

Chapter 2: Classification of Living Beings

Introduction

Classification helps group living organisms based on shared features, making it easier to study and understand them. It avoids confusion from local names and provides a universal system. The need arises due to the enormous diversity in the living world. Scientists categorize organisms based on body structure, mode of nutrition, reproduction, and evolutionary relationships. This scientific method ensures consistency and order in biology. It also helps trace the lineage and evolutionary history of organisms.

Importance of Classification

Classification enables systematic study of organisms and aids in identifying unknown species. It helps in understanding evolutionary relationships and predicting characteristics of organisms. By classifying organisms, we can study them in groups rather than individually. It also assists in biodiversity conservation and ecological balance. Moreover, it serves practical purposes in agriculture, medicine, and environmental science.

Five Kingdom Classification (R.H. Whittaker)

Whittaker divided all life forms into five kingdoms: Monera, Protista, Fungi, Plantae, and Animalia. Each kingdom has distinct features based on cell type (prokaryotic or eukaryotic), number of cells, nutrition mode, and life functions.

- Monera includes bacteria – single-celled, prokaryotic.
- Protista includes mostly unicellular eukaryotes like Amoeba.
- Fungi are decomposers with chitin cell walls.
- Plantae are autotrophic and do photosynthesis.
- Animalia are heterotrophic and usually mobile.

Monera Kingdom

Organisms in this kingdom are unicellular and prokaryotic, lacking a true nucleus. Bacteria and cyanobacteria (blue-green algae) are common examples. They reproduce asexually (binary fission) and can live in extreme environments. Monerans can be autotrophic (e.g., some cyanobacteria) or heterotrophic (e.g., bacteria that decompose organic matter). Despite their small size, they are vital in nutrient cycling and biotechnology.

Protista Kingdom

These are unicellular eukaryotic organisms with a distinct nucleus and cell organelles. They include protozoa (like Amoeba, Paramecium), algae (like Chlamydomonas), and slime molds. Protists may be autotrophic (photosynthetic), heterotrophic, or both. They live mostly in aquatic environments. Protista act as the evolutionary bridge between simple and complex life forms. Some cause diseases (e.g., Plasmodium causes malaria).

Fungi Kingdom

Fungi are eukaryotic, multicellular (except yeast), heterotrophic organisms that absorb nutrients from decaying matter. Their cell walls are made of chitin, unlike plant cells. Common fungi include mushrooms, molds, and yeast. They reproduce by spores and play a key role as decomposers. Some are beneficial in medicine (penicillin) and food (yeast), while others cause diseases or food spoilage.

Plantae Kingdom

This kingdom includes multicellular, autotrophic organisms with chlorophyll that perform photosynthesis. They are fixed in one place and have cell walls made of cellulose. Plants are divided into groups: algae, bryophytes, pteridophytes, gymnosperms, and angiosperms. They play a fundamental role in ecosystems as primary producers. Plants also contribute oxygen and serve as food, medicine, and raw materials.

Animalia Kingdom

Animals are multicellular, eukaryotic, heterotrophic organisms with no cell walls. They show movement and complex behavior. Based on features like body structure, they are classified into groups: invertebrates (no backbone) and vertebrates (with backbone). Vertebrates include fish, amphibians, reptiles, birds, and mammals. Animals occupy every habitat and play essential roles in food chains and ecological balance.