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## Amphibians



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Photo credit: Chinese Gliding Frog (*Rhacophorus dennysi*) by Brian Gratwicke. CC BY-NC

### Defining amphibians

The term amphibian comes from the Greek *amphibios* meaning "both lives". This is an apt description because most adult amphibians are better adapted to life on land than in water, while their larval phases are entirely aquatic.

For much of their lives, which may last a couple of months or several years depending on the species, larval amphibians bear little resemblance to their adult forms. Then something miraculous happens. In a matter of weeks or even days, the once fish-like larvae metamorphose into terrestrial, air-breathing quadrupeds!

There are three extant orders in the Class Amphibia: Anura (frogs and toads), Caudata (salamanders), and Apoda (caecilians). The order Anura has the most extant species, with 4000 members worldwide. Of Caudata, 390 salamander species exist worldwide. The third amphibian group, the caecilians, is smaller still with a total of only 162 species, all of which are restricted to the tropics. Many species of amphibians are threatened, with principal threat classes consisting of anthropogenic alteration of surface water distribution due to agricultural land conversion and urbanization to serve needs of the exploding human

population; other significant threats to species extinctions are excessive nitrate, herbicides and pesticides from agricultural practices.

## **Herpetology**

The study of amphibians is often grouped together with that of reptiles under the heading "Herpetology", the base of which, 'Herpe-', is derived from the Greek word 'herpes' meaning "to creep". The mention of this term is enough to make many amphibian and reptile scientists cringe, since we recognize now that these two taxa are only distantly related. In fact, reptiles are more closely akin to mammals than to amphibians. Despite this fact, for hundreds of years, scientists around the world failed to distinguish between these two vertebrate groups. Carolus Linnaeus, the father of modern biological classification, dismissed them as "foul and loathsome". Today, the success of films such as *Anaconda* attests to our persistent fear of "cool blooded" creatures. However, a better understanding of them may persuade even the most timid observer that reptiles and amphibians are not only profoundly different but hardly "creepy" at all.

## **Amphibians and Reptiles: Similarities and Differences**

Both amphibians and reptiles are ectotherms, meaning that they derive heat from the environment, rather than producing it internally. To say that they are cold-blooded is imprecise since they, like endothermic vertebrates, need to keep warm in order to remain active. Ectotherms are forced to slow down as their environment cools. Although this may put them at risk from predators, it can also be advantageous. Whereas an endotherm expends a tremendous amount of energy just to maintain a constant body temperature, a cold ectotherm can pass months at a time requiring little food or oxygen.

The Surinam toad (*Pipa pipa*), which occurs in South America, is tongueless and is so flat that it appears to have been run over. Credit: Shawn

Aside from sharing the same mode of thermoregulation, amphibians and reptiles are very different organisms. While reptiles have internal fertilization and a waterproof scaly skin which allow them to live independent from water, amphibians are intimately associated with it. For the most part, amphibians are scaleless and their skin is highly permeable, requiring a source of moisture in order to prevent desiccation. In addition, most amphibians must mate in the water, where they deposit their soft, jelly-encased egg masses.

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