 years following their isolation. The limestone forest fragments contrast with forests studied earlier. These are Mt. Canlaon, Cuernos de Negros and Lake Balinsasayao areas, all of which are volcanic in origin.

The vertebrate fauna of Negros Island is the best studied in terms of systematics and ecology as compared with those from the various larger islands of the Philippines. Scientists associated with Silliman University, in Dumaguete City, Negros Oriental, and their research collaborators abroad, have been conducting research on this group since the 1950s, and a number of scientific papers, monographs and books have been published. The existing information and data serve very well as a baseline for the present study. With the standard methods of sampling applied, the following preliminary data resulted:

Species composition. Some plants belonging to 63 families occurring in Cuernos de Negros and environs and in the forest fragments in Cauayan and Hinoba-an have not been identified as to species level but are listed according to common names. The list is not exhaustive but it shows the difference in the number of plant species between a large area of forest (Cuernos de Negros) and the forest fragments. Cuernos has about 197 species while the fragments have 147 species.

There are 87-88 species of frogs, lizards and snakes

Nature Reserve. A main road with a dense traffic of large vehicles crosses this Reserve. This condition possibly affects the population of Lepidoptera. Another possible reason is the use of light trap during moonlight, wherein light intensity could be less efficient in attracting insects.

Among the cave species of arthropods, Isopoda dominates the collected specimens, followed by Collembola and Crustacea (Shrimps). One of the most interesting findings is the presence in Gua Saripa of a Coleoptera that belongs to the genus *Eustra* (Pausidae). The beetle has been described as a new species of cave beetles from a single specimen collected under rotten bamboo. Two other cave beetles have been described from the Maros Karst: *Mateuis troglobiticus*, which has been collected again in several specimens, and *Speonoterus bedosae*, which is only known from the type locality and not found in the others.

A new species of aquatic isopods (*Cirolana* (*Anopsilana*) *marosina* Botosaneanu) was found during field studies. Botosaneanu qualifies it as the first cave aquatic isopod from Indonesia, and the first cave freshwater Cirolanid from Southeast Asia. This species was found during the first fieldwork in Gua Saripa spring, a remnant pool of the cave stream and in the subterranean river of Gua Assuloang (Balocci). Another probable new record is the *Cyathura* (*Stygocyathura*) *munae* Botansaneanu). It was found in Gua Lamansi, Muna Island, Southeast Sulawesi, a karst cave with more or less brackish water. To date, this is the second Anthurid species from Southeast Asia caves. The first is from Sarawak, Malaysia.

Among the spider species, a giant hunt spider (Arachnida: Sparassidae) was collected and sent to Dr. Peter Jaeger of Germany for further identification. Other collections were initially identified under Heteropoda.

Other species such as the shrimps and crabs were sent to Dr. Peter K.L. Ng of Singapore for identification. Among the interesting species found were the Atyids shrimps, which include highly evolved stygobites (blind, obligate cave aquatic species), and species of a genus still unknown to Southeast Asia.

At present, other species are being sorted and in the process of identification by concerned international institutions.

The conduct of collaborative cave visits is planned in May 2003 with another ARCBC- funded research project team in Thailand, headed by Dr. Chaweevan Hutacharern, Project Leader for the Thailand component. Previously, the Thai team visited some caves in Indonesia with the Indonesia team. ■

recorded from Negros Island (forest area 1.3 million ha), including one species of crocodile and two species of mangrove and estuarine snakes. Of these, 71 species have been recorded from Cuernos de Negros, a volcanic area (forest area 10,000 ha), over a period of 50 years.

Graphically, the data shows that the total number of frog and reptile species in the 10 forest fragments in southwestern Negros taken together is 47, compared with 71 for the Cuernos de Negros area, and 87-88 for the whole Negros Island. The predominantly limestone forest fragments in southwestern Negros with an aggregate area of 367 ha harbor 54% of the Negros Island herpetofauna and 66.2% of the Cuernos de Negros herpetofauna. On the assumption that all of the Cuernos species occurred throughout the Island before the denudation of southwestern Negros, about one-third of the species of frogs and lizards have disappeared from these limestone forest during the past 50 years.

It is possible that this lower species count is the result of the modification of the habitat (Davies *et al* 2001). However, survey results of the species in these fragments may yet be incomplete. It should be noted also that the absence of at least one species of forest frog, *Platymantis dorsalis*, in the Linab forest fragment and in the control man-made forest in Sipalay, was caused by the modified habitat resulting from changes in the physical conditions such as the loss of the closed forest canopy. Apparently in this forest fragment, there were insufficient moisture and forest floor cover for the species. This is in contrast to the presence of the frog in the Canlabac non-limestone forest, which has retained sufficient moisture because of a natural water source and a closed canopy, and in the other six limestone forest fragments.

The present study area differs from Cuernos de Negros in being mainly a limestone forest, the former being a volcanic area. It also lacks large river systems and mangroves, both of which are found in other parts of Negros, and therefore lacks the Philippine crocodile and other species adapted to salty environments. However, it has a unique frog species restricted to the limestone forest in southwestern Negros, the cave frog, *Platymantis spelaeus*.

Species endemism. Philippine endemics constitute 38% of the total herpetological species on the island and 41% of the species on Cuernos de Negros.

Ecological groupings. By grouping herpetological species according to observed preferences, it is possible to show the differences between the species composition in Cuernos de Negros and in the limestone forest fragments. Species of frogs, lizards and snakes are heavily dependent on moist arboreal habitats and moist forest floor habitats in Cuernos de Negros and in the forest



Platymantis dorsalis

fragments. More moisture-dependent species are found in the former site, indicating the role of moisture in species distribution. Furthermore, some species found in the Cuernos de Negros area are absent from the forest fragments because of the lack of suitable microhabitats in the latter.

Population densities of surface and burrowing species

Amphibians. From the 10 forest fragments studied, only four species of frog (*Platymantis dorsalis*, *P. spelaeus*, *Limnonectes visayanus* and *Kaloula conjuncta negrosensis*) were found in the plots. The two species of *Platymantis* co-existed in all limestone forest fragments, except in Linab, where only *P. spelaeus* occurred. The last two species were caught on only one plot and are excluded from this analysis.

Reptiles. Only eight species of burrowing and surface-dwelling reptiles, seven lizards and one snake, were found in the plots in at least three limestone forest fragments. These are the three species of *Brachymeles*, three species of *Sphenomorphus*, one species of *Mabuya*, and the common species of *Ramphotyphlops*. All burrowing and surface species of lizards and snakes had low population density of less than 100 adult individuals per hectare in suitable habitats in three or more limestone forest fragments.

Six other reptile species were rarely found in the plots and only in forest fragments. These were the burrowing lizard *Dibamus argenteus* (one forest fragment), the surface lizard *Mabuya multicarinata* (two forest fragments) and the small burrowing snakes *Calamaria gervaisi iridescens* (two forest fragments), *Oxyrhabdium leporinum visayanum* (two forest fragments), *Pseudorabdion mcnamarae* (one forest fragment) and *Pseudorabdion oxycephalum* (two forest fragments).

Not much data exists on their density in the intact forest on Negros Island (Alcala 1976) and, therefore, in most cases, it is not possible to say that their population density has been reduced as a consequence of forest fragmentation. ■