

ANIMALS

Frogs and Toads of the World. By Chris Mattison. 2011. Princeton University Press. (ISBN 9780691149684). 192 pages. Hardcover. \$29.95.

There are probably few questions that a person might have about frogs and toads that are not answered in this book. In its detailed, wonderfully fascinating, and stunningly illustrated chapters, the reader will discover much about the origins and classification of frogs, their anatomy and physiology, their behavior and life cycles, and their place in the natural world.

Believed to be descended from lobe-finned fishes, modern amphibians are divided into three groups – frogs and toads, salamanders, and caecilians. Most prominent are the frogs and toads, which are grouped into 6000 species in 49 families. (It is noted that “scientists do not distinguish between toads and frogs.”) A fairly thorough documentation of fossil remains tells the story of amphibian origins, but the author notes that “lack of fossil frogs made their history difficult to trace.” Modern molecular studies have led to significant changes in their classification and to much disagreement among experts.

Frog anatomy, physiology, and behavior are presented in terms of the interesting assortment of adaptations that enable them to survive in a variety of environments. For example, the Lake Titicaca frog’s greatly increased skin surface area for oxygen absorption is described as “folded and wrinkled to such an extent that it looks as though it has borrowed it from a much bigger frog.” The frog’s skin is also important in thermoregulation, with dark skin colors absorbing more heat than light colors. Some frogs also survive freezing temperatures by converting stored liver glycogen into a high level of glucose or glycerol, which acts as an antifreeze in their blood. Since frogs have adapted to many extremes in environment, it has enabled them to spread “into habitats such as deserts in which they face less competition.”

Frogs eat whatever they can catch and swallow. Their main prey are insects, but some are known to eat fish, mollusks, worms, and even small reptiles and mammals. Two species are herbivorous. Most frogs use their tongues, which show a large variety of adaptations, to capture food. Frogs are also prey to a variety of organisms, from snakes and birds to tarantulas and even insectivorous plants. But they use many strategies to avoid being eaten. Toxins, camouflage, speed, and agility are common defense mechanisms. Some frogs will attack and others scream loudly to startle predators. Despite all these methods, many frogs “rely on the sheer weight of numbers of offspring to ensure that...enough individuals remain to form a new generation.”

The only vertebrates that have an aquatic larval phase and a terrestrial adulthood, amphibians use external fertilization, laying their eggs in water, singly, or in clumps or chains. These hatch into free-living, tail-bearing, gill-breathing tadpoles that gradually metamorphose into lung-breathing terrestrial adults with legs. There are numerous variations on this life-cycle pattern, with desert frogs breeding in flooded areas after heavy rains, tadpoles being defended from predators by the mother, use of tree holes and bromeliads as breeding sites in forest habitats, and even breeding in the pitchers of pitcher plants. Some frogs even show a high level of parental care by laying eggs on land and carrying them to water or by carrying eggs on their backs or in pouches.

Frogs are found in a variety of habitats, mostly in or near water. Others live underground or in trees. Habitat destruction by logging, land clearance, and other activities has damaged many of their environments. Pollution, climate change, and disease have also taken their toll on frogs. Introduction of alien species in some habitats has reduced frog populations, and overexploitation of frogs for food, teaching, and research has led to declines in some frog populations.

The final chapter of the book is a wonderful catalog of the frog families. Although

frog classification is still being overhauled, each of the currently recognized 49 families is described and illustrated, most of them in considerable detail. This chapter alone makes the book a valuable resource.

The book would be an inexpensive but significant addition to a biology classroom library. There is so much more to this volume than can be discussed in a review, including wonderful examples of how humans have interacted with frogs and how frogs have been a part of history and mythology. Many students are interested in frogs but probably know little about them. With this handy reference, teachers can provide information and good examples that enrich many biological topics, including ecology, evolution, adaptation, anatomy, physiology, classification, and behavior.



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Venomous Snakes of the World. By Mark O’Shea. 2011. Princeton University Press. (ISBN 9780691150239). 160 pages. Paperback. \$19.95.

This is a handy and helpful guide to identifying venomous snakes from all over the world. The snakes are grouped by geographic locations, making it easier to identify a certain type of species, with beautiful, full-color photographs taken by the author.

One great point made in the book is how snakes are misunderstood. Most people are not aware of their importance in nature. “Many people fear snakes and see it as their duty to rid the planet, or at least their small patch of it, of the accursed serpent before it has the chance to turn the tables.” The book