

A Savage Approach to Tropical Biology

Ecology and Evolution in the Tropics: A Herpetological Perspective. Maureen A. Donnelly, Brian I. Crother, Craig Guyer, Marvalee H. Wake, and Mary E. White, eds. University of Chicago Press, Chicago, 2005. 584 pp., illus. \$45.00 (ISBN 0226156583 paper).

I've never been a fan of hero worship. I don't even take the day off on Presidents' Day. But in the case of this particular Festschrift, which honors biologist Jay M. Savage, I concede that the cause is awfully compelling. Renowned tropical ecologist and biogeographer, herpetological systematist, and accomplished university administrator, Savage has published more than 200 scholarly papers and three books. His 2002 book, *The Amphibians and Reptiles of Costa Rica: A Herpetofauna between Two Continents between Two Seas*, is regarded already as the definitive summary of Costa Rican herpetology and a benchmark of quality against which all future faunal treatments will be measured. The recipient of numerous distinguished awards for academic achievement and international service in promoting the study of tropical biology (among other things, he helped found OTS—the Organization for Tropical Studies—in 1963), Savage also served as major professor for 39 PhD and 25 MS students.

Clearly, there is a lot of raw material here to work with, and workers to process it. The result is the volume *Ecology and Evolution in the Tropics: A Herpetological Perspective*, edited by five of Savage's former students (Maureen A. Donnelly, Brian I. Crother, Craig Guyer, Marvalee H. Wake, and Mary E. White) and comprising most of the presentations at a symposium convened in his honor at the 2000 joint meeting of the American Society of Ichthyologists and Herpetologists, the Society for the Study of Amphibians and Reptiles, and the Herpetologists' League in La Paz, Baja California, Mexico.

The 18 chapters are organized in two parts: "Evolution and Biogeography" and "Ecology, Biogeography, and Faunal Studies." There is also a foreword by Luis Diego Gómez, former director of Costa Rica's Wilson Botanical Garden and Las Cruces Biological Station, and founding member of that country's National Academy of Sciences (which in 1998 inducted Savage as an honorary member in recognition of his contributions to the scientific development of Costa Rica and his role in establishing OTS). The chapter authors, all of whom are former students of Savage or their collaborators, range from newly minted PhDs to prominent senior scientists. Savage himself coauthored one chapter. As is typical of University of Chicago Press products, the volume is carefully produced. Literature citations are not included in individual chapters but instead are gathered together in a single references section at the end of the book, along with a list of contributors and extensive subject and taxonomic indices. There are numerous black-and-white illustrations, although for the most part these are graphs, histograms, cladograms, or distribution maps. There are relatively few images of organisms, or indeed photographs of any kind. Color photographs are confined to the chapter by Scott and Aquino, which includes four plates that depict frogs of the Paraguayan Chaco. Presumably the paucity of color illustrations reflects at least in part a desire to keep the volume affordable; the cloth edition can be had for under a hundred dollars, and the paper edition costs less than half that.

Individual chapters vary considerably in their breadth and level of detail. Thus, whereas Emerson provides a concise (11 pages) yet very effective overview of the physiology of sexual dimorphism in Old and New World frogs, McDiarmid and Donnelly provide a comprehensive (100 pages) review of the herpetofauna of the Guayana highlands, focusing on the complex of tabletop mountains and other isolated massifs (*Pantepui*) that evince

extreme floral and faunal endemism. More than half of the latter chapter is occupied by five lengthy appendices that identify individual tepuis (flat-topped, sheer-walled mountains) as well as their plant formations, herpetofauna, and history of exploration. Each chapter stars amphibians and reptiles of one sort or another, mostly tropical frogs, lizards, snakes, salamanders, or caecilians, and primarily from the New World; one notable exception is Bickford's report on frog monitoring in Papua New Guinea. Topics range from food habits to karyology, and from biotic surveys to the molecular systematics. Several chapters address similar topics, such as neotropical biogeography, but I was surprised at how little such chapters have to do with one another, insofar as they rarely evaluate or even cite each other's data or conclusions. Kluge's chapter proposing a new phylogenetic system of taxonomy is the most synthetic and in many ways the most impressive and ambitious chapter in the volume; it may outlast all other contributions. Unfortunately, it's also the most incomprehensible of the 18 treatments and is likely to defeat all but the most committed and dedicated—and jargon-hungry—phylogenetic systematists.

The predicaments of and prospects for the world's natural populations of reptiles and, especially, amphibians today are much different from when an innocent young assistant professor named Jay Savage made his first collecting trip to Costa Rica more than 40 years ago. The serious plight of global amphibian populations has been convincingly documented and is now widely accepted, less than 20 years since "declining amphibians" were first brought to the world's attention (Wake 1991, Stuart et al. 2004, Mendelson et al. 2006). Indeed, it's astonishing how quickly we have adjusted to this harsh reality. Declines and even disappearances affecting many species are routinely discussed as a matter of fact. In this light, those chapters that in-

ventory faunal assemblages and population trends from once intact or even "pristine" sites are both immensely valuable and poignant. Perhaps the most stirring example is McDiarmid and Savage's firsthand account of the herpetofauna of Costa Rica's Osa Peninsula and their descriptions of how this region has changed over the course of their study: "At the present rate of cutting and development, within the first two decades of this century nearly all of the Central American humid lowland evergreen forest habitats, products of millions of years of evolution, seem certain of destruction" (p. 366). And later, "Most of the forests in which our work was accomplished have been cut" (p. 413).

From the get-go, the editors unabashedly and proudly identify this book as a testament to taxon-oriented biology, and this claim is more than substantiated by the content and scope of its individual contributions. This raises questions of a broader nature regarding the future of organismal biology—and especially taxon-oriented biology—and how it will be pursued in coming years. Will another such volume be possible 50 years from now? If possible, will it be de-

sirable? Does the taxon-oriented approach respond favorably and satisfactorily to the imperatives of "modern biology"? These questions are not answered here; indeed, they aren't really even broached, either implicitly or explicitly.

To some extent this is understandable; the main topic of the book is the biology of amphibians and reptiles, and especially the ecology and evolution of tropical species. Someone, however, had better start asking these questions publicly, and offering compelling answers, because the time when one could take for granted widespread support of organismal biology—both financial and otherwise—is long past. Many taxon-based professional societies are struggling to remain viable in the face of declining membership. Taxon-based hires also are increasingly rare in many college and university biology departments, including some associated with natural history museums. These are serious problems that require meaningful and creative solutions. My own view is that there is an important—indeed, an indispensable—role for organismal and taxon-oriented approaches in contemporary biology, but that to re-

main viable (at least in an academic setting), such work needs to be much more effectively and extensively integrated with molecular biology, genetics and genomics, physiology, and other disparate fields than it has been to date. Few of the treatments in *Ecology and Evolution in the Tropics* embrace such a forward-looking posture, which remains an appropriate and necessary goal of future education and research.

JAMES HANKEN

James Hanken (e-mail: hanken@oeb.harvard.edu) is Alexander Agassiz Professor of Zoology and director of the Museum of Comparative Zoology, Harvard University, Cambridge, MA 02138.

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