DEPARTMENT OF BOTANY
BY : DR RANJANA
D.B. COLLEGE, JAYNAGAR
ASSISTANT PROFESSOR (GUEST)
LALIT NARAYAN MITHILA UNIVERSITY, DARBHANGA (BIHAR)

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HONOUR'S PART - II

GROUP A - ANATOMY

PRINCIPLE AND DISTRIBUTION OF MECHANICAL TISSUES - II

B. Complex Tissue - It is a heterogeneous in nature, having a collection of different kinds of cells, all of which work together as a unit e.g. Xylem and Phloem.

(i) Xylem -

(a) It is composed of 4 types of cellular elements : Tracheids, Vessels (Trachea), Wood (Xylem) Fibres and Wood parenchyma. They co-ordinate the conduction of water and mineral nutrients from root to leaves.

(b) Except wood parenchyma, rest are dead, heavily lignified and thick walled.

(c) Tracheids have elongated tubular cells with tapering ends and pitted (simple or bordered) walls, primarily concerned with conduction. They occur-both in pr. And sec. Xylem of all groups, including angiosperms.

(d) Vessels are formed of a row of elongated cells placed end to end, with perforated partition walls. It is the most effective conducting element, occuring only in Pteridium, Selaginella, Gnetum, Ephedra, Welwitschia and in all angiosperms.

(e) Wood fibres are the fibres associated with Xylem and serve as the chief mechanical cells of Xylem.

(f) Wood parenchyma are parenchyma associated with Xylem, meant chiefly for storage of food but also helps in conduction.

(ii) Phloem -

(a) It is also composed of 4 types of cellular elements : Sieve tubes, companion cells, Bast (Phloem) Fibres and Phloem parenchyma, which together help in conduction of food material from leaf to different plant parts. Bast Fibres are the only dead cells.

(b) Sieve tubes are tubular bodies arranged in a linear row, having perforated plates on the end walls called Sieve plates. They are found in all angiosperms. Mature Sieve tubes are enucleate. These constitute the main conducting element. Sieve tubes cease to function when a pad like structure called callus, formed by the insoluble carbohydrate the callose gets deposited over the Sieve plates.

(c) Companion cells are the parenchymatous cells closely associated in origin, position and function with Sieve tubes. Each cell contains dense cytoplasm and a large nucleus and are said to assist the Sieve tubes in food conduction. They are absent in pteridophytes and gymnosperms but characteristic of almost all

angiosperms.

(d) Bast Fibres are sclerenchymatous cells, frequently present in the secondary phloem but generally absent in primary phloem and chiefly perform the mechanical functions.

(e) Phloem parenchyma are living cylindrical cells concerned with storage of organic food matters. They are present in all kinds of phloem (primary and secondary) but are absent in phloem of monocotyledons