

# The Philippine Water Bug Inventory Project (PWBIP) and a bibliography for Philippine Nepomorpha, Gerromorpha, and Leptopodomorpha (Insecta: Heteroptera)

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*"Taxonomy is a fascinating branch of biology,  
unique in that it must always be  
retrospective as well as prospective."*

Barry Bolton, 1995

## Abstract

The "Philippine Water Bug Inventory Project" is a research cooperation between scientists of the Museum of Natural History and the Department of Entomology of the University of the Philippines Los Baños, and the Natural History Museum Vienna, Austria. The aim is an inventory of Philippine Nepomorpha, Gerromorpha, and Leptopodomorpha, which includes taxonomic research, zoogeographical analysis of distribution patterns, establishment of a collection of water bugs in the Philippines, and recommendations for nature protection. A bibliography on Philippine water bugs is added.

**Key words:** Philippine Water Bug Inventory Project, Heteroptera, Nepomorpha, Gerromorpha, Leptopodomorpha, research, taxonomy, biogeography, collection, bibliography, Philippines.

## Zusammenfassung

Das "Philippine Water Bug Inventory Project" ist eine wissenschaftliche Zusammenarbeit zwischen dem Museum of Natural History und dem Department of Entomology der University of the Philippines Los Baños sowie dem Naturhistorischen Museum Wien. Forschungsziel ist ein Inventar philippinischer Wasserwanzen (Nepomorpha, Gerromorpha, and Leptopodomorpha), das taxonomische Bearbeitungen, eine zoogeographische Analyse von Verbreitungsmustern, den Aufbau einer Vergleichssammlung auf den Philippinen sowie Empfehlungen für den Naturschutz einschließt. Eine Bibliographie über philippinische Wasserwanzen ist angefügt.

## Introduction

The Philippines remains a rich country: biologists have only hazy notions about how many animal and plant species live here. However, they agree on one point: only a few countries in the world have a similarly high rate of endemism as the Philippines has. Isolated from mainland Asia within the Pacific Ocean, coupled with its island nature (composed of about 7000 islands), the Philippines is unique for its flora and fauna.

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Entomologists are only beginning to study Philippine insects. Described insects are still very few, probably less than 10 % of the actual number. Moved by a strong sense of urgency, entomologists have to race against time to discover and describe them, in the midst of the rapid destruction of the natural habitats, which has probably already resulted in the extinction of many species. Although we suspect that a high percentage of Philippine insects is already extinct, we continue to hope that we can retrieve most of the remaining species before they become extinct, considering that only less than 5 % of the virgin forests remain untouched. We must first discover these unique insects, so we can find ways to protect them. In this regard, an inventory is essential. How do we expect to accomplish this gigantic and enormous task for hundreds of thousands of species? We can only make spot checks within the diversity of insects. One of them is the "Philippine Water Bug Inventory Project", which is a cooperation between scientists of the Museum of Natural History and the Department of Entomology of the University of the Philippines Los Baños, and of the Natural History Museum Vienna, Austria, with participation of specialists from the U.S.A., China, England, and the Netherlands.

### **Why water bugs?**

The water bugs consist of three systematic groups of True Bugs (Hemiptera - Heteroptera): the Nepomorpha (True Water Bugs) living mostly in the water; the Gerromorpha (Water Striders) living mostly on the water surface; and the Leptopodomorpha (Shore Bugs) inhabiting mostly banks and shores. Most species are associated with freshwater, and a minority with the sea (Sea Skaters, Coral Bugs, etc.). While more than 100 described species of water bugs are presently known from the Philippines, we estimated the actual number of species to be higher than 400. Water bugs are an ideal insect group as indicators of the status of aquatic habitats, because they usually occur in good numbers (collection poses no danger to their existence), are easy to sample (rapid accumulation of data), are not too high in species numbers, and often have very distinct habitat preferences. Furthermore, many groups have low migration (dispersal) abilities and therefore exhibit high endemism rates and interesting distribution patterns, which can be compared with the distribution of other Philippine animals. The majority of species is endemic to the Philippines (more than 80 %; this percentage will increase as a result of continuing description of new species). Likewise, a high number of species is endemic to single islands. This is especially true for the running water species, while marine, brackish water, and stagnant water species usually have wide distributions.

### **Goals of PWBIP**

The PWBIP is a basic research project and an exemplary study for biodiversity of Philippine freshwater habitats. It is carried out to give an impression of the diversity of a special insect group in the Philippines. Details of distribution patterns found will be valuable also for the study of other organisms. Furthermore, the study will provide important information on highly endangered freshwater habitats for the purpose of protection and conservation management. Moreover, this effort hopes to foster close collaboration between local and foreign entomologists in efforts to accelerate our understanding of and appreciation for Philippine insects in general and water bugs in particular.

And finally, the project establishes a collection of the studied species in the Museum of Natural History, University of the Philippines Los Baños, to provide Philippine scientists with reference material, especially type material, for future studies.

### Philippine water bug research

Intensive studies on the Philippine water bugs were initially carried out by scientists from the U.S.A. (H.B. Hungerford, R. Matsuda, C.J. Drake, T.W. Porter, I. La Rivers), who worked mainly on the material collected by the expedition of the Field Museum, Chicago, in 1946 - 1947 (for itinerary see HOOGSTRAAL 1951); and by N.M. Andersen (from Copenhagen, Denmark) and I. Lansbury (Oxford, England), who studied the material of the Danish Noona Dan Expedition in 1961. The first over-all study, with descriptions of new species, was published by POLHEMUS & REISEN (1976). Until today, Philippine species were included in several taxonomic revisions by D.A. and J.T. Polhemus (U.S.A.), by P.P. Chen (China), and by N. Nieser (The Netherlands) (see Bibliography).

### Research activities and results of PWBIP

In the seventies and eighties the first author started with more detailed studies, which mainly concentrated on the Mesoveliidae, Ochteridae, and all families of Leptopodomorpha. In 1977 he published a revision of Philippine Ochteridae (GAPUD & SAN VALENTIN 1977); and in 1986 a major contribution to the Philippine water bugs, with a key to all families, to the genera of Saldidae, and to the species of Saldidae, Leptopodidae, and Ochteridae (GAPUD 1986a). Follow-up studies are dedicated to the descriptions of new species (GAPUD 1981, 1986b, 1991). In the eighties he established a close cooperation with J.T. and D.A. Polhemus, who made intensive collections in 1985.

In 1992 the second author spent his holidays in the Philippines. His initial interest in aquatic Heteroptera focused on the Philippine fauna. In 1993 he established cooperation with the Museum of Natural History, University of the Philippines Los Baños. This cooperation was intensified in 1995 through the enthusiastic leadership of A.C. Sumalde, the Director of the Museum of Natural History. The continuous and vigorous support of Dr. Sumalde has facilitated the pace and the success of all efforts of PWBIP. His activities and his understanding demonstrate impressively the general importance of supporting the research done in natural history museums at a high international level.

Initial research activities of the second author mainly concentrated on the family Veliidae, which contains more than one third of all Philippine water bug species. Studies on the genus *Rhagovelia* MAYR, 1865 (ZETTEL 1994b, d, 1995a, 1996) showed that even small islands have endemic stream-inhabiting veliid species. Therefore his field work included islands, which had not been examined before. A similar study on the veliid genus *Pseudovelia* HOBELANDT, 1950, presently carried out by C. Sehnal (Vienna), provides comparable results. Zoogeographical analyses confirm early statements on the Philippine fauna by DICKERSON & al. (1928), but also provide new results on the distribution of species and species complexes. Smaller studies of the second author deal with the families Gerridae (ZETTEL 1994a, c), Notonectidae (ZETTEL 1995b), Aphelocheiridae (ZETTEL 1998c), and Veliidae (LANSBURY & ZETTEL 1997, ZETTEL 1998a, b).

Presently, published results of PWBIP are mostly taxonomically orientated (see Bibliography). However, information on the preferred habitats of species are often included (especially by GAPUD 1986a). The rapidly increasing material of PWBIP and the high number of undescribed species, require the participation of other scientists, who will help by contributing their knowledge of difficult groups. This is also expressed by the articles published in this volume.

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