

occupy, as they range from coral reefs to rocky escarpments and alpine woodlands. A variety of good images of these habitats is provided. Next is identification of snakes and some color photographs showing the different head shapes of typhlopids, along with a python and an elapid snake that are used to demonstrate scalation. Individual scales are highlighted with a key to these diagrams and also how to count mid-body scale rows. Line drawings traditionally have been used to illustrate scalation, but the provision of a color photograph with individual scales highlighted, as in this case, is just as effective.

The following page explains how to use the book and mentions that the taxonomy follows Cogger's (2019) *Reptiles and Amphibians of Australia*, with the exception of the addition of newly described taxa. Here, the authors explain that the book is designed to provide up-to-date information on each of Australia's snakes. This section is meant as an introductory guide for assisting in identification. In many cases, key points of reference to separate species from an individual's nearest relatives are provided. This page also explains the distribution key used for different states and other areas of Australia. A mention of the different potential danger rankings for different groups of venomous snakes is listed here as well. The next few pages contain a useful glossary.

From here the book moves into the species accounts with a small discussion about the family preceding the species information. The species accounts take up the bulk of the book (pp. 17–163) and average about two species per page with an accompanying photograph. Each account contains a description, distribution, habitat and habits and a potential danger ranking. Good useful information is provided in each of these categories. It is usual for field guides to have a distribution map for each species; I would have liked to see these included, but were probably considered beyond the constraints of the book.

In keeping with most field guides, dichotomous keys are not provided and the identification of many species relies on the use of a good photographic image, scale counts, distribution, scale conditions and sometimes internal organ position. Both species and subspecies are given their own entries. Subspecies are clearly identified by the additional subspecific name in the entry's heading. The species accounts describe in detail two species of file snakes, 18 pythons, 7 colubrids (including introduced species), 119 terrestrial elapids, 36 marine elapids, 5 mangrove snakes, and 48 blind snakes. Although it is technically correct to list marine and terrestrial elapids together alphabetically, I prefer these two groups treated separately for easier comparison. The last few pages contain a complete checklist of the snakes of Australia and in which states they occur. An IUCN conservation rating also is applied to each species.

This book is a comprehensive guide to the Australian snake fauna. It is designed as a field guide (180 × 125 mm) with soft covers, glued binding, and semi-gloss paper. It will appeal to field naturalists, bushwalkers, and serious herpetologists, and should be included in the library of anyone with an interest in Australian snakes.

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COGGER, H. G. 2019. *Reptiles & Amphibians of Australia*. Updated Seventh Edition. CSIRO Publishing, Collingwood, Victoria, Australia. 1080 pp.

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Identification Guide. Amphibians & Reptiles of South Tanintharyi

George R. Zug and Daniel G. Mulcahy. 2019. *Fauna & Flora International – Myanmar Programme*, Yangon. 202 pp. Free e-book downloads from https://www.researchgate.net/publication/342703728_Identification_Guide_Amphibians_Reptiles_of_South_Tanintharyi. ISBN 978-99971-0-751-0.

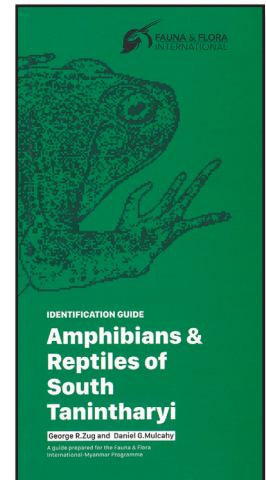
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Myanmar, renamed from Burma in 1989 by its military rulers, is a mid-sized (676,575 km², or about twice the size of Italy) Southeast Asian nation, and the northern-most member of the mostly cohesive group of countries known as ASEAN (the Association of Southeast Asian Nations). Having joined the global economy only in the late 1990s, it remains an entrant in regional cooperation blocks and world bodies in terms of development, despite the fact that the first non-Scandinavian Secretary General of the United Nations, U Thant (1909–1974), was from Burma.

It would be an understatement to refer to the herpetofauna of Myanmar as poorly understood. In fact, the most recent herpetological publications for the country, prior to the engagement of the United States National Museum (USNM) in 1997 (see Zug et al. 1998), were scarce works published after World War II, such as Hundley (1964); to this day, the syntheses of Theobald (1868) and especially the three-volume compilation of Smith (1931, 1935, 1943) continue to be cited. Modern research (apart from reviews based on the literature or museum specimens, e.g., Dowling and Jenner 1988) began with the studies by George Zug, Emeritus Curator of the USNM, and his colleagues from that institution and associates from the California Academy of Sciences. This research has led to species descriptions and faunal revisions (Slowinski et al. 2001), range extensions (Lee et al. 2015, 2019; Platt et al. 2018; Wogan et al. 2008), collection of genetic material in support of future studies (Mulcahy et al. 2018), and the production of resources valuable for health and medicine (Leviton et al. 2003).

The current work, published by Flora and Fauna International (FFI) Myanmar Programme, stems from the field research by Zug and his colleague, Dan Mulcahy, of the Global Genome Initiative, a specialist on analytical laboratory procedures and quality assessment of genomic collections. Mulcahy joined the herpetological surveys in southern Tanintharyi in 2014 to assist the FFI, primarily to convince the government to establish two national parks. In the succeeding three years (2015–2017), he was assisted by the faculty and students of Myeik University to prepare inventories of the region. Thus, in a way, the book can be considered a product of citizen science. Notably, it was submitted for publication in 2019 and published in the latter part of the



year. The volume is of dimensions 10.2 x 20 cm, good for the hip pocket. Extensive use in the field may necessitate a second copy for retention in the library as a 'pristine' version, since the information, images, and descriptions contained within make it suitable for use in adjacent northeast India, Thailand, and the Indo-Chinese nations.

Readers of this review may wish to consult a map to see the area covered by the guide, which spans the southern-most tip of Myanmar's west coast where it extends well into the narrow isthmus that is shared with Thailand, reaching the Isthmus of Kra. This is an important location and generally considered the transition of the Indo-China and Indo-Malaya (or Sundaland) biogeographical subrealms. The fauna is, as expected, an admixture of both, although dominated by Indo-Malayan rather than Indo-Chinese species. Certain species (*Crocodylus siamensis* and *Tomistoma schlegelii*) that are not (yet) known from Myanmar have been included in the guide, and the natural history of some species appears different from what is known elsewhere (such as the semiaquatic habits of *Heosemys spinosa*).

The book begins with a brief table of contents. As one flips open the front cover, the title page of the book is missing (at least the title is on the cover), and information that would normally be contained on the credit page of standard works is presented in an abbreviated form on the back-cover. The initial text includes a page and half of Preface (plus a locator map), two pages of general introduction including the organization of the book and caveats, a three-page table of technical words (morphological or positional terms that may be daunting for the intended audience (students, laypersons, and ecotourists), and a page showing illustrations of features relevant to frog morphology, with text captions on the opposite page. The next 48 pages are devoted to amphibians, including short descriptions of two caecilians and 48 frog species. About half of these (24 species, all frogs) are illustrated via a thumbnail image, and are grouped by family, with all plates placed in the middle of the book. The section starts with a glossary of terms unique to amphibians and continues with species accounts, comprising scientific name, authority with date, a recommended English common name, adult size and body proportions if known, brief diagnoses and coloration, and ecological notes (chiefly, habitats, distribution, and other comments). The dichotomous keys and clear line drawings, placed before the species descriptions, increase the usefulness of the guide. Image quality is good and reproduction is fair, considering the dimensions of the work and the space allocated to each species, and photos of several rarely-seen (presumably of topotypical individuals) species are reproduced, including *Ansonia thinthinae*, *Ingerana tenasserimensis*, and *Amolops panha*. The section on reptiles begins after 20 intervening pages that include 19 color plates. The format of this section follows the section on amphibians, with a glossary of technical terms, a key to the major lineages, and the species accounts within each group, totaling 94 pages. The line illustrations (e.g., of head scale patterns) are recognizable as originating from the Malcolm Smith monographs.

The taxonomy is up-to-date for the time the work went to press in early 2019; one small issue is the authority of *Cuora amboinensis* Riche in Daudin, 1801. Geographical ranges of a few species are wider than depicted (e.g., *Heosemys grandis*, *Manouria emys*, *Amyda cartilaginea*, and *Crocodylus siamensis*), mostly missing northern or southern records. In some instances, the authors' intention was clearly to discuss regional records (e.g., *Python brongersmai* and *Calloselasma rhodostoma*). For a

few species (such as *Naja kaouthia*, *Ophiophagus hannah*, *Pareas carinatus*, and *Argyrophis diardii*), geographical distributions are not provided. I could not detect any major typos. Images of rare species I enjoyed seeing were of *Bronchocela burmana*, *Cyrtodactylus lenya*, *Homalopsis semizonatus*, and *Cylindrophis burmanus*.

Following the species accounts are the acknowledgments, sources of textual information and figures, and finally, an index of common (English) and scientific names. A page on first-aid following snake-bites would have been a valuable addition to this field guide, with a note on appropriate antivenom serum and locations of relevant centers in the country where patients suffering from snake envenomation could receive emergency care.

Recent books covering the herpetofauna of Myanmar have been the work of local or international NGOs, such as this volume (also see Win Maung and Win Ko Ko 2002; Platt et al. 2014); perhaps international publishers don't see a large local market. I have found Myanmar to be a nation of avid readers of English books, with second-hand books or even photocopies of all genre of literature offered for sale on the streets of Yangon, including many rare first editions. Works such as this by Zug and Mulcahy, therefore, are not only useful for citizen scientists and biologists outside the country, but likely to be in demand locally. Flora and Fauna International and the authors are to be credited for making the book available in both electronic (available for free) and hardcopies (limited distribution – availability unknown at this time) to the citizens of Myanmar and of the world.

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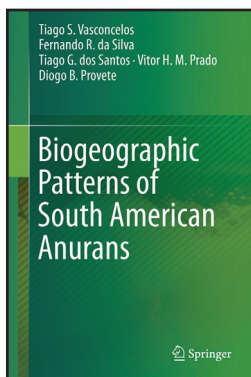
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Biogeographic Patterns of South American Anurans

Tiago S. Vasconcelos, Fernando R. da Silva, Tiago G. dos Santos, Vitor H. M. Prado, and Diogo B. Provete. 2019. Springer Nature, Cham, Switzerland (<https://www.springer.com>). 155 pp. 3 black & white illustrations, 13 illustrations in color. Hardcover. €124.70 (ca. US \$146.50). Softcover €88.39 (ca. US \$103.85). Ebook €96.29 (ca. US \$113.10). ISBN: 978-3-030-26295-2 (Hardcover).



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When I received my e-book review copy of *Biogeographic Patterns of South American Anurans*, the first thing that came to my mind as a Herpetology

Reader at a local South American University was—“I have to read it,”—referring to all 149 pages (okay, almost half of the book is a species list [pp. 12–74], but after all, we are talking about South America where there are so many species). The book contains seven significant and scientifically important chapters comprising an overview of South American anuran biogeographic patterns, a topic that has rarely been offered to specialized readers. At the end (Chapter 7), of course, was my favorite chapter, where the authors include a nice discussion of prioritized areas for anuran spatial conservation in South America. With this book, the authors have provided a highly relevant and quality publication on this subject and region,

focusing particularly on the last two decades of research, with well-written summaries of current issues and hypotheses suitable for herpetologists as well as others interested in South American biogeography. This is the kind of book I have always wanted to have available to my students in their herpetology lectures and discussions every year. Now we have one.

The book begins with a necessary though brief Foreword that provides an historical update on the literature since the last time anuran biogeographic patterns were considered in depth (Duellman 1999). The Foreword notes that the authors have documented and mapped different components of anuran diversity, such as phylogenetic diversity and several other metrics of functional diversity, and that they explore evolutionary and ecological processes and set priority areas for conservation to maintain the diversity of anurans on the continent.

The Foreword is followed by a Preface in which the authors demonstrate their commitment and passion for the efforts they have undertaken in writing this publication, and of course their gratitude for all the people and institutions that have helped them achieve their goals. The pre-text material is completed with a concise and useful table of contents. Abstracts are included within each chapter, but are not mentioned in the table of contents.

With regard to the overall framework of this publication, I would emphasize three important points: 1) the novel and precise maps; 2) the comprehensive and robust data analysis; and 3) the thoughtful discussions. The book is composed of seven chapters, each of which effectively subdivides the topic at hand into a format that includes an Abstract, Introduction, Methods, Results, Discussion, and important references. The book assembles a comprehensive and well-documented overview of lissamphibian biology, as well as associated topics in biogeography, phylogenetics, ecology, and conservation biology into a single volume. A complete and very useful Index follows the chapters at the end of the book.

As a university lecturer, Chapter 1 (An Introduction to the Biogeography of South American Anurans) will become a “must read” assignment for my undergraduate herpetology class next term. This introductory chapter is short but comprehensive, and it provides a necessary overview on the subject to form a foundation for understanding the remaining material. This chapter takes readers on a more than 200 million year journey through geological and evolutionary history, then brings them forward to recent times and shows how dramatic changes to our physical environment have resulted in such a diverse and well represented anuran fauna throughout the southern continental Neotropics. Further, the chapter offers the reader an overview of the methodology used to document the South American anuran species richness, which in turn leads to the various authors’ conclusions in later chapters.

Chapter 2 (South American Anurans: Species Diversity and Description Trends Through Time and Space) reviews the history of the discovery of anuran species richness in South America, a chapter that is quite well documented. The chapter includes a review of how researchers from the international scientific community described hundreds of species over the centuries. This combined effort led to the first well-documented biogeographic summary, covering more than 1600 species (Duellman 1999), and eventually to the 2600 anuran species currently known from the region. This chapter shines light on the major historical contributions to the field, while