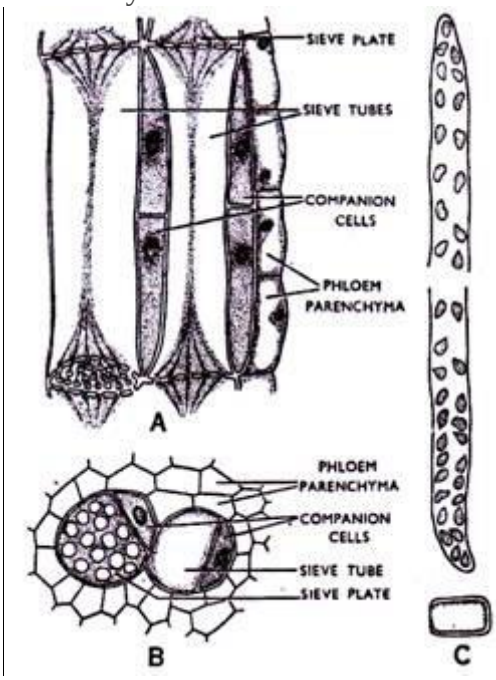
COMPLEX TISSUE : PHLOEM:

The other specialised complex tissue forming a part of the vascular bundle is phloem It is composed of sieve elements, companion cells, parenchyma and some fibres. Sclerotic cells may also be present.Phloem is for translocation of organic solutes—the elaborated food materials in solution. The elements of phloem originate from the procambium of apical meristem or the vascular cambium. Phloem tissue consists offour types of cells, namely: sieve tubes, companion cells, phloem fibres and phloem parenchyma

Sieve Elements*:*

The most important constituents of phloem are the sieve elements, the sieve tubes and sieve cells. From ontogenetic point of view a sieve tube resembles a vessel and a sieve cell a tracheid. Sieve tubes are long tube-like bodies formed from a row of cells arranged in longitudinal series where the end-walls are perforated in a sieve-like manner. The perforated end-walls are called the sieve plates, through which cytoplasmic connections are established between adjacent cells.

A sieve plate is called simple, if it has only one sieve area, whereas the plate may be compound with several sieve areas arranged in scalariform, reticulate or other manners. Though rare, the sieve areas may occur on the side walls as well.



Companion Cells:

Companion cells remain associated with the sieve tubes of angiosperms, both ontogenetically and physiologically. These are smaller elongate cells, having dense cytoplasm and prominent

nuclei. Starch grains are never present.They occur along the lateral walls of the sieve tubes. A companion cell may be equal in length to the accompanying sieve tube element or the mother cell may be divided transversely forming a series of companion cells . The companion cells are so firmly attached to the sieve tubes that they cannot be normally separated by maceration. A sieve tube element and a companion cell originate from the same mother cell. Their functional association is evident from the fact that companion cells continue so long the sieve tubes function, and die when the tubes are disorganised.

Phloem Parenchyma:

Besides companion cells and albuminous cells, a good number of parenchyma cells remain associated with sieve elements. These are living cells with cellulose walls having primary pit fields. They are mainly concerned with storage of organic food matters. Tannins, crystals and other materials may also be present. The parenchyma cells of primary phloem are somewhat elongate and occur with the sieve elements along the long axis.

Phloem Fibres:

Sclerenchymatous fibres constitute a part of phloem in a large number of seed plants, though they are rare in pteridophytes and some spermatophytes. They occur both in primary and secondary phloem. These are typical elongated cells having interlocked ends, lignified walls with simple pits. The fibres of primary phloem are essentially similar to those occurring in cortex and secondary phloem.

They are of considerable commercial importance, as these fibres are abundantly used for the manufacture of ropes and cords. The flax fibres, unlike others, have non-lignified walls. Sclerotic cells are often present in primary phloem. They probably develop from parenchyma with the age of the tissue. So it is a case of ‘secondary sclerosis’.

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