

## Study No.: 13

### NAME OF THE STUDY: STUDY ON ANATOMY OF DICOT ROOT (GRAM ROOT)

Dicot roots of gram shows following distinct region in its Transverse section with following features:

1. **Epiblema or Epidermis** - It is the outermost unilayered with several unicellular root hairs. It consists of thin walled, compactly arranged living parenchymatous cells. Usually epiblema is characterized by absence of stomata and cuticle.
2. **Cortex** - It is thin walled, multilayered region made from circular or polygonal parenchymatous cells. they usually have intercellular spaces.
3. **Endodermis** - It is the innermost layer of cortex and covers the stele. It consists of compactly arranged barrel shaped parenchyma without intercellular spaces. Most of the cells are characterized by the presence of special thickening of suberin and lignin on their radial and tangential walls called **casparian strips**. Some endodermal cell near protoxylem has no casparian strips and called **passage cells** or transfusion cells. These cells allow radial diffusion of water and minerals through the endodermis.
4. **Pericycle** - It is the innermost layer of stele and composed of uniseriate layer of parenchymatous cells without intercellular spaces.
5. **Vascular bundles** - They are 2-6 in number, radial and arranged in ring. Xylem and phloem bundles are separated from each other by parenchymatous cells called conjunctive or **complementary tissue**.
  - **Xylem** is exarch (i.e. protoxylem towards the periphery and metaxylem towards the centre) and consists of vessels, xylem parenchyma and xylem fibres.
  - **Phloem** forms oval masses beneath the pericycle and consists of sieve tubes, companion cells and phloem parenchyma.
6. **Pith** - It consists of thin walled, polygonal parenchyma cells with intercellular spaces. In dicots roots, it may be reduced or absent. It helps in storage of food materials.

#### Identification:

1. It is a **root** because
  - i) Vascular bundles are radial i.e., xylem and phloem lie in the different radius.
  - ii) Xylem is exarch i.e., metaxylem towards the centre and protoxylem towards the periphery.
2. It is a **dicot root** because
  - i) Vascular bundle less than six (varies from 2-4).
  - ii) Endodermis contains both casparian stripes and passage cells.
  - iii) Pith may be reduced or absent.

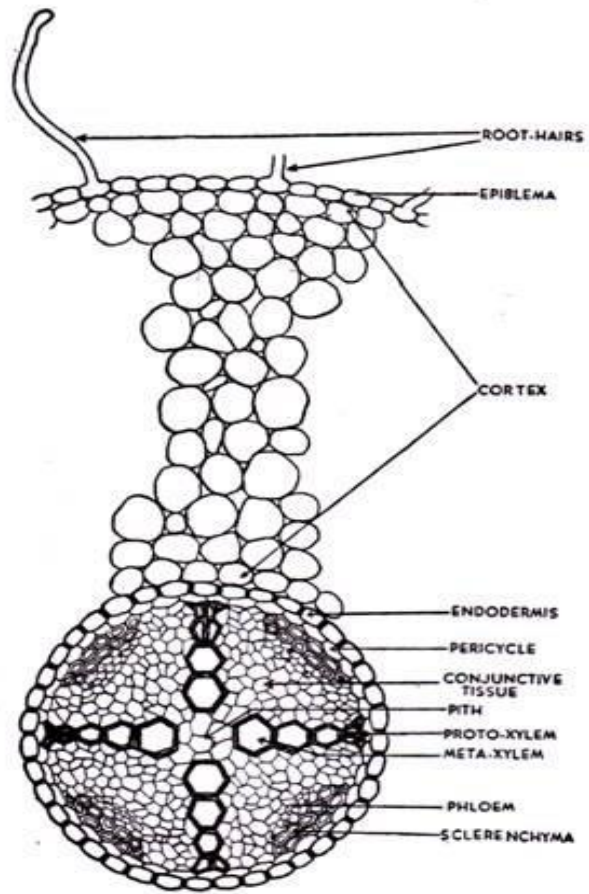


Fig.: T.S. of dicot root (Gram root)