

8. Kingdom Animalia

Fundamental basis of classification

- **Levels of organisation** - It includes cellular level, tissue level, organ level and organ system level of organisation.
- **Symmetry** - Body of animals can be asymmetrical, radially symmetrical, and bilaterally symmetrical.
- **Organisation** - Animals are classified on the basis of diploblastic or triploblastic organisation.
- **Coelom** - Animals can be classified as acoelomate, pseudocoelomate, or coelomate.
- **Segmentation** - It involves the phenomenon of metamerism.
- **Presence or absence of notochord**

Phylum - Porifera

- Multicellular organisms with cellular level of organisation
- Water or canal system is present.
- Water enters through ostia and goes out through osculum.
- Skeleton is made of spongin fibres or spicules.
- Choanocytes (collar cells) line the spongocoel and the canal.
- Hermaphrodite
- Fertilization is internal and development is indirect (larval stage is present).
- Examples: *Sycon*, *Spongilla*, and *Euspongia*

Phylum - Coelenterata (Cnidaria)

- Multicellular organisms with tissue level of organisation
- They are diploblastic and radially symmetrical.
- Digestion is intracellular and extracellular.
- Corals have calcium carbonate skeleton.
- Cnidarians exhibit two basic body forms – polyp and medusa.

- Metagenesis is the alternation of generation between polyp and medusa forms.
- Examples: *Hydra*, *Adamsia*, and *Pennatula*

Phylum - Ctenophora

- Multicellular organisms with tissue level of organisation
- They are diploblastic and radially symmetrical.
- They show the property of **bioluminescence**.
- Eight external rows of ciliated comb plates are present.
- Examples: *Ctenoplanea* and *Pleurobrachia*

Phylum - Platyhelminthes

- Bilaterally symmetrical organisms with dorso-ventrally flattened body
- They are triploblastic and acoelomate with organ level of organisation
- They are usually parasitic on other animals.
- Fertilization is internal.
- Hermaphrodite
- Flame cells perform the function of osmoregulation and excretion.
- Examples: *Fasciola* (liver fluke) and *Taenia* (Tapeworm)

Phylum - Aschelminthes

- Multicellular organisms with organ system level of organisation
- They are triploblastic and bilaterally symmetrical.
- They are pseudocoelomate.
- Sexes are separate.
- Fertilization is internal.
- Examples: *Ascaris* (round worm), *Ancylostoma*, and *Wuchereria*

Phylum - Annelida

- Multicellular organisms with organ system level of organisation
- They are triploblastic and bilaterally symmetrical.

- They are coelomate.
- They are metamerically segmented.
- *Nereis* possesses parapodia, which help in swimming.
- They have nephridia as excretory and osmoregulatory organs.
- Earthworm and leech are monoecious and *Neries* is dioecious.
- Examples: *Pheretima* (earthworm), *Neries*, and *Hirudinaria*

Phylum - Arthropoda

- Largest phylum of kingdom Animalia
- They are triploblastic, bilaterally symmetrical, segmented, and coelomate animals.
- The body is covered by chitinous exoskeleton.
- They have jointed appendages.
- Circulatory system is open.
- Respiration through book lungs, gills, book gills, or tracheal system
- They have malpighian tubules as excretory organ.
- Mostly dioecious and oviparous
- Examples: *Anopheles*, *Aedes*, and *Locusta*
- *Limulus* (King crab) is a living fossil.

Phylum - Mollusca

- Second largest phylum of kingdom Animalia
- They are triploblastic, bilaterally symmetrical, and coelomate animals.
- Possess organ system level of organisation
- Body possesses calcareous shell and is unsegmented having distinct head, muscular foot, and visceral hump.
- Usually dioecious and oviparous
- They have radula (a file-like rasping organ for feeding).
- Examples: *Pila*, *Pinctada*, and *Octopus*

Phylum - Echinodermata

- They are triploblastic and coelomate animals with adult echinoderms having radial symmetry and larvae having bilateral symmetry.
- Endoskeleton is of calcareous ossicles.
- They have well-developed water vascular system, which is used for locomotion, capture, and transport of food and respiration.
- Examples: *Asterias* (Star fish), *Echinus* (Sea urchin), and *Antedon* (Sea lily)

Phylum - Hemichordata

- They are triploblastic, bilaterally symmetrical, and coelomate animals.
- Body is composed of proboscis, collar and trunk.
- Respiration through gills; sexes – separate; fertilization – external; development – indirect
- Proboscis gland is excretory organ.
- Example: *Balanoglossus*

Phylum - Chordata

- They are triploblastic, bilaterally symmetrical, and coelomate animals with organ system level of organisation.
- These animals are characterized by the presence of a notochord.
- They have single, dorsal, and hollow nerve cord.
- Their pharynx is perforated by gill slits.
- The heart is located in ventral part.
- They have post anal tail.
- Phylum Chordata is divided into three sub-phyla:
 - Urochordata - Notochord is present only in larval stages. Example: *Ascidia* and *Doliolum*
 - Cephalochordata- Notochord is persistent throughout life. Example: *Branchiostoma*
 - Vertebrata

Sub-phylum Vertebrata

- All vertebrates are chordates, but all chordates are not vertebrates.
- Notochord is replaced by vertebral column in adult.
- Sub-phylum vertebrata is divided into two divisions called **Agnatha** (which lacks jaws) and **Gnathostomata** (which bears jaw).

- The division **Agnatha** contains a single class called **Cyclostomata**.

Class- Cyclostomata

- They are ectoparasites on fishes.
- Jaws are absent.
- Example: *Petromyzon*
- The division **Gnathostomata** is divided into two super classes called **Pisces** (which bear fins) and class **tetrapoda** (that bear limbs).
- The super class Pisces contains two classes – **Chondrichthyes** and **Osteichthyes**.

Class- Chondrichthyes

- Skeleton is cartilaginous.
- Operculum is absent.
- Notochord is persistent.
- Air bladder is absent.
- Heart is two-chambered.
- Poikilothermous i.e., cold blooded animals
- Skin is covered by placoid scales.
- Fertilization is internal.
- Mostly viviparous
- Example: *Scoliodon*

Class- Osteichthyes

- Skeleton is bony.
- Operculum is present.
- Air bladder is present.
- Skin is covered by ctenoid/cycloid scales.
- Heart is two-chambered.
- Poikilothermous i.e., cold-blooded animals
- Fertilization is external.

- Mostly oviparous
- Example: *Hippocampus*, *Exocoetus*
- The super class tetrapoda contains four classes called **Amphibia**, **reptilia**, **aves**, and **mammals**.

Class- Amphibia

- Cold-blooded animals with two pairs of limbs
- Heart is three-chambered.
- Respiration is through gills, lungs, and skin.
- Fertilization is external; sexes are separate; oviparous
- Examples: Frog, toad, and salamander

Class- Reptilia

- Cold-blooded animals with two pairs of limbs
- They have dry and cornified skin.
- Mostly, heart is three-chambered, but it is four-chambered in crocodiles.
- Respiration is through lungs.
- Fertilization is internal; sexes are separate; oviparous
- Examples: Snake, lizard, and crocodile

Class- Aves

- Homoeothermic i.e., warm-blooded animals with forelimbs modified into wings
- Heart is four-chambered.
- Respiration is through lungs.
- Bones are hollow with pneumatic cavity.
- Fertilization is internal; sexes are separate; oviparous
- Examples: Crow, Pigeon, and Parrot

Class- Mammalia

- Warm-blooded animals having mammary glands
- Two unique features of mammals are the presence of mammary gland and hairs on skins.

- Heart is four-chambered.
- Respiration is through lungs.
- Fertilization is internal; sexes are separate; viviparous with some exceptions such as *Platypus*
- Examples: Rat, elephant, and kangaroo

Biodiversity is the species richness of the biosphere. It is defined as the number and variety of life forms such as plants, animals and microorganisms in an area.

- It supports all the essential living resources such as wild life, fisheries and forests.
- Forests help in maintaining the delicate balance of nature.
- Animals living in forests are called wild animals.
- The plants found in a particular area are known as **flora** of that area.
- The animals found in a particular area constitute **fauna** of that area.
- Those species of plants and animals, which are found only in a particular area, are called **endemic species**. (**Species** is a group of organisms in population which are capable of interbreeding)
- The animals, whose numbers are diminishing to a level that they might face extinction, are called **endangered animals**. For example: tiger, lion, and elephants
- **Project tiger** was launched by the government of India to protect endangered tigers in their natural habitat.
- The flora and fauna of a particular habitat can be protected through special **protected areas**.

Protected areas

- **Wildlife sanctuary:**

It is the place where wild animals are protected from hunting and are provided with suitable living conditions. For example: Madhumalai wildlife sanctuary in Tamil Nadu, Chilika bird sanctuary in Orissa, etc.

- **National parks:**

These are the areas reserved for wildlife. They are maintained and preserved by the government for the public to visit. For example: Ranthambore National Park in Rajasthan, Kanha National Park in Madhya Pradesh, etc. Satpura National Park is the first reserve forest of India.

- **Biosphere Reserves:**

It is a large protected land for conservation of wild life, plant and animals resources, and the traditional life of the tribal groups living in the area. For example: Pachmarhi Biosphere Reserve and Nilgiri Biosphere Reserve in India.

Red Data Book:

It is the source book maintained by IUCN (International Union for Conservation of Nature and Natural resources). It keeps a track record of various endangered species of plants and animals.

Migration

- It is the movement of birds and animals from their original habitat to other places at a particular time.
- Migratory birds fly to distant areas every year during a particular time because of
 - climatic changes- their original habitat becomes very cold and inhospitable
 - lack of food availability
- Numerous migratory birds including ducks, geese, flamingos, and cranes fly to India every year.