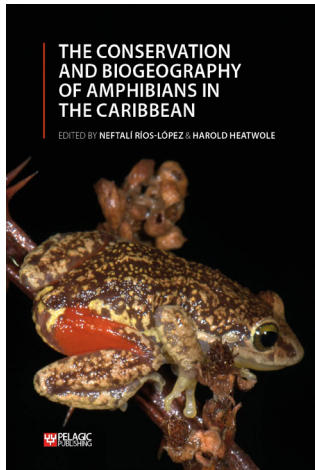


# The Conservation and Biogeography of Amphibians in the Caribbean

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The ‘Amphibian Biology’ series was initiated in 1994, with a mission to publish volumes that provide detailed, contemporary accounts of work in different areas of the subject. The first eight volumes therefore covered topics such as social behaviour, palaeontology, endocrinology and disease. From volume 9 onwards the series has focused more on conservation aspects and regional accounts. The series has had its ups and

downs and has had more than one publisher, but with Harold Heatwole leading the editing of every volume, a high standard of quality and consistency in approach has been maintained throughout. Volume 9 of the series - of which this book is part 5 - focuses on the “Status of Decline of Amphibians: Western Hemisphere”. In producing this Caribbean volume the two editors have assembled some 29 contributors - drawn from across the Caribbean, North and South America and Europe - to assist them with the task.

After a dedication of the book to Stephen Blair Hedges, whose research on Caribbean amphibians is nudging some 300 publications, Professor Heatwole outlines the scope of the volume in a preface, summarising ongoing efforts to update the IUCN Red List status of the species in the region. He points out that the book goes a little beyond the Caribbean *sensu stricto*, as it includes the Bahamas and Turks and Caicos Islands, as well as some small islands close to the coasts of South and Central America.

The first chapter of the book is co-authored by the editors and provides an overview of insular biogeography and ecology. Building on the classical MacArthur and Wilson theory of island biogeography, this chapter takes the reader on a scientific and historical journey through the theories that have been developed since. Although neither explicitly about the Caribbean or amphibians, this opening chapter provides a comprehensive and up-to-date account of the ideas that have framed the work of subsequent chapters. The acknowledgements provide an intriguing personal perspective from Heatwole about his relationships with Robert MacArthur, E.O. Wilson and Richard Levins at the ground-breaking time of the 1960s and 1970s.

Chapters 2–13 provide accounts of the status and distribution of amphibians in different regions of the Caribbean. The larger islands, such as Cuba, Jamaica, and Trinidad and Tobago get dedicated chapters, while others, such as those comprising the Lesser Antilles are dealt with collectively in individual chapters. As the book runs to over 600 pages, it is difficult to provide a detailed review of each individual chapter, so some highlights will be presented here.

In Cuba, the amphibians have a higher level of endemism (95%) than reptiles, mammals and birds, with the number of frog species exceeded only on the island of Hispaniola. Indeed, Hispaniola is dealt with in two separate chapters focusing on the two countries it comprises – Haiti to the west and the Dominican Republic to the east. *Eleutherodactylus* has radiated into many endemic species across the Caribbean islands, with 17 species within the genus endemic to Haiti alone. In contrast, the much smaller islands that form the arc of the Lesser Antilles are relatively depauperate in terms of amphibians. Here just 47 out of several hundred islands contain amphibians, with the fauna comprising a mere ten native and six non-native species. The difficulty of colonising such small, often inhospitable habitats across saltwater is flagged as a driver of this pattern. *Eleutherodactylus johnstonei* plays an intriguing role in this story. In Chapter 9, Robert Powell and Robert Henderson describe this species as “the anuran version of a weed”. Interestingly, the type specimen of *E. johnstonei* is from Grenada, yet it was introduced there from Barbados, which itself has a non-native population dating from about 1885. One of the reasons this species is so widespread across the region is its ability to capitalise on human initiatives to increase water supplies and irrigate what is an otherwise dry landscape. Cisterns, ornamental pools and ponds on golf courses can all support buoyant populations of this species. I can attest to this personally, as having stayed on an island where the only water supply was a rain-filled water tank, each bucket needed to be checked carefully for frogs before transferring the contents to the kettle or shower!

All of the chapters provide historical accounts of progress in the discovery of the species found on the island (or group of islands), along with taxonomic information and debates, distribution, climate, threats and conservation interventions. Several chapters discuss the role that captive breeding can play in the conservation of the species of the region. Indeed, some captive programmes, such as that for the Puerto Rican crested toad *Peltophryne lemur* have

been at the forefront of the field in developing in vitro fertilisation, cryopreservation of sperm and eggs, and wider assisted reproductive technologies.

A common theme running through the book is the complexity of threats facing amphibians of the region. Although the threats are well-known and certainly not confined to the Caribbean (i.e. habitat loss and fragmentation, introduced species, overexploitation, pollution, climate change and disease), there are clearly pockets of research that deserve further exploration. For example, an appendix to Chapter 8 that deals with Puerto Rico and the Virgin Isles provides a critical review of the evidence that the mongoose has had on amphibians. Intriguingly, the conclusion is that this non-native predator may not deserve the reputation that it has historically received. Earlier on in the same chapter, the authors highlight the importance of scrutinising “old literature” to provide context for the current distribution and status. In fact, what is clear from the book is that the whole of the Caribbean has a long history of herpetological research. Given the biological and geographical diversity of the region, the Caribbean has proved irresistible as a natural laboratory for exploring evolutionary patterns and processes. This book is as much about how that work has progressed over many decades as it is about describing present-day status and distribution.

Frogs of the genus *Eleutherodactylus* are not the only taxa to have been widely transported around the islands by human agency. As in other parts of the world, cane toads *Rhinella marina* have been introduced for pest control, and American bullfrogs *Lithobates catesbeianus* for commercial and aquaculture purposes: both species are considered by IUCN to be among the world’s top 100 most invasive species. As its scientific name implies, the cane toad is tolerant of saltwater and able to swim short distances between islands. One of the more unusual arrivals was a fire salamander *Salamandra salamandra* that arrived in a plastic box of salad shipped from France to St Barthélemy in 2012. It died a couple of days after its discovery.

Pelagic Publishing is a growing publisher with a strong portfolio of quality herpetological books. It is therefore reassuring to see the ‘Amphibian Biology’ series firmly homed within this stable. ‘The Conservation and Biogeography of Amphibians in the Caribbean’ is a bulky volume, and although £120 may seem quite expensive, this is now standard for a scholarly book of this quality and size. Indeed, the standard of production is high. All of the photographs, maps and figures are reproduced in colour and the tables are clearly laid out. Although I reviewed the hardback copy, the book is also available as a PDF and e-book, which might suit researchers who have limits on luggage yet need this book for fieldwork. The book is comprehensively referenced throughout and includes a glossary and separate subject and taxonomic indices. This is likely to remain the standard reference volume for those undertaking research on amphibians in the Caribbean for some time to come, but it will also be of interest to those wishing to explore the rich herpetological history of the region.

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