

Foreword

The amphibia represent one of the most diverse vertebrate groups. They have successfully adapted to almost every habitat available on planet earth. Given their physiological vulnerabilities, this would seem to be a conundrum. As a group they generally have a limited tolerance to temperature variation. They have very high cutaneous evaporative water loss compared to other vertebrates. Their kidneys are not capable of retrieving water that is lost in urine production, as are many other vertebrates. Hence they produce an extremely dilute urine. With few exceptions, as a group they are tied to water for reproduction. Eggs are deposited in water and tadpoles develop and metamorphose in an aquatic medium. Knowing only these facts, a sagacious physiological ecologist would likely predict that all amphibians would be limited to aquatic or tropical environments.

The authors of this text have combined their talents to amass a large body of literature that amply demonstrates why the sagacious physiological ecologist would be wrong. The text is well written and the chapters are organized in logical succession. For the graduate student who is interested in amphibian physiology, this text should serve as a springboard to a world of potential problems to solve. As everyone who has done research in this area knows, if one door is opened, then many more doors will become apparent and each one hides important information that fills in the missing gaps.

The authors of this text are esteemed scientists who have made seminal contributions to this field as a result of their research. The connecting thread that runs throughout this book is that there is a continuum of information in amphibian physiological ecology from the molecular level to the whole animal level, and no one piece of information or particular area of research is more important than another. The key is understanding how it all fits together to give a whole picture.

Another important point that can be made for this text is that it reveals there is no room for dogma in this field of endeavor, or any other scientific field for that matter. Unfortunately there are times when a researcher becomes overzealous and makes broad predictions based on findings for one or more species. A good example would be the research that demonstrated that bullfrog tadpoles lacked key ornithine cycle enzymes to produce urea as a nitrogenous end product and therefore were obligated to ammonotelism. Unfortunately, that research finding was generalized to all amphibian tadpoles. Now it is known that many species of amphibians have tadpole stages that are fully capable of producing urea throughout their development.

This is an important text because not only does it summarize existing literature in the field of amphibian physiological ecology, it also gives future directions and potential research projects for those who are entering the field. Given the diversity, complexity, and beauty of amphibians it is easy to understand why they have been idolized and revered historically by so many different cultures.

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