

# **Anomalous Secondary Growth In Mirabilis Stem**

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## **INTRODUCTION**

### **Secondary growth :**

Meristematic activity of the cambial ring in the stellar region is uniform throughout. This results in the uniform increase in girth or diameter of dicot stem (and also in dicot roots)

### **Anomalous secondary growth :**

In some plants the cambium is normal at the beginning but thereafter, it becomes unevenly active at different parts, producing different proportion of secondary xylem and secondary phloem with an unusual arrangement. When the cambium in some parts produces a large amount of xylem than phloem, and in reverse order in some other parts, the vascular cylinder produced, thus, becomes lobed instead of being cylindrical.

## **T.S.of Mirabilis Stem**

**It is rectangular in outline and reveals the following tissues from outside within:**

**Epidermis:**

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- Single-layered epidermis consists of compact, rectangular cells, the outer face of which is covered by a thin cuticle.
- From some cells arise multicellular hairs.

### **Cortex:**

- A broad cortical region is present below the epidermis consisting of collenchyma, parenchyma and endodermis.
- Collenchymatous cells are thickened at their corners and oval or polygonal in shape.
- Parenchyma is present below the collenchyma, the cells of which are spherical or polygonal in shape with many intercellular spaces.
- Parenchymatous region is three to many cells deep and cells are generally filled with many chloroplasts.
- Endodermis is the innermost layer of the cortex consisting of barrel shaped cells.
- Endodermal cells lack casparian strips and filled with starch grains.

### **Pericycle:**

- It is represented by few parenchymatous layers below the endodermis.

### **Vascular System:**

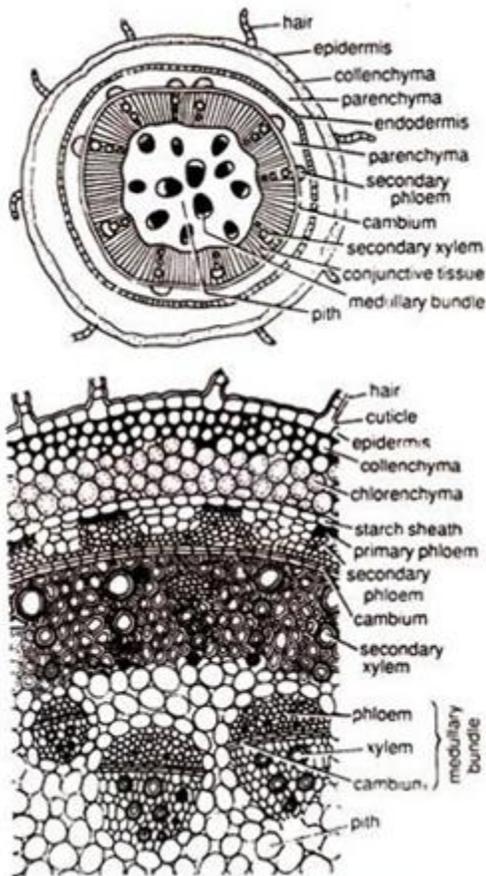
- It is composed of primary phloem, secondary phloem, cambium, secondary xylem, conjunctive tissue and primary xylem. Many medullary bundles are also present
- Vascular bundles are conjoint, collateral, open and endarch.
- Primary phloem is crushed and occurs in patches.
- A complete ring of few cells thick secondary phloem occurs just outside the cambium.
- Cambium is present in the form of a strip in between the xylem and phloem.
- Secondary xylem is present inner to the cambium, and consists of tracheids, vessels, fibres and xylem parenchyma
- A continuous cylinder of conjunctive tissue (prosenchyma) is present which is composed of thick and lignified cells.
- Near the pith are situated groups of primary xylem just opposite to the location of primary phloem.

### **Medullary Bundles:**

- Many medullary bundles are scattered in the pith which are 'leaf traces'.
- Medullary bundles in the pith, present towards its periphery, are smaller while that of the central position are larger in size.

**Pith:**

- It is parenchymatous. The cells are oval with many intercellular spaces.



**Fig Mirabilis:T.S.of stem (diagrammatic)**

**T.S. of Stem (A part cellular )**

**Anomalous Secondary Growth:**

Anomalous secondary growth occurs in the form of succession of rings of vascular bundles. Extrastelar cambium ring arises in the pericycle (De Bary,1884) or separate strips of interfascicular cambium develop in the medullary rays between the outer rings of normal bundles. It forms a complete cambium ring by joining with the strips of fascicular cambium (Maheshwary,1930).