

Introduction

Plants are essential living organisms in the environment. They produce food through **photosynthesis**, release oxygen, and provide energy for other organisms. Plants also play a vital role in **maintaining ecological balance** and **preventing soil erosion**.

Plants can be classified based on their **structure, presence of vascular tissue, and mode of reproduction**. Some are very simple and lack true roots or leaves, while others are more advanced, producing seeds and flowers.

Broadly, plants are divided into two main groups:

1. **Cryptogams (non-seed plants):** Reproduce without seeds, mainly using spores.
2. **Spermatophytes (seed plants):** Produce seeds and may or may not have flowers.

Division of Plants

1. Thallophytes (Algae & Simple Plants)

- **Examples:** Spirogyra, Chlorella, Ulva
- **Characteristics:**
 - Simple thallus-like body (no true roots, stems, or leaves)
 - Mostly aquatic
 - Can be unicellular or multicellular
 - Reproduce by spores or simple cell division
 - No vascular tissue

2. Bryophytes (Mosses and Liverworts)

- **Examples:** Moss, Marchantia
- **Characteristics:**
 - No true roots, stems, or leaves (have rhizoids instead of roots)
 - Non-vascular
 - Require water for reproduction (sperm swims to egg)
 - Usually grow in moist environments

3. Pteridophytes (Seedless Vascular Plants)

- **Examples:** Ferns, Club moss, Horsetails
- **Characteristics:**
 - Have vascular tissue (xylem & phloem)
 - Reproduce by spores
 - Require water for fertilization

4. Gymnosperms (Seed Plants without Flowers)

- **Examples:** Pine, Cycas, Cedar
- **Characteristics:**
 - Seeds are naked (not enclosed in fruits)
 - Usually evergreen
 - Vascular
 - Mostly wind-pollinated

5. Angiosperms (Flowering Plants)

- **Examples:** Mango, Rose, Wheat
- **Characteristics:**
 - Seeds enclosed in fruits
 - Have flowers
 - Vascular
 - Divided into:
 - **Monocots:** One cotyledon, parallel leaf veins, fibrous roots (e.g., maize, rice)
 - **Dicots:** Two cotyledons, net-like leaf veins, taproots (e.g., beans, sunflower)