

Unit-1 Introduction to Diversity of Plants

1.1 Definition

1.2 Importance and Scope

1.3 Concept of Cryptogams and Phanerogams

Unit-1: Introduction to Diversity of Plants (Detailed Notes)

1.1 Definition of Plant Diversity

Meaning of Plant Diversity

Plant diversity refers to the **variety of plant life** found on Earth. It includes differences in:

- Size and shape
- Structure
- Habitat
- Reproduction
- Life cycle
- Evolution

Plants range from simple microscopic algae to large flowering trees.

Definition

Plant diversity is the study of different kinds of plants, their classification, characteristics, evolution, and relationships with each other and the environment.

Examples of Plant Diversity

- Algae (Spirogyra, Chlamydomonas)
- Fungi (Mushroom, Yeast)
- Bryophytes (Mosses)
- Pteridophytes (Ferns)
- Gymnosperms (Pine, Cycas)
- Angiosperms (Mango, Rose, Wheat)

Characteristics of Plants

- Multicellular organisms
- Possess chlorophyll for photosynthesis
- Cell wall made of cellulose
- Store food as starch
- Mostly fixed at one place

- Reproduce sexually and asexually
-

1.2 Importance and Scope of Plant Diversity

Importance of Plant Diversity

Plant diversity is important for humans, animals, and the environment.

1. Food Source

Plants provide:

- Fruits
- Vegetables
- Cereals
- Pulses
- Oils
- Sugar

Examples:

- Rice
 - Wheat
 - Maize
 - Mango
 - Banana
-

2. Oxygen Production

Green plants perform photosynthesis and release oxygen.

Photosynthesis:

Carbon dioxide + Water + Sunlight → Food + Oxygen

Without plants, life on Earth cannot survive.

3. Medicine

Many medicines are obtained from plants.

Examples:

Plant	Medicine
Neem	Antibacterial
Tulsi	Cold and cough
Aloe vera	Skin diseases
Cinchona	Quinine (Malaria)
Digitalis	Heart medicine

4. Timber and Fuel

Plants provide:

- Wood
- Furniture
- Paper
- Firewood
- Bamboo

Examples:

- Teak
 - Sal
 - Eucalyptus
-

5. Industrial Importance

Plants are used in industries to produce:

- Paper
 - Rubber
 - Cotton
 - Jute
 - Perfumes
 - Essential oils
 - Dyes
-

6. Ecological Importance

Plants:

- Prevent soil erosion
 - Maintain ecological balance
-

- Control pollution
 - Purify air
 - Maintain water cycle
-

7. Habitat for Animals

Forests provide shelter and food for wildlife.

8. Economic Importance

Agriculture and forestry provide employment and contribute to national income.

Scope of Plant Diversity

The study of plant diversity covers many branches.

1. Taxonomy

Study of classification and naming of plants.

2. Morphology

Study of external structure:

- Root
 - Stem
 - Leaf
 - Flower
 - Fruit
-

3. Anatomy

Study of internal structure of plants.

4. Physiology

Study of plant functions:

- Photosynthesis
 - Respiration
-

- Transpiration
 - Mineral nutrition
-

5. Genetics

Study of heredity and variation.

6. Ecology

Study of relationships between plants and the environment.

7. Plant Pathology

Study of plant diseases.

8. Economic Botany

Study of useful plants and their products.

9. Biotechnology

Application of technology to improve plants.

Examples:

- Tissue culture
 - Genetic engineering
-

10. Conservation Biology

Study of protecting endangered plants.

Methods:

- National parks
 - Botanical gardens
 - Seed banks
-

1.3 Concept of Cryptogams and Phanerogams

Plants are mainly divided into **two groups**:

1. **Cryptogams**
 2. **Phanerogams**
-

A. Cryptogams

Definition

Cryptogams are plants that **do not produce flowers and seeds**. They reproduce by **spores**.

The word Cryptogam means:

- Crypto = Hidden
- Gamos = Reproduction

Their reproductive organs are hidden.

Characteristics

- No flowers
 - No seeds
 - Reproduce by spores
 - Mostly found in moist places
 - Simple plant body
-

Classification of Cryptogams

1. Algae

Characteristics:

- Mostly aquatic
- Contain chlorophyll
- Perform photosynthesis

Examples:

- Spirogyra
- Chlamydomonas
- Ulothrix

Importance:

- Produce oxygen
 - Food for aquatic animals
-

2. Fungi

Characteristics:

- Lack chlorophyll
- Heterotrophic
- Reproduce by spores

Examples:

- Mushroom
- Rhizopus
- Penicillium
- Yeast

Importance:

- Bread making
 - Medicine
 - Cheese production
-

3. Bryophytes

Known as **Amphibians of Plant Kingdom**.

Characteristics:

- Live on land
- Need water for reproduction
- No true roots, stems, or leaves

Examples:

- Moss
- Marchantia
- Riccia

Importance:

- Soil formation
 - Prevent soil erosion
-

4. Pteridophytes

First vascular plants.

Characteristics:

- Have true roots, stems, and leaves
- Reproduce by spores
- No flowers

Examples:

- Fern
- Selaginella
- Equisetum

Importance:

- Ornamental plants
 - Fossil fuels originated from ancient pteridophytes
-

B. Phanerogams

Definition

Phanerogams are plants that produce **flowers and seeds**.

The word Phanerogam means:

- Phaneros = Visible
- Gamos = Reproduction

Their reproductive organs are clearly visible.

Characteristics

- Well-developed roots
 - Stem and leaves
 - Vascular tissues present
 - Produce flowers or cones
 - Reproduce by seeds
-

Classification of Phanerogams

1. Gymnosperms

Meaning:

Gymno = Naked

Characteristics:

- Naked seeds
- No fruits
- Cone-bearing plants
- Evergreen

Examples:

- Cycas
- Pinus
- Cedrus
- Ginkgo

Importance:

- Timber
 - Paper industry
 - Ornamental plants
-

2. Angiosperms

Meaning:

Angio = Covered

Characteristics:

- Flowering plants
- Seeds enclosed inside fruits
- Most advanced plants

Examples:

- Mango
- Rose
- Wheat
- Rice
- Coconut

- Sunflower

Importance:

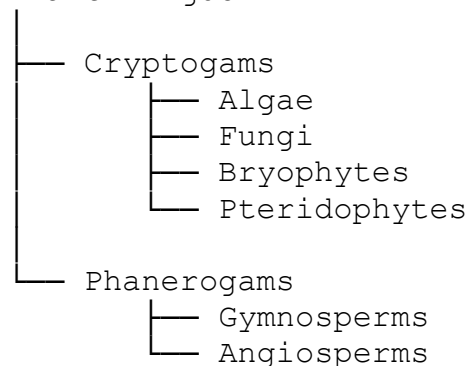
- Food
- Medicine
- Timber
- Fibres
- Oils

Difference Between Cryptogams and Phanerogams

Cryptogams	Phanerogams
No flowers	Flowers or cones present
No seeds	Seeds present
Reproduce by spores	Reproduce by seeds
Reproductive organs hidden	Reproductive organs visible
Simpler plants	More advanced plants
Mostly moist habitats	Found in almost all habitats
Examples: Algae, Fungi, Bryophytes, Pteridophytes	Examples: Gymnosperms, Angiosperms

Classification of Plant Kingdom

Plant Kingdom



Key Points for Exam

- Plant diversity means the variety of plants on Earth.
- Plants are classified based on structure and reproduction.
- Plant diversity is important for food, oxygen, medicine, industry, and ecological balance.
- **Cryptogams** are non-flowering, seedless plants that reproduce by spores.
- **Phanerogams** are seed-producing plants with visible reproductive organs.

- Cryptogams include **Algae, Fungi, Bryophytes, and Pteridophytes.**
- Phanerogams include **Gymnosperms and Angiosperms.**
- Angiosperms are the largest and most advanced group of plants.

These notes are suitable for undergraduate introductory botany courses and provide a solid foundation for Unit 1 on plant diversity.

