

# Botany Paper II

## Plant Morphology and Anatomy

# Plant Anatomy

## **3. ANATOMY:**

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### **3.1 Introduction and definition**

**3.2 Importance in Taxonomy, Physiology, Ecological interpretations,  
Pharmacognosy and Wood identification.**



## 3.1 INTRODUCTION

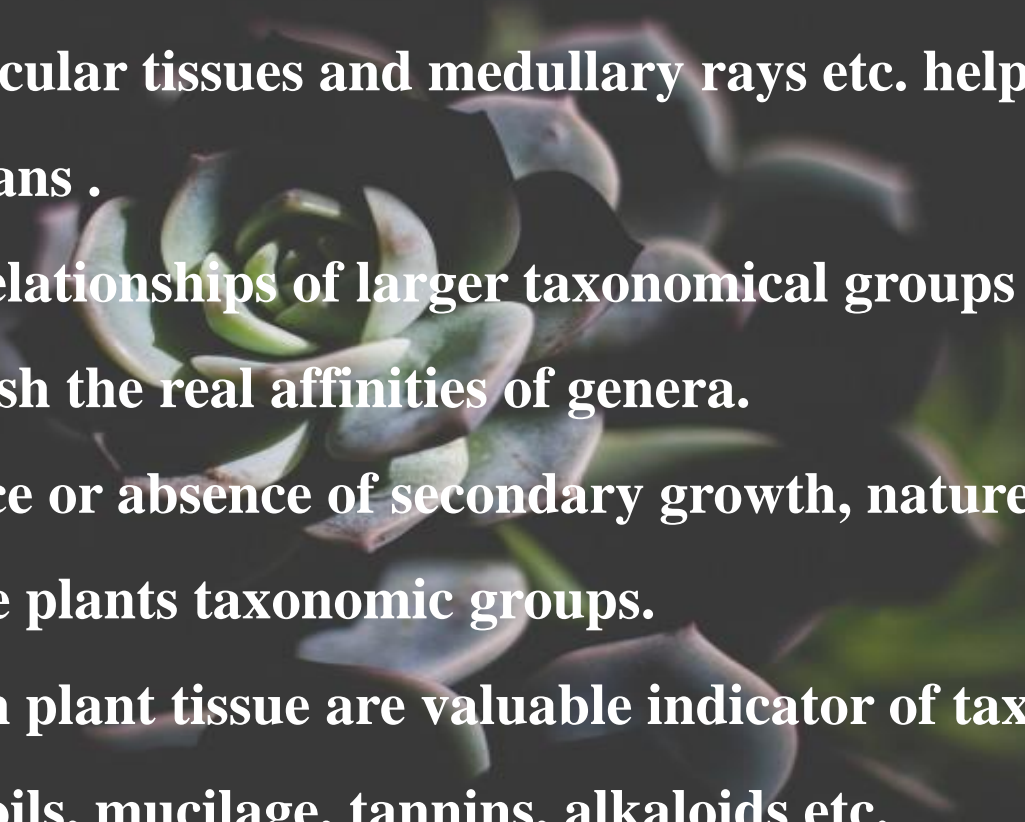
- ❖ Every plant body is cellular i.e. composed of cells or tissues organized in a specific way.
- ❖ The plant body of higher plants is multi-cellular and complex.
- ❖ It is composed of a number of organs i.e. roots, stems, leaves, flowers, fruits and seeds.

### **Definition:**

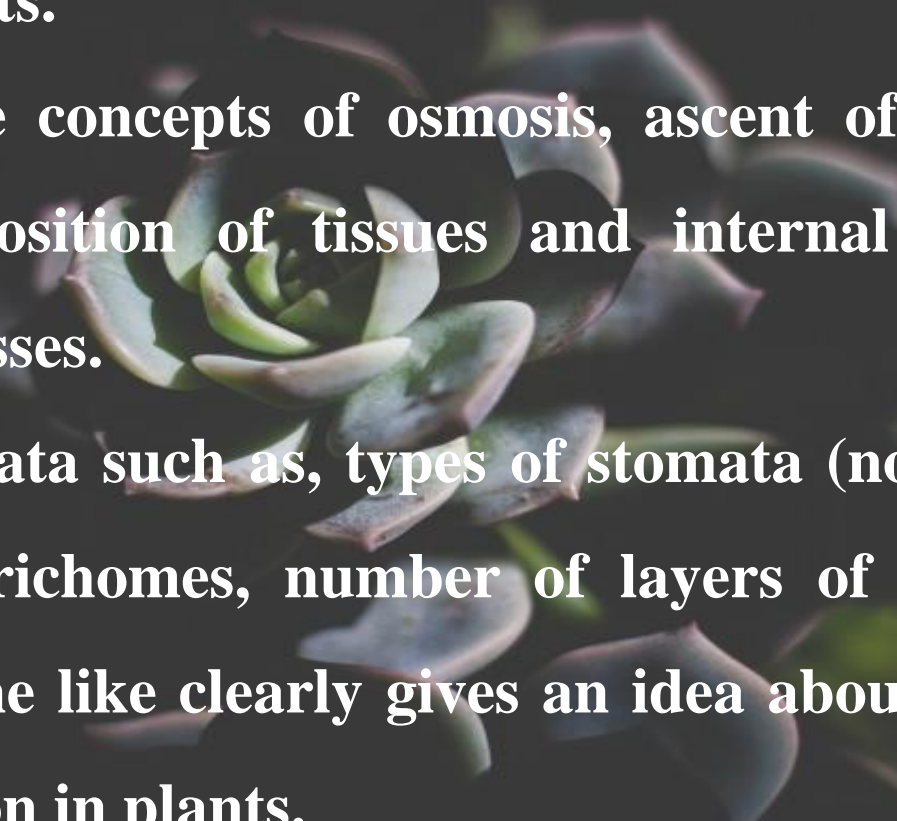
**The study of gross internal structure or characteristics of the plant and organs is known as Anatomy.**

## 3.2 Importance of anatomy

### 3.2.1 Importance in Taxonomy

- Anatomical characters such as nature and structure of hair stomata, epidermal cells, hypodermal region, veins, vascular tissues and medullary rays etc. help in perfect identification of the plant organs .
  - Anatomy provides the inter relationships of larger taxonomical groups e.g. family.
  - It provides evidence to establish the real affinities of genera.
  - The vascular bundles, presence or absence of secondary growth, nature of mesophyll tissue are also used in separating the plants taxonomic groups.
  - Chemical compounds occur in plant tissue are valuable indicator of taxonomic affinity, e.g. crystals, starch grains, latex, oils, mucilage, tannins, alkaloids etc.
  - Types of secondary growth, vascular rays.
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## 3.2.2 Importance in Physiology

- ❑ Metabolic processes in plants.
  - ❑ It helps to understand the concepts of osmosis, ascent of sap, water and mineral absorption, nature and position of tissues and internal structure of the organ concerned with these processes.
  - ❑ Anatomical nature of stomata such as, types of stomata (normal or sunken), type of guard cells, presence of trichomes, number of layers of hypodermis, presence of cuticle on epidermis and the like clearly gives an idea about important physiological process such as transpiration in plants.
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**❑ The structure of xylem, phloem, helps to understand the concept photosynthesis.**

**Ultrastructure of chloroplast is very important to explain the photosynthetic process.**

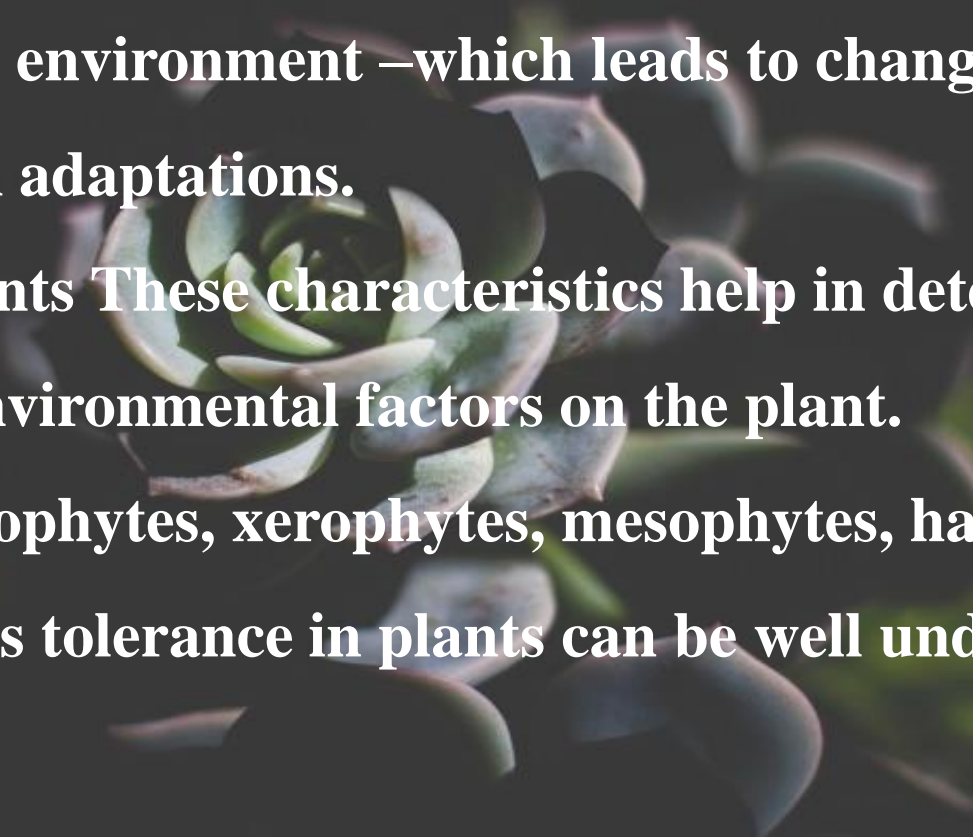
**❑ To understand the effect of light, mineral elements, plant hormones, etc. anatomical characters of respective organs play an important role.**

**❑ The detailed study of tissues concerned with conduction of water and mineral salts and the anatomy of xylem help us to understand the concept of ascent of sap.**

**❑ Presence of storage cells, vacuoles, oil cavities in plants provide an idea about storage of reserve food and Secondary metabolites.**

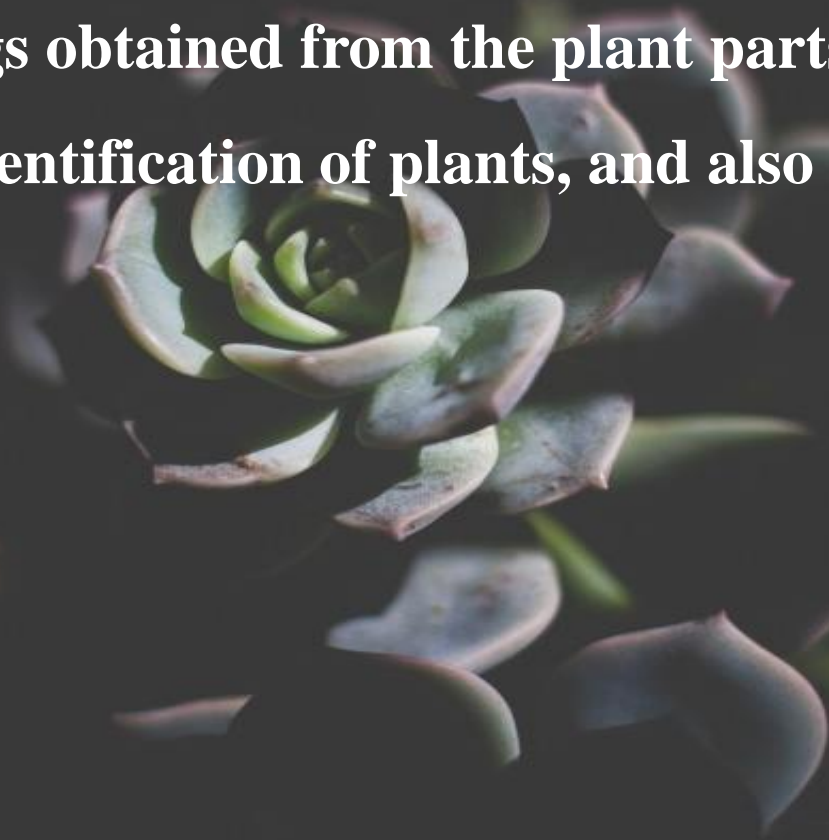


### **3.2.3 Importance in Ecological Interpretation**

- ✓ **Every plant reacts with the environment –which leads to changes in morphology, anatomy, and physiological adaptations.**
  - ✓ **Internal adaptations in plants These characteristics help in detecting the habitat and interpreting the effect of environmental factors on the plant.**
  - ✓ **Ecological grouping - hydrophytes, xerophytes, mesophytes, halophytes.**
  - ✓ **The biotic and abiotic stress tolerance in plants can be well understood by studying their anatomical features.**
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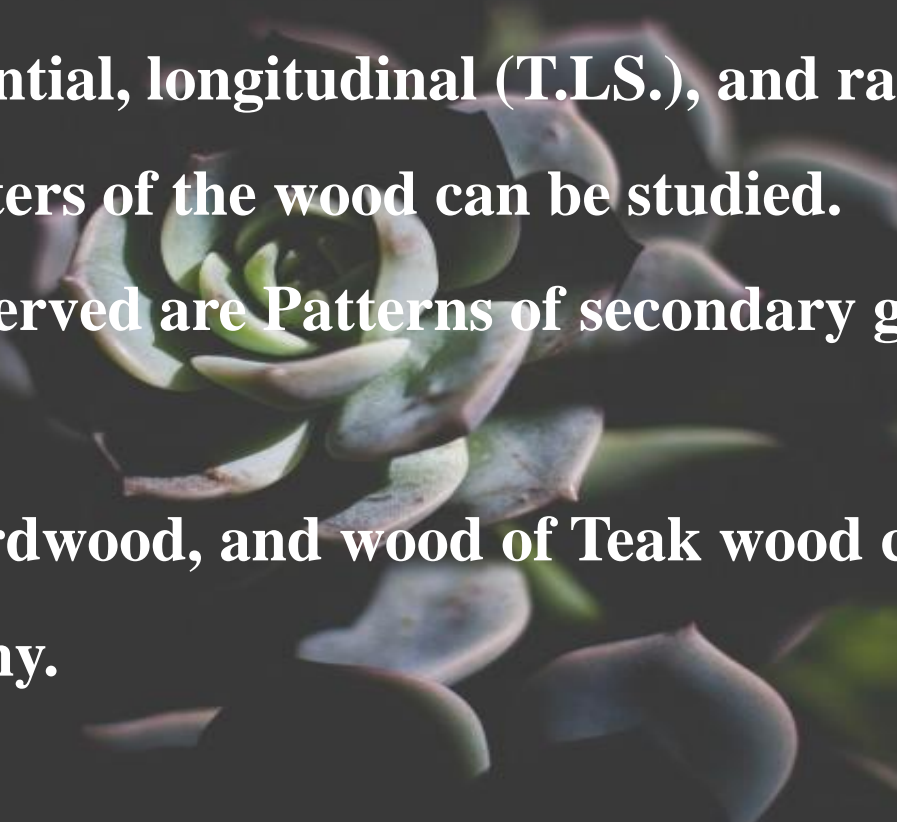
### 3.2.4 Importance in Pharmacognosy

- Majority of the crude drugs obtained from the plant parts are known as organized crude drugs, used in the identification of plants, and also in detecting adulterants.





### **3.2.5 Importance in Wood Identification**

- **Application of anatomy in the identification of wood is a common practice. By obtaining transverse, tangential, longitudinal (T.L.S.), and radial longitudinal section (R.L.S.) anatomical characters of the wood can be studied.**
  - **The Characters mainly observed are Patterns of secondary growth Position and the nature of growth rings.**
  - **Sandal wood, softwood, hardwood, and wood of Teak wood can be identified by knowing their wood anatomy.**
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*Thank you...*