The Herpetofauna of Panay Island, Philippines—An Illustrated Field Guide


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The Philippines, a country of incredible biodiversity and high levels of vertebrate endemism, spans the area between the Sunda-land-Eurasian and Philippine Sea plates (Brown and Diesmos 2009). Beginning in the Mesozoic, various geological processes shaped the distribution of land, including the collision of sea plates, strike-slip fault formation, and volcanic activity (Dimalanta and Yumul 2004; Rangin 1990; Yumul et al. 2003, 2009). In addition to the geological processes that created the island arc system, Pleistocene sea level fluctuations have caused repeated and dramatic changes in the size and connectivity of islands (Hall 1996, 1998; Heaney 1986; Karns et al. 2000; Rohling et al. 1998; Siddal et al. 2003), creating an excellent model for a wide variety of systematic and evolutionary studies. Although processes of diversification in the archipelago are quite dynamic, biodiversity in general is partitioned across several major faunal regions corresponding to historically connected island platforms recognized as Pleistocene aggregate island complexes (PAICs: Brown and Diesmos 2002, 2009). Within the Visayan, or central Philippine, PAIC lies the island of Panay.

As many of the seminal works describing Philippine amphibians and reptiles are decades old (e.g., Brown and Alcala 1978, 1980; Inger 1954), new field guides integrating what we now know of the Philippine herpetofauna have the potential to become immediate reference tools. Maren Gaulke is among the most active researchers focused on understanding the diversity of amphibians and reptiles in the Philippines. With a long-term research program based on the northwest peninsula of Panay, Gaulke is ideally suited for such a review of the island’s herpetofauna. An elegant preface by Wolfgang Böhme sets the stage for what will surely serve as a broadly used reference for students and researchers alike interested in Philippine biodiversity, particularly amphibians and reptiles. The book has numerous strengths, from descriptive accounts, an identification key, and an incredible number of photographs, to its physically manageable size as a working reference tool that can easily be carried into the field. Although the book falls short of being comprehensive in several respects, it still represents an excellent contribution to our understanding of the amphibians and reptiles of the western Visayas.

Throughout nine introductory chapters, Gaulke provides brief, but suitable, summaries of Philippine geography, climate, geology, zoogeography and biodiversity, flora, fauna, conservation, and legislation as it pertains to the country’s biodiversity. As the focus of this work specifically deals with the herpetofauna of Panay Island in the central Philippines, the brevity of these first few chapters on these subjects will provide many readers with an appropriate first introduction to the material. Those looking for a definitive, thorough reference on any one of these topics will likely discover they must supplement the summary information with external sources. Two examples of this pertain to summaries of Philippine geology and zoogeography and biodiversity. First, a number of recent studies on the geologic history of the Philippines unfortunately are missing from the book. Discussion of two studies in particular that summarize the geologic origins of Panay Island, as well as the unique origins of the northwest peninsula of Panay, or the Buruanga Peninsula, would have increased greatly the breadth of the chapter on Philippine geology (Zamoros and Matsuoka 2004; Zamoros et al. 2008). Additionally, the summary of Philippine zoogeography and biodiversity may be viewed as an overly simplified introduction to the unique and dynamic patterns of faunal partitioning across the archipelago. Gaulke does summarize how faunal demarcations in the Philippines have traditionally been explained by the geography of Pleistocene aggregate island complexes (PAICs: Brown and Diesmos 2002, 2009; Heaney 1985; Heaney et al. 1998, 2005), and highlights how recent studies have indicated diversification in the Philippines likely is more complicated. However, over the last decade alone, the results of a large number of studies on diversification patterns in the Philippines have created fertile ground for a thorough review on this topic. Unfortunately, much of this literature is absent from the book. Regardless of these few shortcomings, the first nine summary chapters provide a sound introduction to major topics concerning the study and conservation of Philippine biodiversity.

The book represents a substantial source of literature references with 192 citations, compared with the 104 references cited in the previously published herpetofaunal study of Panay Island (Ferner et al. 2000). Although a more comprehensive approach to incorporating relevant literature may have been taken, with the inclusion of more in-depth comparisons to what is known of the amphibian and reptile diversity in other regions of the Philippines, the book provides an excellent, focused account of Panay’s herpetofauna. Furthermore, with 258 figures, Gaulke provides an incredible photographic account of the diversity of Panay’s amphibians and reptiles. A methodology chapter details the methods followed to develop taxonomic accounts and various sections of the book. Species accounts are arranged by Linnaean rank and alphabetical order within families. Throughout the last sections of the book, Gaulke summarizes doubtful Panay records and useful information concerning snakes and the few venomous species known from the island. Additionally, two tables provide a simplified summary of species habitat preferences and faunal comparisons to other sub-provinces.

In general, the accounts provide an excellent overview of each representative species. Each account references the authoritative publication for the focal species, and provides information on etymology, description, habitat, biology, and distribution. Additional taxonomic notes and specific literature references are provided for select accounts. Although minor errors in format, spelling, and grammar exist, Gaulke has done an excellent job of keeping these few in number. Missing in species accounts are diagnosis sections, references to vouchered, museum specimens, and IUCN criteria-based conservation

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assessments. Although Gaulke provides a general description of each referenced species, a brief paragraph providing a diagnostic account would have greatly strengthened the practical applications of this book as a complete field guide and reference source. Additionally, Gaulke provides no reference to Panay Island collections housed in many large, reputable museums around the world. Significant collections from Panay Island exist at the University of Kansas Natural History Museum (KU), the Texas Natural History Collections (TNHC), California Academy of Sciences (CAS), Field Museum of Natural History (FMNH), National Museum of the Philippines (PNM), and the Cincinnati Museum of Natural History (CMNH). Finally, the impact of this work on conservation efforts in the Philippines would have been greatly improved if the author evaluated each species against the International Union for Conservation of Nature (IUCN) criteria for classification.

A resurgence of research focused on the herpetofauna of the Philippines has taken place during the last decade, and the incorporation of genetic data into studies of biodiversity has resulted in continual changes to accepted taxonomy within the region. Although many of these changes create greater taxonomic stability, it makes it difficult for any large-scale endeavor, such as this book, to present updated, recognized taxonomic nomenclature at the time of publication. Gaulke explains this issue in the book’s methodology. Several key taxonomic changes have taken place since the publication of the book. A portion of the genus *Sphenomorphus* has been systematically revised as a result of a recent phylogenetic study (Linkem et al. 2011) resulting in the following taxonomic changes to several Philippine species: 1) *Sphenomorphus abdictus*, *S. llanosii*, *S. coxi*, and *S. jagori* are now recognized to be members of a newly described genus *Pitoyoscincus*; 2) *S. arbores* is now recognized to be a member of the resurrected genus *Insulasaurus* Taylor, 1922; and 3) *S. steerei* is now recognized to be a member of the genus *Pitoyoscincus* Brown and Greer, 1997. As a result of other recent studies, species of the genus *Zaocys* are now recognized as members of the genus *Pitoyoscincus* (David et al. 2011). Finally, a large-scale revision of Philippine Slender Skinks (genus *Brachymeles*) resulted in the elevation of *Brachymeles boulengeri taylori* to full species status (B. *taylori* Brown, 1956; Siler and Brown 2010).

With the availability of high resolution, topographic maps of the Philippines, it is disappointing that more detailed sampling and species distribution information is not available throughout the book. Although it is clear that Gaulke has been involved in biodiversity surveys across much of Panay Island and its surrounding islets, the description of survey sites remains vague, and no specific reference is made to exact localities throughout the island. Unfortunately, this makes it difficult to: 1) draw comparisons between species accounts presented in this book and previous faunal inventories that documented species’ distributions across georeferenced sites (Ferner et al. 2000); and 2) evaluate survey efforts across this geographically complex island, leaving the research community in the dark as to where regional gaps remain in our understanding of the Panay herpetofauna. Additionally, with such a rich history of biodiversity research on Panay Island, it is surprising that the author chose not to provide distribution maps for each species. These visual details would have been useful to local government units, students, and researchers.

Gaulke provides several nice line drawings to assist readers in understanding key morphological characters discussed in the book. These include figures showing labeled head scales, body scales, and scale counts for snakes (figs. 15, 16), figures showing an unlabeled dorsal view of the head of a skink and illustrations of morphologically distinct gekkonid digits, respectively (figs. 17, 18), and a figure showing an unlabeled, lateral view of the head of *Parvoscincus sisoni* (fig. 137). However, the book does not provide any additional diagnostic figures that would assist readers in understanding the many different morphological features used to diagnose species. This is surprising considering the number of illustrations that are present in the scientific literature for species of amphibians and reptiles in the Philippines. Basic diagnostic illustrations defining key characters for frogs, lizards and snakes would have added greatly to the educational value of the book; however, without these visual references, readers still will be forced to refer to external literature when needing to explore key diagnostic features of Panay’s amphibians and reptiles.

The book contains many wonderful photographs of vertebrate species from Panay Island, from beautiful, full-page photographs of the frugivorous monitor lizard *Varanus mabitang*, to close-up views of the Rufous-headed Hornbill *Aceros waldeni* and the Philippine sailfin lizard *Hydrosaurus pastulatus*. Additionally, Gaulke provides a nice series of developmental photographs, including pictures of foam nests of the arboreal frog *Polyedepes leucomystax*, tadpoles of two genera, *Kaloula* and *Rhabophorus*, hatching and juvenile lizards of 16 genera, and lizard eggs of species of *Gonocephalus*, *Gekko*, and *Eutropis*. Although a number of pictures provide a summary of the general habitat types found on the island, more detailed photographs of the many microhabitats preferred by focal species are missing from the book.

In summary, the book provides a sound, thorough reference tool to tourists, wildlife units of the government, students, and researchers. Unfortunately, in several respects, the work falls short of being truly comprehensive; however, this will not keep readers at all levels of interest from finding valuable data, photographs, and background information on the unique herpetofauna of Panay Island. I have no doubt that this book will immediately become a widely used field guide, reference tool, and cited work.

**Literature Cited**


Many books have been written on marine turtle biology, but this book is an exceptional one with its catchy and narrative style. Interesting stories make this book fun to read, even for those whose primary interest are not chelonian. Further, the accessible language makes the book suitable both for non-specialists and for those for whom English is a second language. The book comprises 15 sections which are accompanied by 12 color photos grouped near the middle of the volume.

The book starts with some general information about marine turtle biology. In most of the remainder of the book, noted sea turtle specialist Jim Spotila tells stories about his past experiences with marine turtles, especially leatherbacks. In doing so he also weaves in information about the pioneering researchers of marine turtle studies throughout the world. This information is especially useful for the younger generation of marine turtle biologists. The book summarizes global problems that threaten sea turtle survival and highlights some conservation actions that help to preserve their future generations.

Spotila’s stories include some based on work carried out with his former students and he even recounts some stories about non-marine turtles. A particularly engaging story describes the rescue of a European family during field work and another interesting anecdote concerned meeting the sailor who was famously photographed for Life Magazine when he kissed a nurse in Times Square in August 1945. In addition to these there are also success stories of long-term conservation actions such as the implementation of TEDs (Turtle Excluder Devices) in the USA, which took almost 30 years, and the ongoing struggles with the Costa Rican government over the management of a national park. The most intriguing part of the book is the innovative approach of the leatherback team to raise money for the turtle conservation; they used the satellite tagged turtles for a sponsored turtle race—excellent idea!

Although the book is thoroughly enjoyable, there are some minor issues I would like to mention. The author states that Archelon is responsible for the conservation of marine turtles in the Mediterranean. However, this entity is responsible for the conservation and monitoring of marine turtles only in Greece.