Topic: Gnetum; Structure of Sporophytic Plant Body

B.Sc. Botany Hons. II

Paper: III Group: A

Dr. Sanjeev Kumar Vidyarthi
Department of Botany
Dr. L.K.V.D. College, Tajpur, Samastipur
L.N. Mithila University, Darbhanga

Stem of *Gnetum*

External Morphology:

- Almost all the species of *Gnetum*, except the tree type like *G. gnemon*, exhibits two types of branches viz. dwarf shoots or branches of limited growth and long shoots or branches of unlimited growth.
- In climbing and scandent species of *Gnetum*, the stem is articulated with prominent joints.
- The joint consists of two parts: one just above the node and the other below the node and these two are separated by an annular groove.
- In arboreal species such as *G. gnemon*, the stem exhibits uniform type of branching.

Internal Structure:

- Internally, a Gnetum stem is similar to that of a dicot.
- In T.S. the stem exhibits more or less circular outline.
- The following regions are discernible from outside inward:

➢ the heavily cutinised single-layered epidermis with sunken stomata

➢ A several- layered (12-16 layers) thick cortex which is differentiated into an outer chlorenchymatous, a middle parenchymatous and an inner sclerenchymatous region.

- The cells of the inner regions are referred to as spicular cells.
- Many fibrous cells are often present which have branched or unbranched pit canals.
- The cortex is followed by endodermis and pericycle layers which are not distinct.

- Next to pericycle, there is an endarch siphonostele.
- The vascular cylinder is comprised of 20-24 collateral, open and endarch

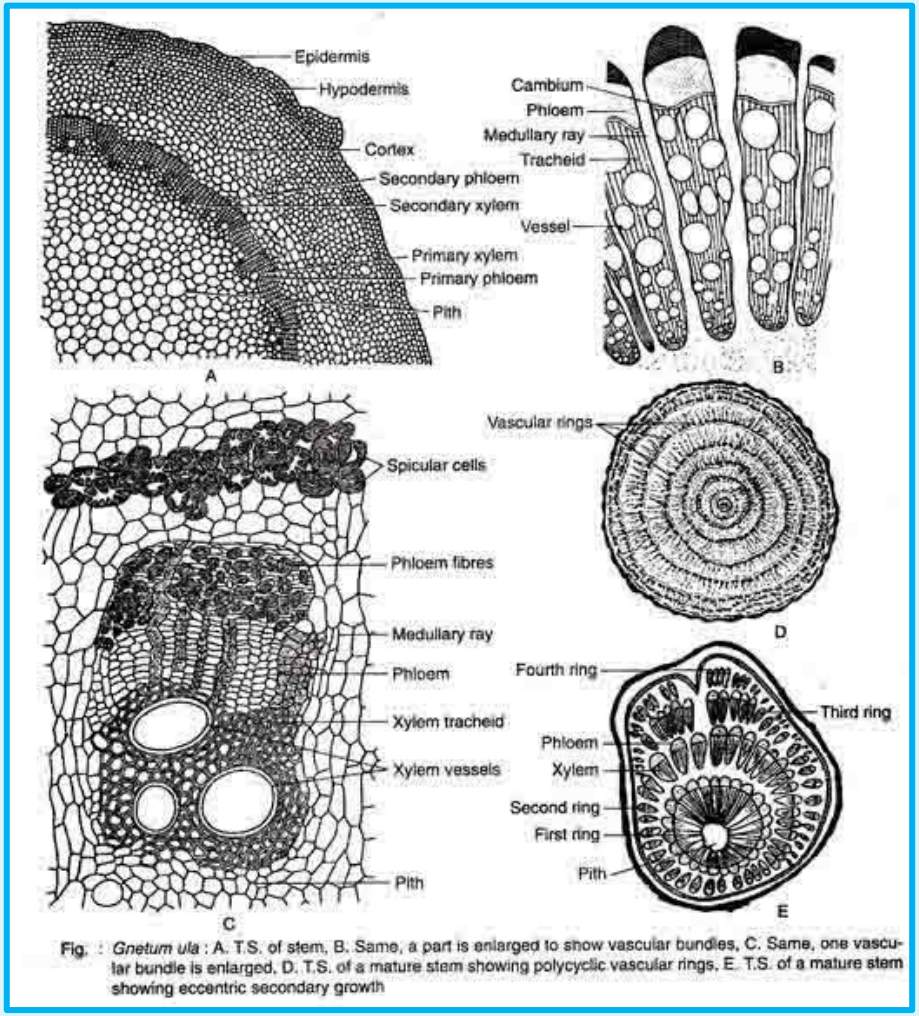

Fig. : *Gnetum ula* : A. T.S. of stem, B. Same, a part is enlarged to show vascular bundles, C. Same, one vascular bundle is enlarged, D. T.S. of a mature stem showing polycyclic vascular rings, E. T.S. of a mature stem showing eccentric secondary growth

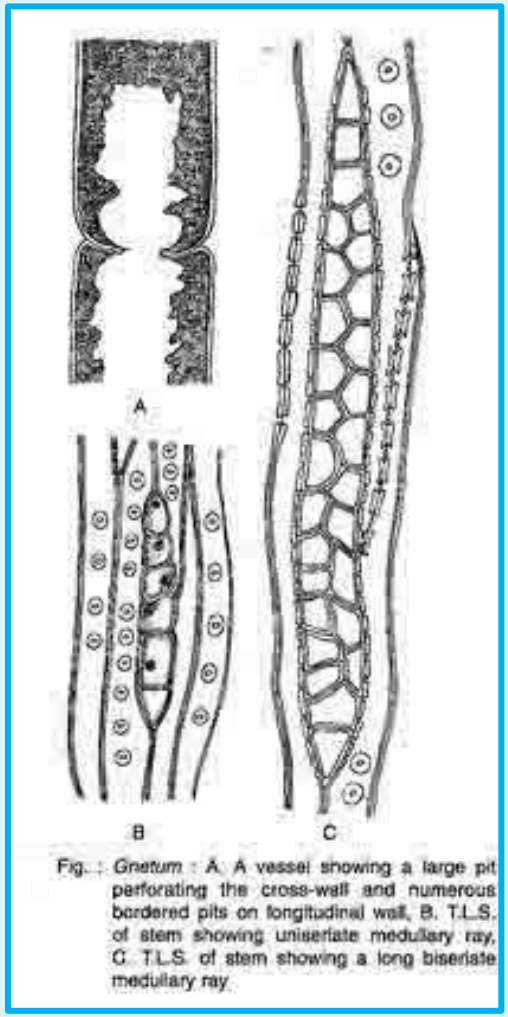

Fig. : *Gnetum* : A. A vessel showing a large pit perforating the cross-wall and numerous bordered pits on longitudinal wall, B. T.L.S. of stem showing uniseriate medullary ray, C. T.L.S. of stem showing a long biseriate medullary ray

- The vascular bundles are separated from one other by wide primary medullary rays.
- The xylem consists of tracheids and few vessels.
- The protoxylem of tracheids have annular or spiral thickening and the metaxylem have reticulate thickening with uniseriate bordered pits.
- The phloem is composed of sieve cells and phloem parechyma.
- Laticiferous elements are often found in pith as well as in cortex.

Secondary Growth in Thickness:

- In tree species like *G. gnemon*, the secondary growth is of normal type.
- The fascicular cambium joins with interfascicular cambium to form a complete cambium ring that cuts off a continuous cylinder of secondary xylem towards the inside and secondary phloem towards the outside.

- The secondary xylem is produced much more than the secondary phloem.
- Thus, several extra- stellar rings of xylem and phloem are formed which are separated into wedge-shaped bundles because of medullary rays.
- Some of these accessory rings remain incomplete and, as a result, the vascular bundles become eccentric with regard to pith .
- The periderm is also formed by the activity of phellogen during the third or fourth year of growth of the stem.
- The wood of *Gnetum* is composed of vessels, tracheids and xylem parenchyma.
- The vessels are of different sizes and have a single pore on their end walls.
- The tracheids are much longer than the vessels and have bordered pits on both of their radial and tangential walls.

- The xylem parenchyma cells have simple pits. There are many uni- to multiseriate vascular rays.
- The secondary phloem consists of sieve cells and phloem parenchyma.
- The companion cells are totally absent in Gnetum, although some small cells are present near the sieve tube.
- The vascular rays are very large and multi- seriate which appears boat-shaped in T.L.S. occasionally, some short biseriate or uniseriate rays are present.
- The ray cells are thick-walled and pitted.