

PLANT ANATOMY Lecture 15 - Stele and Bundle Types

- I. Types of steles (stellar types); stele refers to the central vascular network of the shoot and the root (includes outermost phloem and everything to the inside of it)**
 - A. Protostele**
 - 1. No pith and usually no separate vascular bundles
 - 2. First pattern (phylogenetically) that appeared in vascular plants
 - 3. Predominant pattern found in roots of almost all plants and shoots of lower vascular plants
 - 4. Types of protostele
 - a) Haplostele - xylem is a circular mass
 - b) Actinostele - xylem margin is not smooth; it "undulates"
 - c) Plectostele - xylem not one mass; series of plates
 - B. Siphonostele**
 - 1. Has a pith and can have separate vascular bundles (primary growth)
 - 2. More advanced plants
 - 3. Found in shoots of seed plants and in roots having a broad stele (monocots)
 - 4. Types of siphonostele
 - a) Amphiphloic - phloem found on both sides of the xylem
 - 1) Solenostele - very few or little leaf gaps widely separated (continuous cylinder)
 - 2) Dictyostele - leaf gaps are abundant
 - b) Ectophloic - phloem found only to outside of the xylem
 - 1) Eustele (dicots) - one ring of vascular bundles surround a pith
 - 2) Atactostele (monocots) - scattered bundle arrangement
- II. Stellar patterns at the node (Nodal pattern)**
 - A. Different because this is where leaves and buds are attached
 - B. Area above & behind the leaf or bud is the leaf gap
 - C. Area showing where the leaf (bundle(s)) attaches to stem is called leaf trace
 - D. Examples of patterns:
 - 1. Unilacunar, 1 trace; unilacunar, 3 trace; trilacunar, 3 trace
- III. Bundle types**
 - A. Collateral (common) - phloem on one side (abaxial) and xylem on the other (adaxial)
 - B. Bicollateral (not common) - phloem on both sides of the xylem
 - C. Amphiphloic (not common at all) - xylem in the middle surrounded by phloem
 - D. Amphixylic (rare) - phloem in the middle surrounded by xylem
 - E. Isolated phloem strands (random in some species) - phloem here and there (no such thing as isolated xylem strands)
 - F. All bundle types in minor veins are collateral