

## STUDY NO.: 11

### NAME OF THE STUDY: STUDY ON ANATOMY OF CUCURBIT STEM (DICOT STEM)

A thin transverse section (T.S.) of supplied specimen (Cucurbit stem) under compound microscope shows the following structures from the periphery to the center.

1. **Epidermis:** The epidermis consists of a single layer of compact and rectangular shaped cells having no intercellular spaces among them. A protective layer, composed mainly of cutin substances, called cuticle present on the outer surface of epidermis. Some of the epidermal cells possess multicellular epidermal hairs.
2. **Cortex:** The region that lies next to the epidermis is the cortex. It is differentiated into three zones- hypodermis, general cortex and endodermis.
  - 2.1 **Hypodermis:** This lies below the epidermis and consists of collenchyma cells. In ridges the number of collenchyma is six to seven layers whereas in the furrow it is only two to three layers.
  - 2.2 **General cortex:** This lies internal to the hypodermis and consists of thin walled and flattened parenchyma cells having no intercellular spaces among them. The cells contain chloroplasts.
  - 2.3 **Endodermis:** The innermost layer of the cortex is the endodermis consisting of barrel shaped, elongated, compact cells having no intercellular spaces among them. The cells contain starch grains hence it is known as starch sheath.
3. **Pericycle:** Just beneath the endodermis there is a zone of sclerenchyma present, which is known as pericycle. The cells are lignified and hexagonal or polygonal in shape.
4. **Ground tissue:** The ground tissue lies just below the pericycle to the pith cavity. The vascular bundles are lying embedded in the thin walled round or polygonal parenchyma cells of ground tissue.
5. **Vascular bundles:** The vascular bundles are conjoint, bicollateral and open, and arranged in two rows, the outer row corresponding to the ridges and the inner to the furrows. Each bundle consists of xylem, two strips of cambium and two patches of phloem.
  - 5.1 **Xylem:** It lies in the central position of the vascular bundle, consisting of very wide, pitted metaxylem vessels towards periphery of the xylem and in the inner side narrow vessels, which form the protoxylem. Wood fibre and xylem parenchyma are also present in the xylem.
  - 5.2 **Cambium:** Two strips of cambium are found in each vascular bundle. It lies as a layer of meristematic cells between the xylem and phloem on either side of the bundle. The cambium consists of thin walled rectangular cells which arranged in radial rows. The outer cambium is many layered and flat while the inner cambium is few layered and curved.
  - 5.3 **Phloem:** Two patches of phloem are found in each vascular bundle. The outer phloem locates towards periphery and the inner phloem towards the pith. Each strand of phloem consists of sieve tube, companion cells and phloem parenchyma.

#### Identification:

1. It is a **stem** because
  - i) Vascular bundles are conjoint i.e., xylem and phloem lie in the same radius.
  - ii) Xylem is endarch i.e., metaxylem towards the periphery and protoxylem towards the centre.
2. It is a **dicot stem** because
  - i) Vascular bundles are open type i.e., cambium is present in between xylem and phloem.
  - ii) Hypodermis composed of collenchyma cells.
3. It is a **cucurbit stem** because
  - i) Vascular bundles are bicollateral and open type
  - ii) Continuous pericycle present.

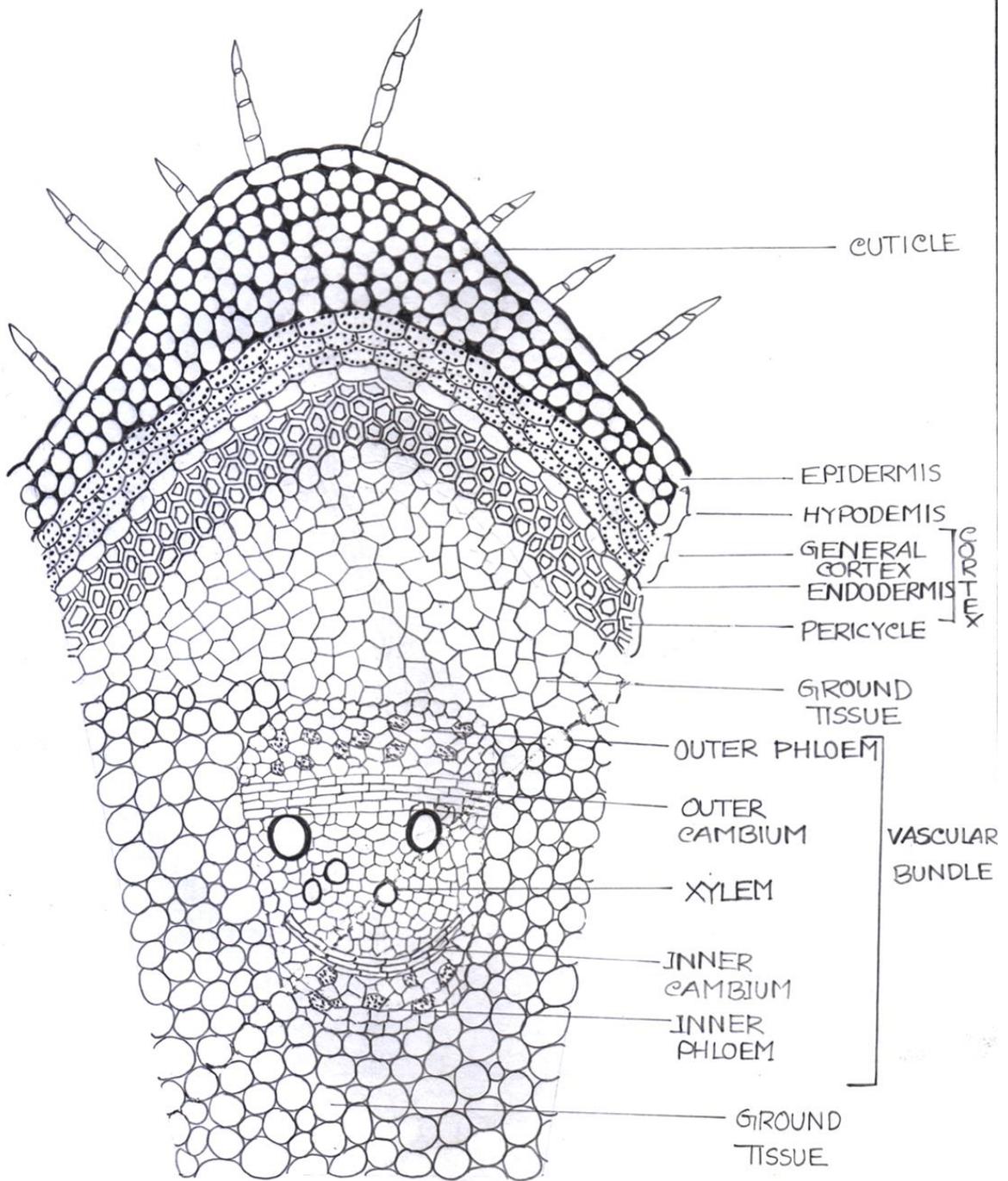


Figure : T.S. of dicot stem (Cucurbita stem)