



# Department of biology

## GENERAL BOTANY

### Lab2

#### Stage -1-

# Angiosperms (Flowering plants)

By

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# Angiosperms (Flowering plants)

- These plants are the source of all the food crops that sustain humans and most animals. They are also the source of many medicinal materials, textile fibers, oils, spices, perfumes, ornamental plants, beverages such as tea, coffee, cocoa, and cola, and many types of timber trees such as walnut and oak. For this reason, they have received the attention of researchers at all times and places due to their great importance to the present and future, including human survival.

# Characteristics of Angiosperms

- **1-** All angiosperms contain flowers that contain both pollen grains and female gametes. This is in contrast to gymnosperms, where the cones are either male or female.
- **2-** Ovules, and subsequently seeds, are found within a closed structure called the ovary, which develops into a fruit. In gymnosperms, however, they are borne exposed on the surfaces of open carpels.
- **3-** In angiosperms, the xylem tissue contains xylem vessels, although cacti lose their vessels due to specialization, and some evolutionarily backward families lack vessels, as in the Winteraceae family.

# Characteristics of Angiosperms

- **4-** Double fertilization occurs, resulting in the formation of the endosperm, the nutritive tissue of the seed embryo emerging from the fertilized egg.
- **5-** Pollination is carried out by wind, insects, birds, and mammals, whereas it is restricted to wind in gymnosperms.
- **6-** Some flowering plants are woody perennials, but most are herbaceous, living for one or two years, while all gymnosperms are woody perennials.

# Flowering Angiosperms plants are divided into two subclasses


**1- Monocotyledons**



**2- Dicotyledons, based on the number of cotyledons**

# There are some similarities between gymnosperms and angiosperms

**1- Both have a reduced gametophyte stage that depends on the sporophyte stage.**

A green-outlined arrow pointing downwards from the first box to the second box.

**2- Both form two types of spores (heterospory).**

A green-outlined arrow pointing downwards from the second box to the third box.

**3- Both form pollen tubes, seeds, true roots, stems, and leaves.**

# Plant organs

## ✓ Root System

Seed plants have a plant body, the lower or ground portion of which is called the root system, and the upper or aerial portion is called the shoot system. The more different forms a plant organ takes, the greater the opportunities for comparison and diagnosis. The traits relied upon for diagnosis are those characterized by their stability and persistence, remaining unchanged except through evolution and becoming inherited. Therefore, reproductive organs are more important in the diagnosis process than vegetative organs in general.

# Type of Root

**Primary Roots**



**Secondary Roots**



**Adventitious Roots**



# Primary Roots

- These are typically found in dicotyledons and gymnosperms. They result from the growth of the seed embryo, and everything that branches off from them is considered a secondary root.

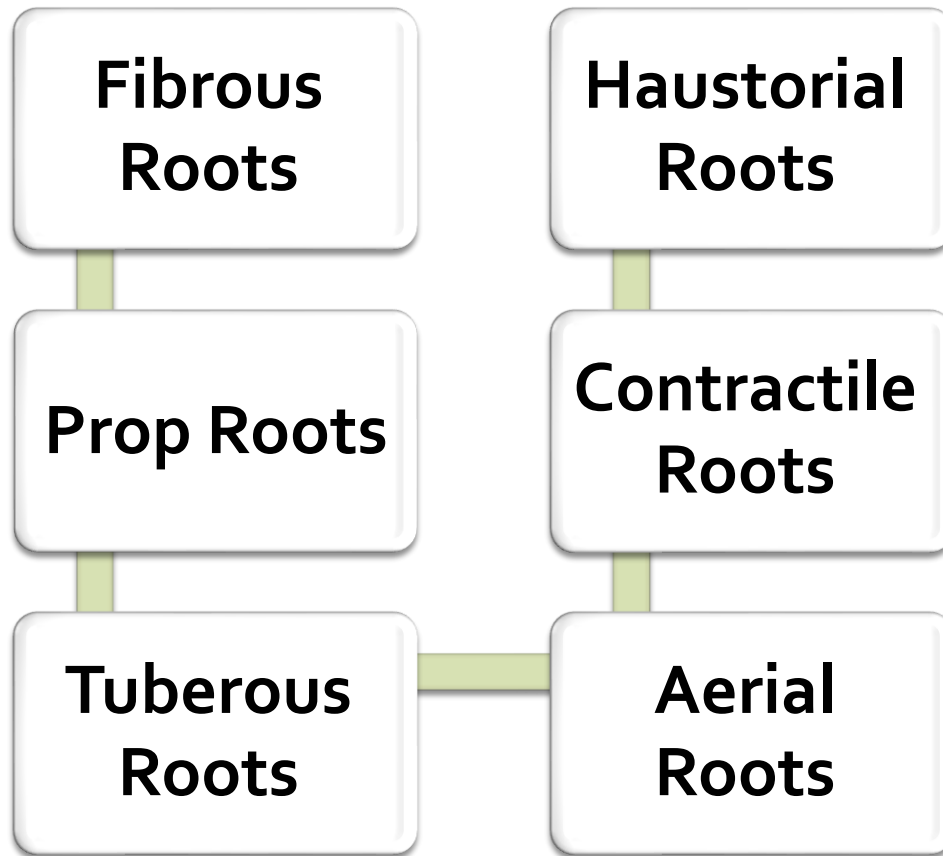
# Primary Roots

- Sometimes, the root stores quantities of water and nutrients, becoming enlarged and fleshy. In this case, it takes on several shapes:
  - ✓ 1. **Conical**, which is wide at the base and gradually tapers at the other end, as in (*Daucus carota* L.)
  - ✓ 2. **Fusiform**, which is wide in the middle and tapers at the ends, as in, (*Raphanus sativus* L.)
  - ✓ 3. **Napiform**, as in turnips (*Brassica rapa* L.) and beets (*Beta vulgaris* L.)

## Secondary Roots

- These are branches that arise from the pericycle of the primary root in some plants. They store nutrients, swell, and become tuberous, as in the sweet potato. The stored nutrients are used by the plant in flowering and seed formation.

# Adventitious Roots



These arise from the stems or leaves and take the following forms:







Thank  
you

