

# **General Botany**

## **Lecture (7)**

### **INTERNAL PLANT PARTS & EXTERNAL PLANT PARTS**

- 1. INTERNAL PLANT PARTS**
- 2. EXTERNAL PLANT PARTS**
- 3. Roots**
- 4. Type of roots**

**All Groups ( 1- 8 )**

## Botany Lect. 7

### INTERNAL PLANT PARTS:

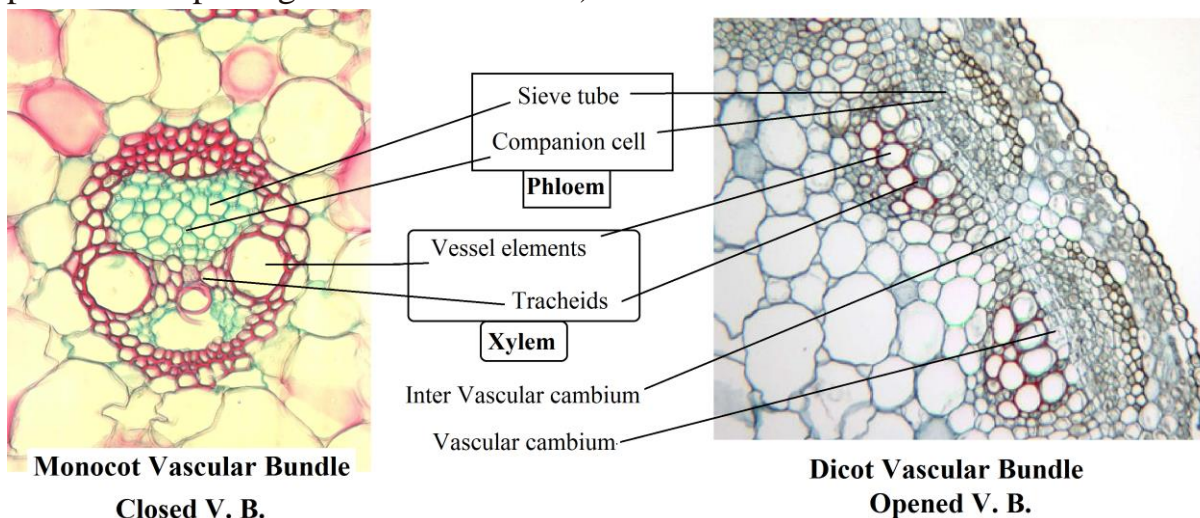
Cells are the basic units of plants. Plant reactions such as cell division, photosynthesis, respiration go on at the cellular level. Plant tissues such as meristems, xylem and phloem are large organized groups of cells that work together to perform specific functions. Specialized groups of cells called meristems are the plants growing points.

The vascular plants, or Tracheophyta, are a monophyletic subgroup of the land plants. The major lineages of tracheophytes (Vascular plants) together share a number of apomorphies, including:

- (1) **Lignified secondary walls**, with pits, in certain specialized cells.
- (2) **Sclerenchyma**, specialized cells that function in structural support.
- (3) **Vascular tissues** are made up of xylem and phloem, each of which are complex tissues (having more than one cell type).

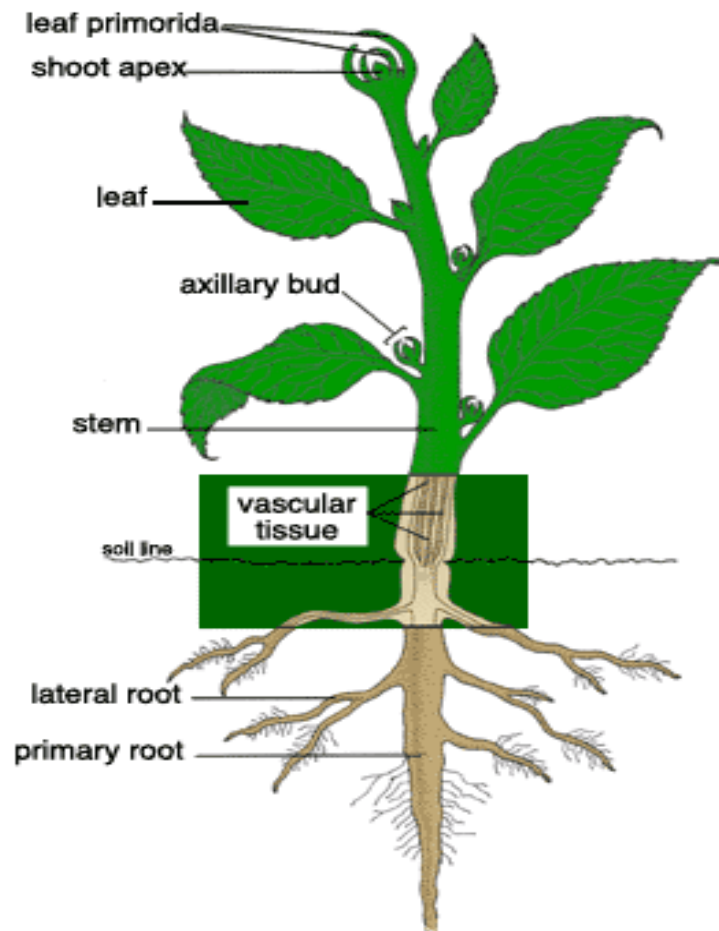
**A. Xylem** (Gr. *xylos*, wood) is a tissue composed of **tracheary elements** plus some parenchyma and sometimes sclerenchyma. There are two types of tracheary elements: **tracheids** and **vessel members**.

**B. Phloem** (Gr. *phloem*, bark) is a tissue composed of specialized cells called **sieve elements** plus some parenchyma and often some sclerenchyma. **Sieve elements** are elongate cells; have only a primary wall; (3) are semi-alive at maturity, losing their nucleus and other organelles but retaining the endoplasmic reticulum, mitochondria, and plastids; and have specialized pores, aggregated together into **sieve areas**. Cells of **phloem** tissue; **Parenchyma** cells associated with sieve tube members are called **companion cells**. (The xylem and phloem comprising the vascular tissue).



## EXTERNAL PLANT PARTS:

Leaves, stems, roots, flowers, fruits, and seeds are known as organs. They can be divided into sexual reproductive and vegetative organs. Sexual reproductive parts produce seed. They include flower buds, flowers, fruits and seeds. Vegetative parts include roots, stems, shoot buds, and leaves. Vegetative parts can be used in asexual forms of reproduction such as cutting, budding and grafting.



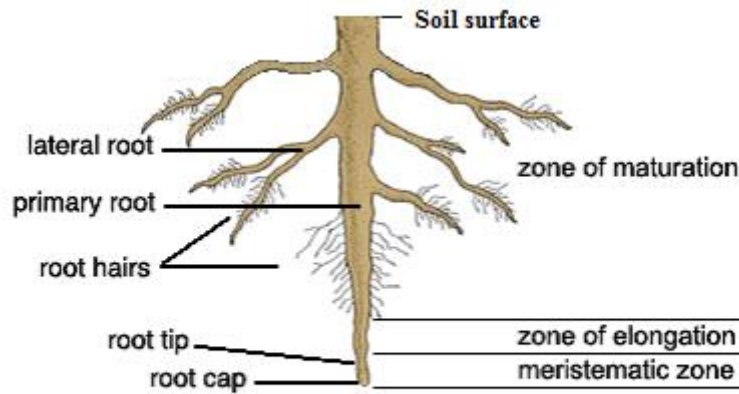
Principal Parts of a Vascular Plant

### 1- Roots:

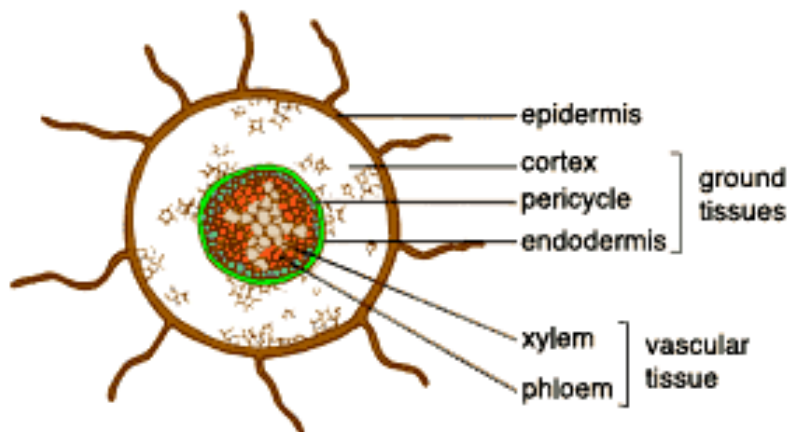
Their principle functions are to absorb nutrients and moisture, anchors the plant, support the stem, and store food (Carrot).

1. Calyptrogen, a layer of rapidly dividing cells at the tip of a plant root, from which the root cap is formed.
2. Root cap: protects the end of the root.
3. The meristematic zone manufactures new cells.
4. Zone of elongation: cells increase in size and push the root through the soil.
5. Zone of maturation: cells become specific tissues: epidermis, cortex or vascular tissue.

6. Epidermis: outermost layer which absorbs water and nutrients.
7. Cortex cells: help move water to vascular tissue and storing food.
8. Root hairs are epidermal cells that occur in a small zone behind the root's growing tip. They increase the absorptive capacity of the root. They usually live one or two days. Roots often have a symbiotic relationship with certain fungi - mycorrhizae (fungus + root).



Root structure

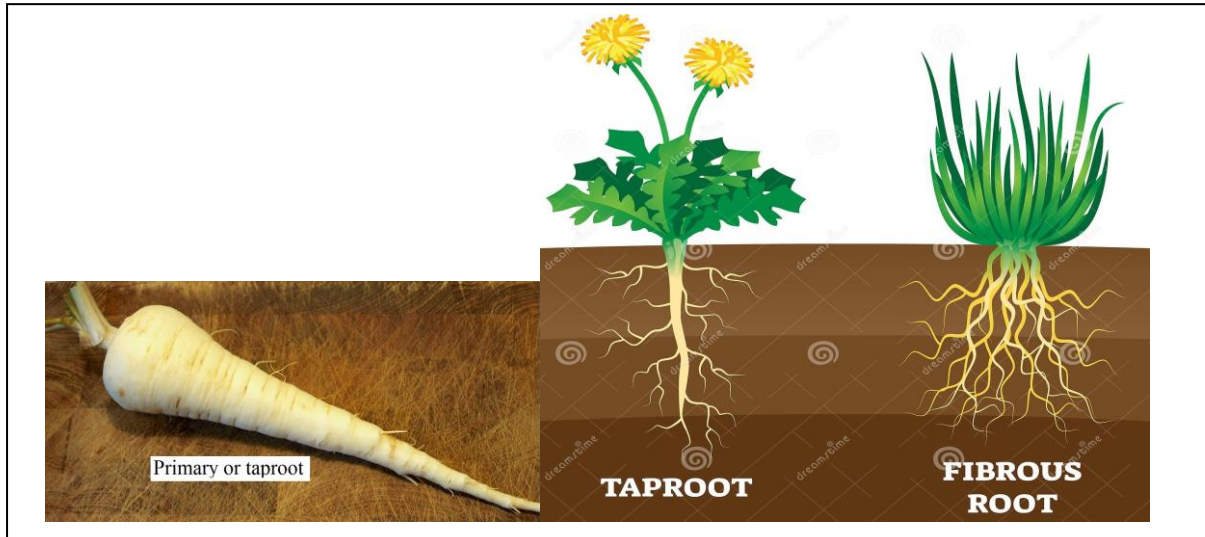


Cross section of a root

**Types of roots:**

1. **Primary or taproot system:** if the primary root elongates downward and develops few lateral roots then it is called a taproot. Example: carrot. A taproot system is universal in dicotyledonous plants.
2. **Lateral root:** is a side or branch root that arises from another root. If the taproot ceases to grow then a fibrous root system forms.

**3. Fibrous root system:** is the opposite of a taproot system. It is usually formed by thin, moderately branching roots growing from the stem. A fibrous root system is universal in monocotyledonous plants



### **Modified Roots;**

1. Some roots are modified to carry out specialized functions of mechanical and physiological nature.
2. Some taproots are modified for food storage as fleshy or succulent tap roots.
3. Some adventitious roots are modified for other functions also.