

Preface

Vertebrate zoology is the biological discipline that consists of the study of vertebrate animals, i.e., animals with a backbone, such as fish, amphibians, reptiles, birds and mammals.

Vertebrate Zoology is the science of animals with backbones, that is, mammals, birds, amphibians, reptiles, and fishes. At the Department of Vertebrate Zoology, we investigate the systematics, phylogenetic history and geographical distribution of these animals. Focal research points include the phylogeny of birds, and the distribution and phylogeny of tropical freshwater fishes.

The subphylum *Vertebrata* includes all of the familiar large animals and some rare and unusual ones as well. The 7 living classes of vertebrates are distinguished mostly on the basis of their skeletal system, general environmental adaptation, and reproductive system.

Three of the vertebrate classes are fish. The most primitive of these is *Agnatha*. It consists of jawless fish that do not have scales. These are the lampreys and hagfish.

Fish that have skeletons consisting of hard rubber-like cartilage rather than bone are members of the class *Chondrichthyes*. These are the sharks and rays. All of the bony fish are members of the class *Osteichthyes*. Tuna, bass, salmon, and trout are examples of *Osteichthyes*.

Animals in the class *Amphibia* spend part of their lives under water and part on land. Frogs, toads, and salamanders are amphibians. Many of these species must keep their skin moist by periodically returning to wet areas. All of them must return to water in order to reproduce because their eggs would dry out otherwise. They start life with gills, like fish, and later develop lungs to breathe air.

The class *Reptilia* includes turtles, snakes, lizards, alligators, and other large reptiles. All of them have lungs to breathe on land and skin that does not need to be kept wet.

They produce an amniote egg which usually has a calcium carbonate rich, leather hard shell that protects the embryo from drying out. This is an advantage

over fish and amphibians because the amniote egg can be laid on land where it is usually safer from predators than it would be in lakes, rivers, and oceans.

The class *Aves* includes all the birds. They also produce amniote eggs but usually give them greater protection from predators by laying them high off of the ground or in other relatively inaccessible locations. In the case of both reptiles and birds, the eggs are fertilized within the reproductive tract of females. There are other striking similarities between reptiles and birds in their anatomies and reproductive systems. This is not surprising because birds are descendents of theropod dinosaurs (two-legged mostly carnivorous dinosaurs).

Dogs, cats, bears, humans and most other large animals today are members of the vertebrate class *Mammalia*. All mammals conceive their young within the reproductive tract of the mother and, after birth, nourish them with milk produced by their mammary glands.

Mammals are heterodonts with strong jaws. That is to say, they have a variety of specialized teeth (incisors, canines, premolars, and molars). This allows them to chew their food into small pieces before swallowing it. Subsequently, they can eat any size plant or animal. Many reptiles must swallow their prey whole, which limits them to hunting smaller game.

The book is such that the students will be benefited as far as the their knowledge and examination is concerned.

—Editor