

Pough, F. H., R. M. Andrews, M. L. Crump, A. H. Savitzky, K. D. Wells, and M. C. Brandley. 2016. **Herpetology**. Fourth Edition. 591 pp. Sinauer Associates, Inc., Sunderland, MA, USA.

ISBN-10: 1605352330

ISBN-13: 978-1605352336

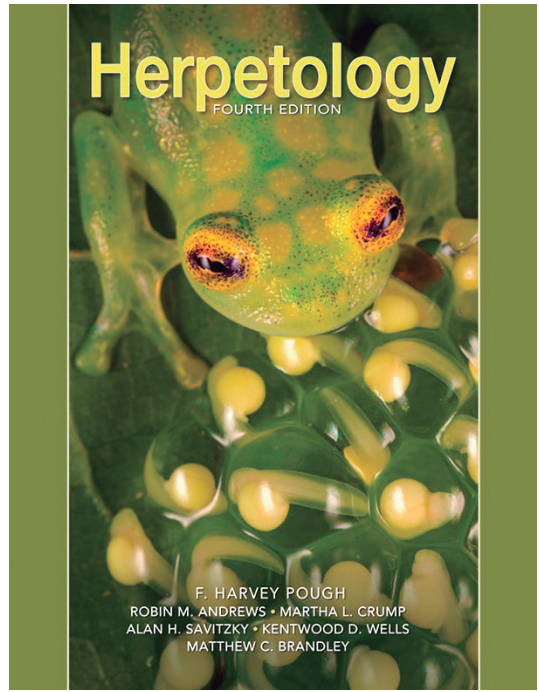
Price: USD 88.36

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I have owned every edition of this textbook, and every one has been the best herpetology text available at the time. This one is the best of the best.

It starts with a quick introduction to amphibians and reptiles; much of this is familiar to anyone who has been studying herpetology for a while, but with excellent color illustrations that are well above what was presented in older texts and should make anyone's introduction to the wonders of herps easier and more entertaining than it would have been.

After an excellent presentation of the basis for modern systematics, Pough *et al.* follow with a presentation of the modern diversity of amphibians and reptiles. They use taxonomy that is as up to date as it's possible to be in these times of rapid change driven by advancing statistical and molecular methods. I learned a lot in this section myself, as I've been too lazy to keep up with those rapid changes. Almost all taxa are illustrated with a photograph. As a reviewer I always feel obliged to point out something that could be improved, and that is going to be difficult with this book, so I will point out that I suspect it would be possible to find at least some photos of representative animals that were either more naturalistic or (e.g. the white-background images that have become popular recently) more striking illustrations of the taxa pictured. Varying image size and placement a bit more might be useful also. At any rate, this is truly a minor suggestion—the authors have managed to find good images of living animals, and that in itself is an achievement.



The introductory section closes with a chapter entitled The Biogeography of Amphibians and Reptiles which manages to succinctly cover historical evolution and biogeography through modern dispersal and island assemblages.

The next major division of the book covers how herps work, with particular focuses on how they way they work differs from the mammals. The general framework of this has not changed greatly since my graduate student days (before even the first edition of this text), but the presentation is worlds beyond anything available then, and much interesting new information has appeared about every aspect of herps' functional biology. As someone interested in thermal and water relations of amphibians, I was very pleased to see more information on the fact that many amphibians do thermoregulate, and that they face complex tradeoffs while doing so. The coverage of energetics and how they interact with behaviour is extensive and fascinating, and

forms a solid background for the later sections on ecology.

This section includes extensive and up-to-date discussions of the reproductive biology of amphibians and reptiles. There has been and continues to be a great deal of recent work in this area. Anyone who comes to these chapters with the belief that herps have simple, primitive reproductive biology will be astonished by the sophistication and complexity they reveal. Neither taxon is by any stretch of the imagination “stuck” with a primitive life history or reproductive mode; as these chapters reveal, there are a staggering array of adaptations, up to and including viviparity in both taxa, and, particularly in amphibians, including a huge variety of strange and wonderful reproductive strategies and modes of parental care. Finally in this section, chapters on body support and locomotion and feeding work through these aspects of function, showing that although modern herps might be thought to have relatively stereotypical body forms, they are capable of a very wide range of functions.

The final major area of the book focuses on what amphibians and reptiles do, divided into chapters on spatial ecology, communication, mating systems and sexual selection, diets and species interactions, and population and assemblage level ecology.

I was initially curious about the inclusion of spatial ecology as a separate subject. However, the chapter covers the very important areas of movement behaviour, home range size, homing and territoriality, and dispersal. It is possibly a bit conservative, with its discussion of amphibians largely focused on systems in which adults exhibit high site fidelity, and making less mention of systems in which it appears there is mass movement among breeding habitats even by adults. The recent massively developed literature on the cane toad (*Rhinella marina*) as a model invasive species is touched on, but perhaps necessarily there is much more than is covered. One more (very minor) criticism; I was disappointed to see that the book repeats the

poorly documented assertion that the cane toad has displaced native species; many studies have failed to demonstrate this. Its greatest effects seem to be caused by the effects of its venom on top predators, rather than by direct or indirect effects on competitors.

The spatial ecology chapter is followed by communication. This uses graphics very effectively and incorporates the results of recent work that has emphasized the importance of matches and contrasts between signals and background, as filtered by the perception of the recipient. Communication leads fairly naturally to mating systems and sexual selection, one of the most heavily studied aspects of herp biology and a subject that could and has served as the focus of an entire book. The chapter does a good job of covering the topic (though lightly), including more recent developments in theory and discoveries via data, such as the prevalence and effects of polyandry and sperm competition.

The final chapters on species interactions and assemblage structure point out the roles of amphibians and reptiles as elements of ecosystems and how they interact with their resources, each other, and their predators. They include a fairly extensive discussion of how human impacts may have modified, and may continue to modify, the diversity and distribution of herps. A great deal of new information is presently accumulating on many aspects of the higher level ecology of amphibians and reptiles, in part because of concern for their conservation and future survival, which is addressed in the final chapter. This chapter is commendably even-handed, documenting and discussing the status of both reptiles and amphibians, and examining most of the ideas that have been advanced regarding both the reasons for their declines and how to avoid or reverse them. There is a relatively large section on amphibians and the chytrid fungi that threaten them, but this is balanced against the many other sources of threat that are sometimes forgotten.

In summary, this new edition is certainly a solid advance on the previous ones. The authors

have done well at updating the information and literature, and modernizing the look and presentation. Even those who own previous editions will probably want to acquire this one to have a handy, relatively current resource on aspects of herpetology that fall outside their expertise. Anyone who is new to the field should read it from cover to cover, and will acquire a very solid basic knowledge of most aspects of the diversity and biology of amphibians and reptiles, and very good introductions to the general fields of study that knowledge is

embedded in. If I was still teaching a herpetology subject, I would certainly adopt this as my textbook.

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