Vivekanand College, Kolhapur
(Empowered Autonomous)

DEPARTMENT OF BOTANY

B.Sc. I

TOPIC : ANGIOSPERMS

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ANGIOSPERMS

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What is Angiosperms?

- The term "angiosperm" derives from the two Greek words: angeion, meaning "vessel", and sperma, meaning seed.
- Angiosperms (flowering plants) are the largest group of plants on Earth.
- Approximately 270, 000 known species alive today.
- Angiosperms include all plants that have flowers and account for approximately 80% of all known living plants.

Evolutionary Development of Angiosperms

- Angiosperms evolved during the late **Cretaceous Period**, about 125-100 million years ago.

This leaf imprint shows a *Ficus speciosissima*, an angiosperm that flourished during the Cretaceous period.

A large number of pollinating insects also appeared during this same time.

Characteristics of Angiosperms

- Angiosperms have developed **flowers** and **fruits**.
- Flower serves as the reproductive organs for the plant.
- Flowers have a wide array of colors, shapes, and smells, all of which are for the purpose of attracting pollinators.
- Roots, stems, and leaves
- Xylem & phloem

- **Xylem** → conveys water & dissolved minerals from the roots to the shoots

- **Phloem** → transports food made in the leaves to the roots and developing leaves and fruits

- Flowers are a part of every plant's life cycle.
- The reproductive organs of the plant, which also serve as a route of genetic information exchange, are the flowers.
- The stems, roots, and leaves of the sporophyte are distinct from one another.
- The vascular system consists of phloem-based companion cells and xylem-based real vessels.

- The flower is a structure made up of stamens (microsporophyll) and carpels (megasporophyll).
- There are four microsporangia in each microsporophyll.
- At the base of the megasporophyll, the ovary contains the ovules.
- Angiosperms produce both microspores (pollen grains) and megaspores, making them heterosporous.
- The nucleus retains a single functioning megaspore indefinitely

- Pollination is the process of reproduction where pollen grains are transferred from the anther to the stigma.
- They are in charge of transferring genetic material from one flower to the next.
- Compared to the gametophytes or reproductive cells found in non-flowering plants, pollen grains are significantly smaller.
- The flowers undergo double and triple fusion, which produces a triploid endosperm and a diploid zygote.
- Marine environments are just one of the many habitats in that angiosperms can thrive.

- In angiosperms, fertilization occurs more quickly. Due to the smaller female reproductive components, the seeds are also generated swiftly.
- Stamens, the reproductive organs of flowers, are a component of every angiosperm.
- They create pollen grains that contain genetic material.
- The carpels contain growing seeds that could produce fruit.
- One of the main benefits of angiosperms is the formation of the endosperm. After fertilization, the endosperm develops and serves as a food supply for the growing seed and seedling.

Angiosperms are divided into two subgroups—dicotyledonous (dicots) and monocotyledonous (monocots).

Monocotyledons

- One cotyledon on each seed.
- Parallel veneation
- Fibrous roots.
- There are three parts in each floral whorl.
- It has numerous, closed vascular bundles.
- Bananas, Sugarcane, Maize etc.

Dicotyledons

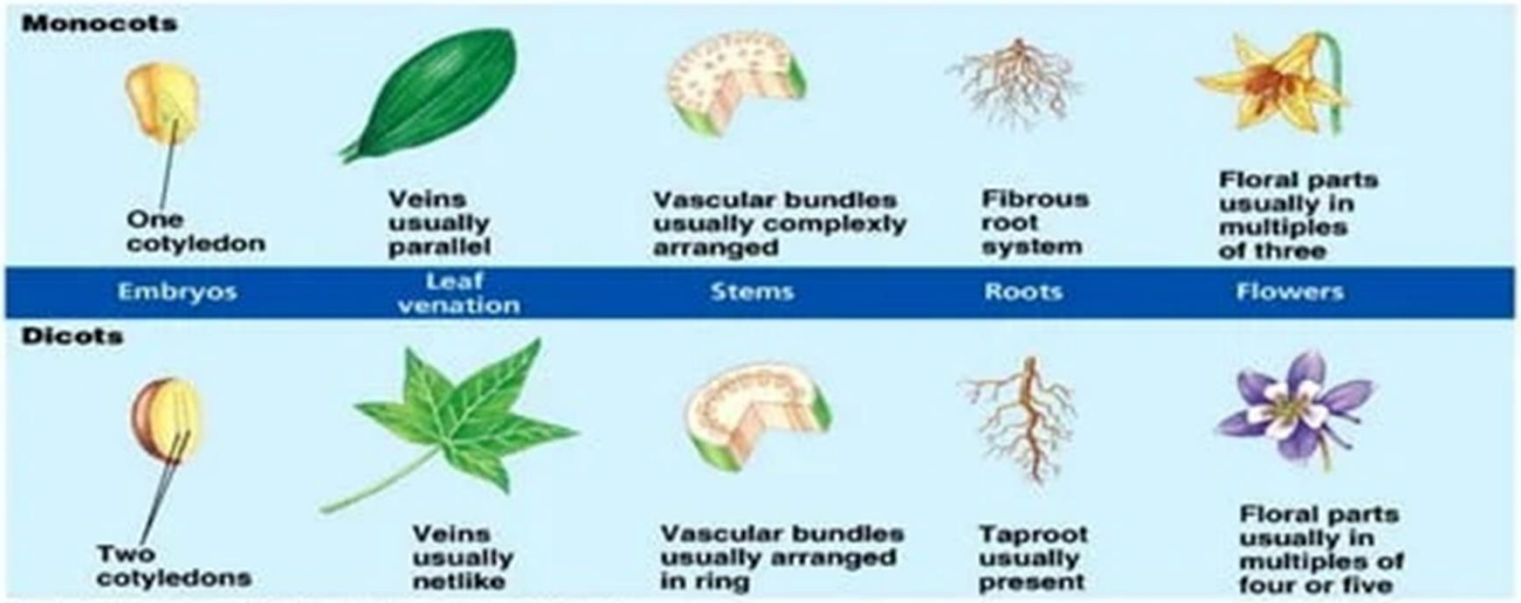
- Seeds with two cotyledons.
- Tap roots.
- Venation reticulated.
- The vascular bundles are arranged in rings,
- Flowers are either tetramerous or pentamerous.
- Grapes, Sunflowers, Tomatoes, etc.

Terminologies

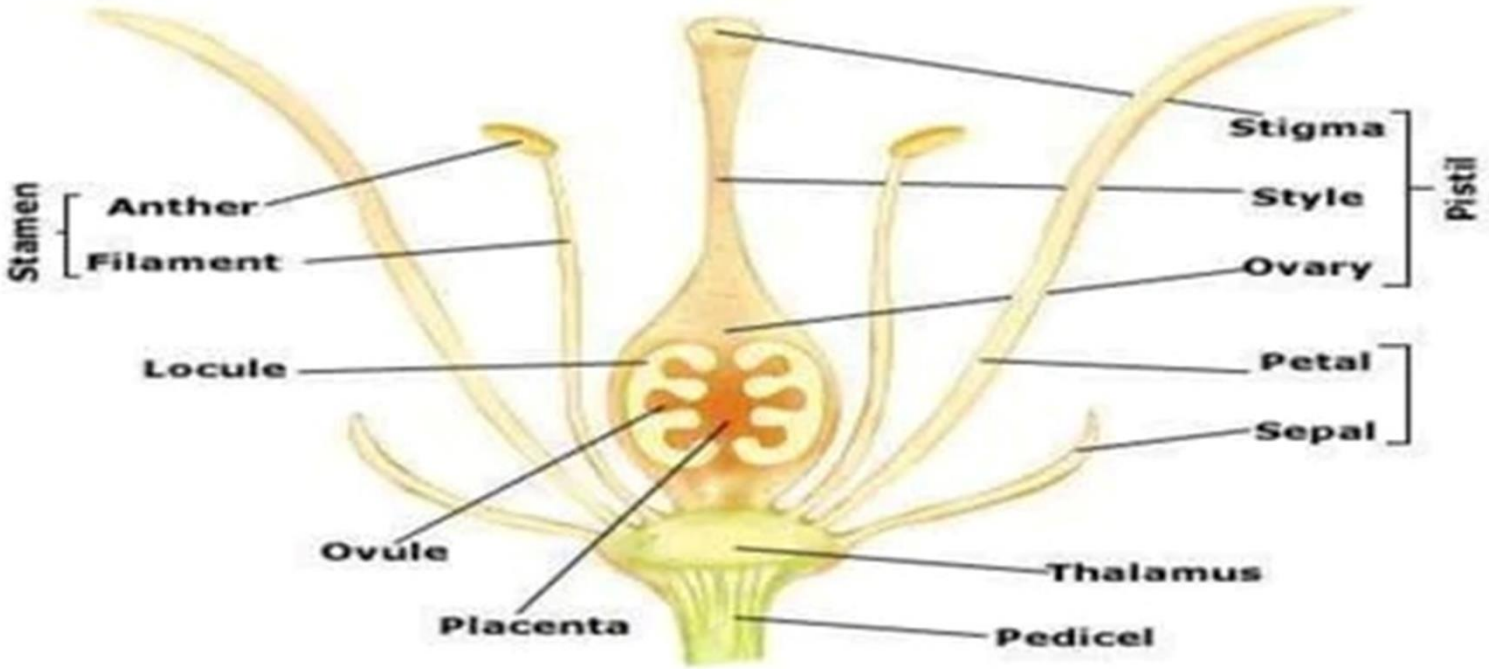
- Androecium – bearing one or more stamens
- Gynoecium – bearing one or more carpels
- Bisexual (Perfect) flower – containing both stamens and carpels
- Unisexual (Imperfect) flower – having only stamens or carpels

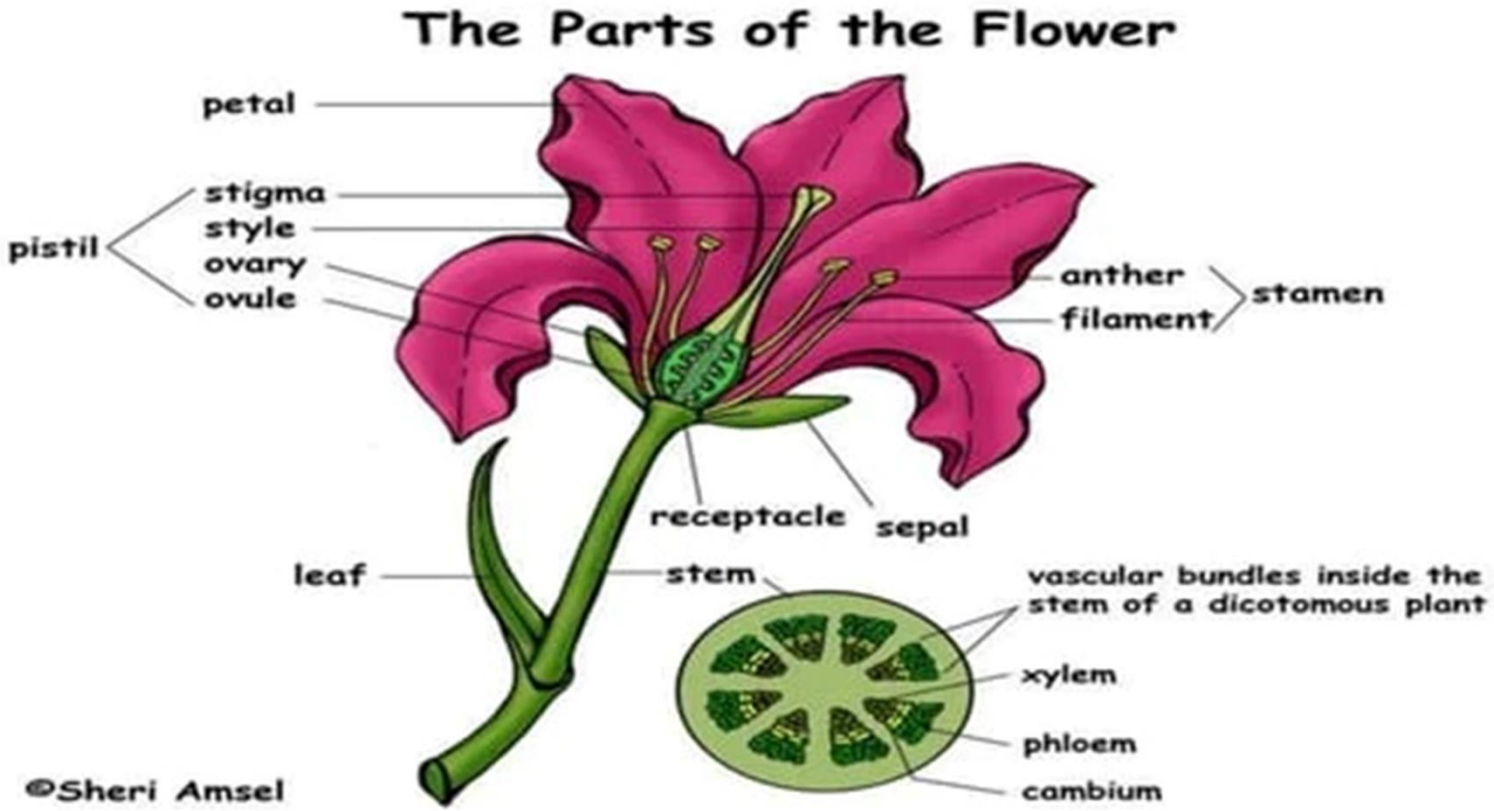
Two Classes of Angiosperms

1. Monocotyledons (monocots) → have a single cotyledon
2. Dicotyledons (dicots) → have two cotyledons



Morphology of Angiosperms




The Parts of the Flower
petal
pistil
stigma
style
ovary
ovule
anther
filament
stamen
receptacle
sepal
leaf
stem
vascular bundles inside the stem of a dicotomous plant
xylem
phloem
cambium
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Distribution of Angiosperms

- One reason for this dominance is the relatively high photosynthetic capacity of their leaves.
- They occupy every habitat on Earth except extreme environments such as the highest mountaintops, the regions immediately surrounding the poles, and the deepest oceans.
- They live as epiphytes (i.e., living on other plants)

They occur abundantly in;

- shallows of rivers and fresh-water lakes
- to a lesser extent, in salt lakes and in the sea

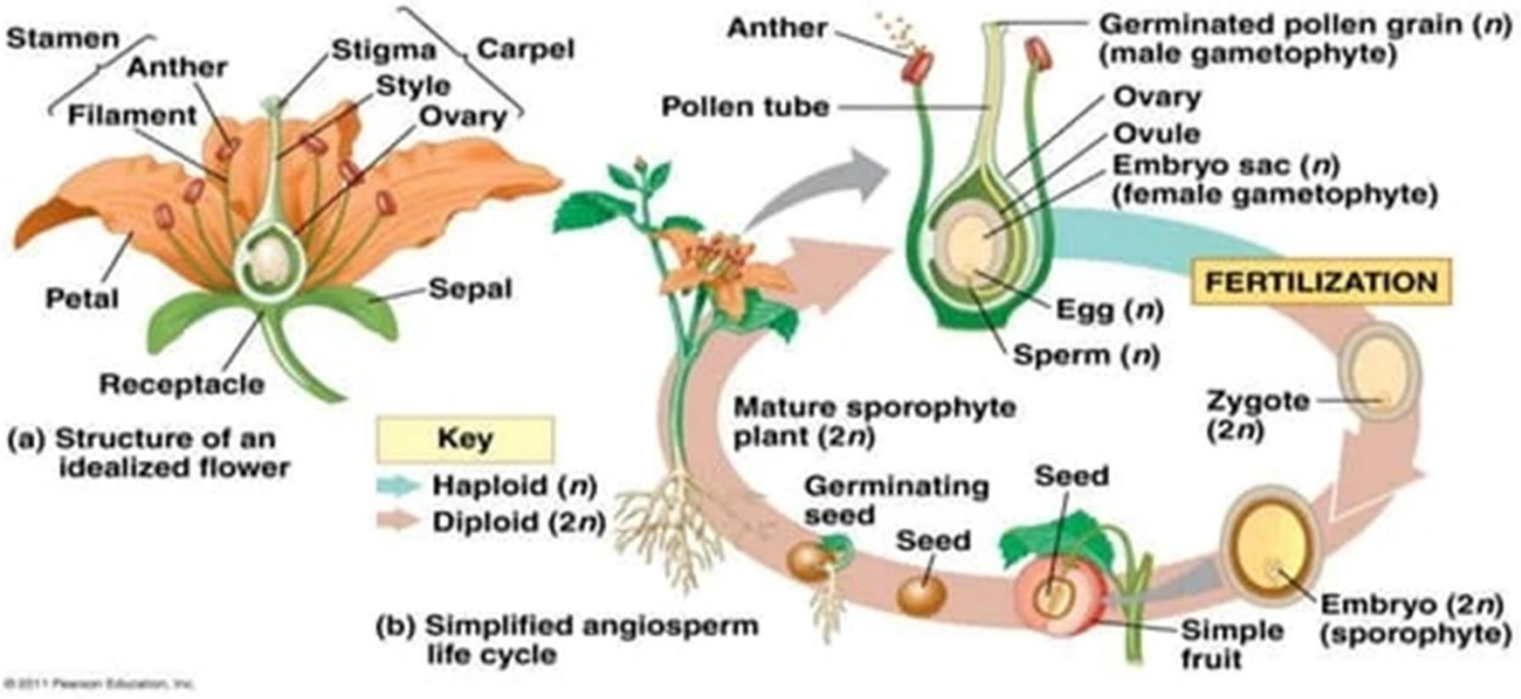
Over 250,000 species of flowering plants have been described, within about 460 families.

The most diverse families of flowering plants, in order of number of species, are:

- Orchidaceae (Orchid family): 25,000 or more species
- Asteraceae or Compositae (Daisy family): 20,000 species
- Fabaceae or Leguminosae (Pea family): 17,000
- Poaceae or Gramineae (Grass family): 9,000
- Rubiaceae (Madder family): 7,000
- Euphorbiaceae (Spurge family): 5,000
- Malvaceae (Mallow family): 4,300
- Cyperaceae (Sedge family): 4,000
- Araceae (including aroids subfamily): 3700

In the list above (showing only the 9 largest families), the Orchidaceae, Poaceae, Cyperaceae, and Araceae are monocot families; the others are dicot families.

Life cycle of Angiosperms



Economic Importance of Angiosperms

- The flowering plants have a number of uses as **food**, specifically as **grains**, **sugars**, **vegetables, fruits**, **oils**, **nuts**, and **spices**.

- In addition, plants and their products serve a number of other needs, such as **dyes, fibres, timber, fuel, medicines, and ornamentals**.