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SUBJECT: BIOLOGY. DATE: 2ND/JANUARY/2024.

Plants do not move around like animals do. They do not require too much energy. Due to that a reasonable number of their tissues are supportive providing rigidity for uprightness to obtain maximum sunlight for photosynthesis. These supportive tissues also give resistance against strong wind and water which they are continuously subjected to.

Types of supportive tissues.

Based on functions they are of five (5) types, but the focus is on parenchyma, sclerenchyma and xylem. Others include: collenchyma and phloem.

- ❖ **Parenchyma: Parenchyma is a tissue made up of living unspecialised cells that are roughly spherical in shape. A parenchymatous cell has a thin but fairly rigid cell wall composed mainly of cellulose and a large vacuole containing cell sap. Cell sap is a concentrated solution and has a high osmotic pressure. Water (absorbed by the roots) enters the cell and passes into the vacuole by osmosis. The cell vacuole increases in volume causing the cytoplasm to press against the cell wall. The cell wall only expands slightly and resists the internal water pressure. This is known as *turgor pressure*. Eventually turgor pressure builds high enough to stop the flow of water into the cell (although the cell sap may still be more**

concentrated than the medium outside the cell). Such a cell is said to be fully turgid.

Turgid parenchyma press against one another and become tightly packed, providing support in the organs where they are found. In herbaceous plants, turgid parenchyma provides the main support.

FUNCTIONS.

- 1. They act as packing cells.**
- 2. They synthesize food when chloroplast is present in them.**
- 3. They store food because of the space.**
- 4. They can store and assimilate reserve food materials like fats, protein and starch.**

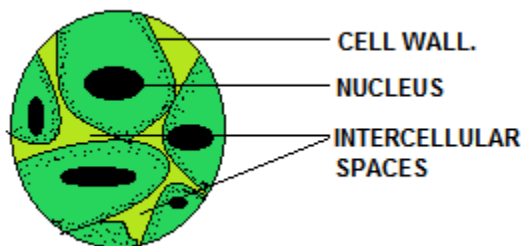


Diagram of parenchyma.

- ❖ **Sclerenchyma:** This tissue is composed of two types of cells, *fibres* and *sclereids*. Both are dead cells in which cell walls are heavily thickened with deposits of *lignin*, a hard substance that provides mechanical strength. (A dead cell has a cell wall enclosing a space or lumen instead of protoplasm.)
Sclerenchyma fibres are narrow, elongated, polygonal cells with tapering end walls. The lumen is small because of the thickened cell walls. The end walls of adjacent cell walls interlock forming long strands.

Sclerenchyma fibres are arranged in bundles or sheets in the outer regions of the cortex and pericycles of stems and in vascular tissue.

Sclereids or stone cells are heavily lignified cells which are roughly spherical and slightly elongated. They are singly, in groups or in solid layers in almost all parts of the plant, especially in the cortex, pith, phloem, fruits and seed coat.

FUNCTIONS.

- 1. It gives toughness and rigidity to different parts of the plant.**
- 2. It provides protective covering to seeds and nuts(sclereids).**
- 3. The sclerenchyma fibres of coconut and jute are used commercially.**

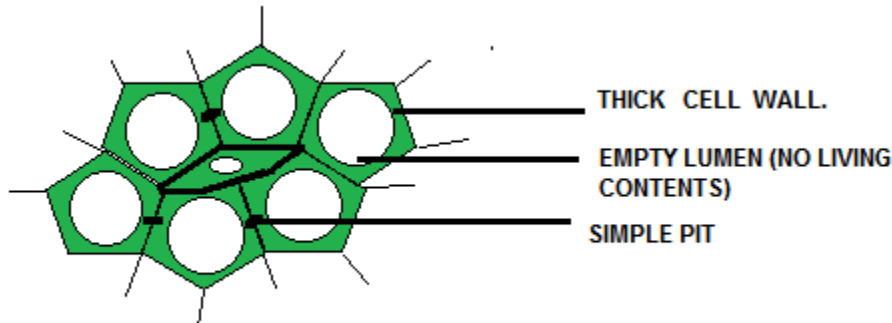


Diagram of sclerenchyma.

- ❖ **Xylem: This the water conducting tissue which also has a strengthening function, especially in plants that undergo secondary growth. Four types of cells make up the xylem tissue; the *tracheids*, *vessels*, *xylem fibres* and *xylem parenchyma*. Of these the first three are lignified and so provide mechanical support.**

- **Tracheids are single elongated cells with tapering end walls, which may grow to a length of 0.5mm and a width of 0.3mm they are arranged in strands just like sclerenchyma fibres. Mature tracheids are dead with empty lumens. They are the only xylem tissues present in less advanced vascular plants like ferns. The xylem of angiosperms contains few tracheids.**
- **Vessels are more abundant in the vascular tissues of angiosperms. They are long tabular structures that are formed by the fusion of several elongated cells stacked one on top another. They are wider than tracheids and are dead. Xylem vessels have distinctive wall patterns, formed by the way lignin was deposited on the primary cell wall.**
- **Xylem fibres are similar sclerenchyma fibres. They are narrow, elongated cells with very thick walls and tapering end walls. Their sole function is to provide support.**
- **Xylem parenchyma: These are composed of cells with large vacuole. They serve for the storage of food and conduction of water and minerals in the plant body.**

FUNCTIONS.

- 1. It is responsible for upward movement of water and dissolved mineral salts from the root to the leaves.**
- 2. The lignified walls of xylem fibres provide mechanical support to different plant parts.**



(a) A vessel element



(b) Tracheid

Diagram of xylem tissues.