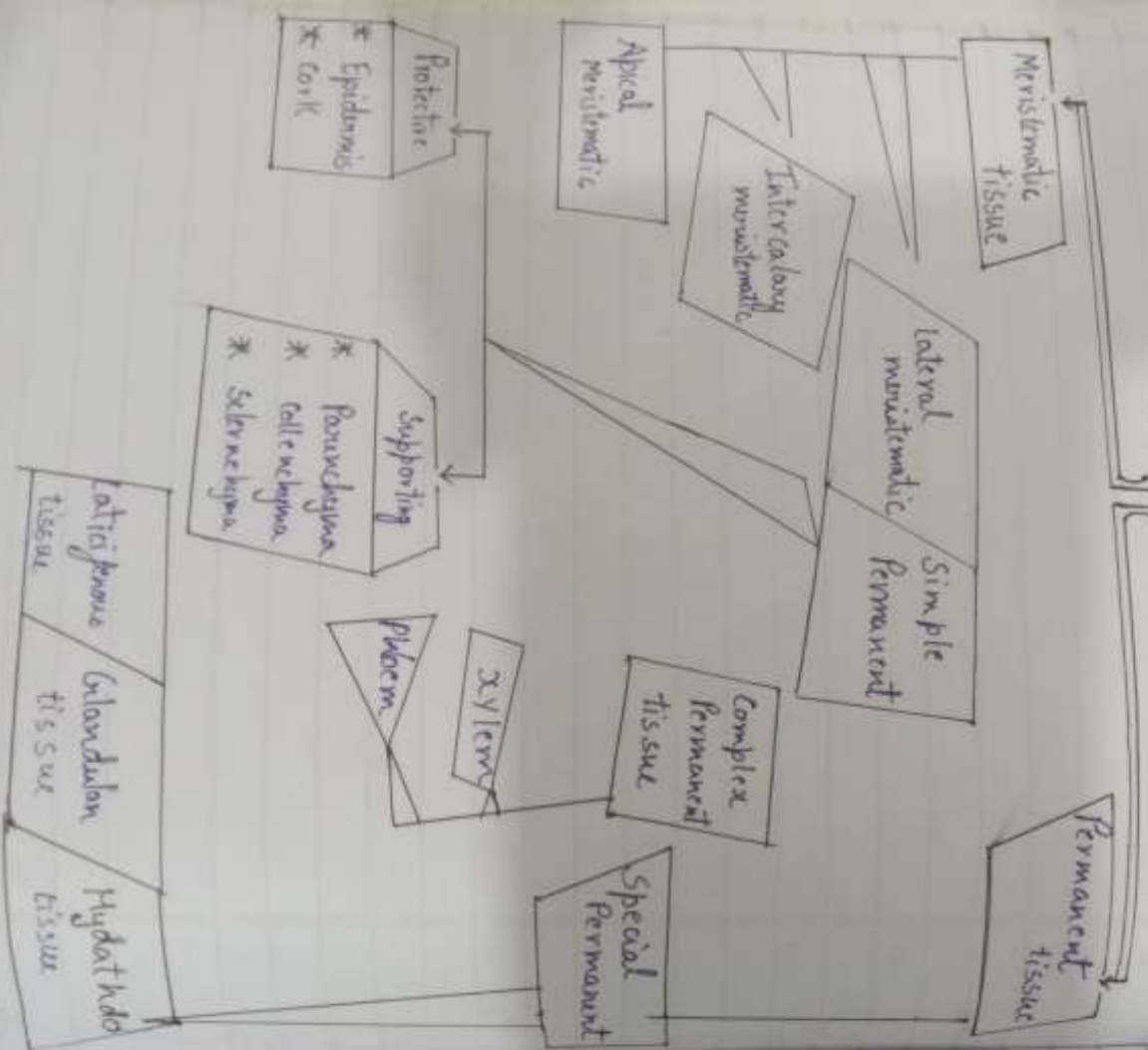


Plant tissue



CHAPTER - 2

TISSUES

Tissues - can be defined as a group of cells that have a common origin and function. They work together to achieve a common function.

Plant tissues -

Plant tissues are divided into two categories based on the ability of their cell to divide. These are meristematic tissue & permanent tissue.

Meristematic tissue -

Meristematic tissue are formed of young, comparatively unengaged undifferentiated living cells that keep dividing and add new cells throughout the life of plant. Meristematic tissue are growing areas of plant such as tips of root, shoot and branches.

Page _____

Meristematic tissues are present in the growing region of plant. Such as tips of root, shoot and branches.

Characteristics of meristematic tissues

The meristematic cells are small, undifferentiated and thin walled. These are compactly arranged, without intercellular spaces.

A cell may be oval, spherical, polygonal with thin cell wall made of cellulose. Cytoplasm is dense, vacuoles are small or absent.

Types of meristematic tissues

Based on location, in plant body following three types meristematic are found -

Apical meristem - is found at the growing tips of stem, root and growing young leaves. It is also

Date _____
Page _____

called Primary meristem. It is responsible for growing and elongation of root and stems.

Intercalary meristem - is located at the base of leaves and twigs at the base of internodes.

It increase the length of organ and branches and is responsible for winding movement of twigs.

Lateral meristem - is found as cambium and in the vascular bundle of dicot ~~wood~~ stem and root and as cork cambium beneath the

It helps in ~~increasing~~ the diameter and girth of ~~plant~~.

Permanent tissue -

→ Permanent tissue are formed of cell that have capacity to divide

Simple permanent tissue-

are made up of only one type of structurally and functionally cells. These are tissues which are protective and supporting in function.

Supporting tissue

- Parenchyma - Parenchyma is the unspecialized living plant tissue formed of thin walled, rounded and polygonal cells. It is considered as the fundamental tissue of ground tissue.
- Parenchyma cells is found in the soft part of almost all the organs of plant.

Characteristics of Parenchyma

- Parenchyma cells are living cells with thin cell wall of cellulose.
 - They are rounded, oval or polygonal in shape with intercellular spaces.
 - Cytoplasm is dense with one large or more than one small vacuole.
- ~~Cytoplasm is dense with one large or more than one small vacuole.~~
- Specilised types of parenchyma -

→ Chlorochyma -

Parenchyma cells with chloroplast form chlorochyma. They manufacture food for the plant by photosynthesis.

→ Palisade chlorochyma -

In ~~parenchyma~~ cells are ~~parenchyma~~ and are arrange under the upper part of leaves. These cells also synthesis ~~tooth~~ food.



* Parenchyma -

In aquatic plant, large air cavity are present between the parenchyma is known as aerenchyma. It helps in aquatic plants in floating.

Function of parenchyma

- Parenchyma forms the ground tissue and tissue in plant.
- The storage organs, parenchyma cell store food.
- It provides rigidity to the plant by keeping cell rigid.
- Parenchyma cells store waste material in the form of gum, crystals and tannin.

* Collenchyma

Collenchyma is divide from parenchyma by the elongation of cells and thickness of primary cell wall only at the ~~corner~~ corner.

- Collenchyma is found in stem, stalk leaf and leaf

Characteristics of collenchyma

- The cell of collenchyma are living fairly elongation.
- They appear polygonal and circular, oval in cross section.
- The collenchyma cells are found by thick primary cell wall. The cell wall is thickened along the corners due to the deposition of cellulose and

Function of Collenchyma

- Collenchyma provides mechanical support to the developing organ tubercules discs.
- Collenchyma cells with chloroplast carry out photosynthesis.
- These cells also store food and allowed growth and elongation of organ.

2) Sclerenchyma

- Sclerenchyma is hard supporting tissue formed of long narrow fibres like cell.
- These cell are dead with thick lignified cell.
- Sclerenchyma occurs in root, stem leaves, petiole, associated with the vascular tissue and in the cortex.

3) Characteristics of sclerenchyma



- Sclerenchyma cells are dead without nucleus and cytoplasm.
- Their cell wall is formed of cellulose and hemicellulose. It is thickened due to the secondary deposition of lignin.
- Lignin act as a cement and hardens the cell wall.
- In sclerenchyma cells occur into two forms
 - (i) Fibres
 - (ii) Sclereids

• Fibres -

The fibre cells of sclerenchyma are elongated, narrow, ~~gapping~~ tapering at both end with ~~thickened~~ lignified cell wall.

- The sclerenchyma fibre provides mechanical support to the plant. They help in conduction hence present in the secondary xylem.

• Sclereids

They are also called stone cells. Their cell wall is highly thickened and lignified. These become dead, stony, at all maturity.

- Function -

Sclereids provide mechanical strength and rigidity to the plant.

Complex permanent tissue

A complex permanent tissue living as well as dead cell which work together as a unit to perform common function.

Xylem and phloem are two types of complex permanent tissue.

Xylem

Xylem is a vascular as well as mechanical tissue. It is mainly responsible for conduction of water and mineral from root to top of the plant. It consists of 4 kinds of cells.

- Xylem tracheids
- Xylem fibres
- Xylem parenchyma
- Xylem vessels

Xylem tracheids - They are dead, elongated cells with thickened walls.

Their cell walls are very thin and lignified.

- Tracheids are mainly found in lower vascular plants, in xylem of trees and gymnosperms but are absent in most angiosperms.
- Xylem tracheids conduct water, minerals and give mechanical support to the plant.

Xylem parenchyma

They are the living parenchymatic cells with thin cellulose wall.

- They are present in primary and secondary cell wall.
- They store food and help in conduction of water.

Phloem

Phloem is the living conductive tissue. It contains tubes for the transport of food product from green and storage organ of plant to the other organ. The cells of phloem are of the following four types :-

- Sieve tube
- Phloem parenchyma
- Phloem fibre
- Companion cells.

Sieve tubes

These are main conductive tissue of the plant. These are cylindrical cells arranged in vertical rows joint at the end.

- Sieve tube conduct food material prepared in the leaf.

Companion cell -

These cells are elongated thin walled living parenchyma cell. They remain associated with sieve tube and help them in the conduction of food material.

Phloem parenchyma -

It is formed of thin wall unspecialised parenchyma cell these cell store food.

Phloem fibre -

These are dead sclerenchyma fibres

Differentiate :-

Phloem

Xylem

- | | |
|--|---|
| * It conduct organic solution of food material. | * It conduct water & minerals. |
| * In addition to conduction, xylem provides mechanical strength to plant | * Phloem performs no mechanical function for plant. |
| * Conducting channels & sieve tubes | * Conducting channel are tracheids & vessels. |