

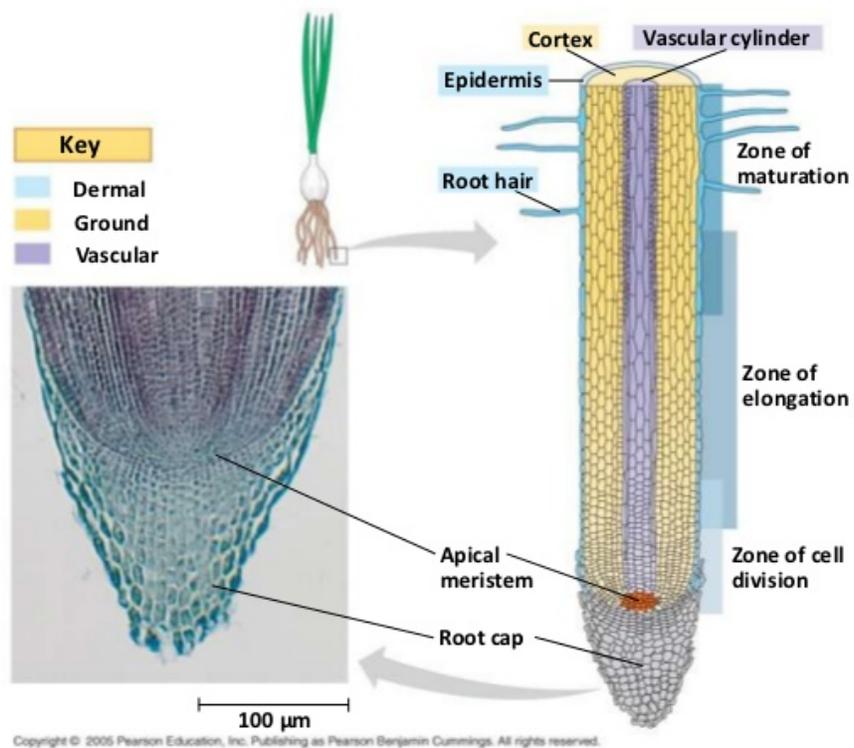
11 October 2016

Plant Growth

- I. Plant Life Span
 - a. Non-determinant growth: If plants stop growing they die
 - b. Primary growth- increase in length of shoot and root
 - c. Secondary growth- increase in thickness or girth of the plant
- II. Perennials (lasting for a long or infinite time) (Woody)
 - a. Indefinite growth (extended period of juvenility before reproductive phase)
- III. Biennials (takes two years to complete its biological lifecycle)
 - a. 2 Growing Seasons: Yr-1 Vegetative; Yr-2 Reproductive
 - b. Vernalization is a cold treatment that is necessary before flowering (reproductive stage)
- IV. Annuals (herbaceous)
 - a. 1 growing season
 - b. Annuals and biennials can grow forever if given the right environment
- V. Plant Meristems
 - a. Perpetually embryonic
 - b. Apical (and Axillary) Meristem
 - i. Height (and Spread)
 - ii. Generates all cell types of plant
 - iii. Sets up initial body plant
 - c. Lateral meristem
 - i. Girth (Diameter)
 - ii. Two kinds
 1. Vascular cambium
 2. Cork cambium
 - d. Intercalary meristem
 - i. Extension of nodes
 - ii. Found in grasses (monocots only, bamboo)
- VI. Origins of All Plant Cells
 - a. Apical Meristem
 - i. Primary Meristems
 1. Protoderm
 2. Procambium
 3. Ground Meristem
 - ii. Primary Tissues
 1. Protoderm → Epidermis
 2. Procambium → primary phloem, primary xylem

3. Ground Meristem → pith, cortex
- iii. Lateral Meristems
 1. Procambium → vascular cambium
 2. Cortex → cork cambium
- iv. Secondary Tissues
 1. Vascular cambium → secondary phloem, secondary xylem
 2. Cork cambium → cork

Primary Growth of Roots



VII. Primary Growth of Root

- a. Stele- central core of the stem and root of a vascular plant, consisting of the vascular tissue (xylem and phloem) and associated supporting tissue
- b. Cortex- the outermost layer of the stem or root bounded on the outside by the epidermis

VIII. Secondary Growth of Root (dicots only)

- a. Cannot take up water (no root hairs and covered with cork)

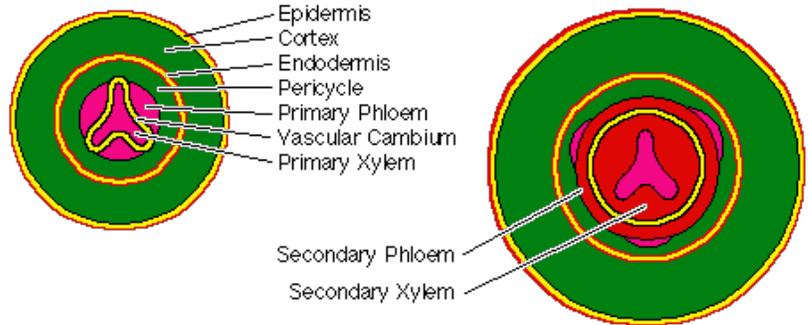
- b. Appearance of vascular cambium surrounding xylem, cork cambium surrounding the phloem and the vascular cambium, and secondary xylem and phloem replace primary xylem and phloem

- c. Bark= phloem, cork cambium, and cork

- d. Periderm= cork cambium and cork

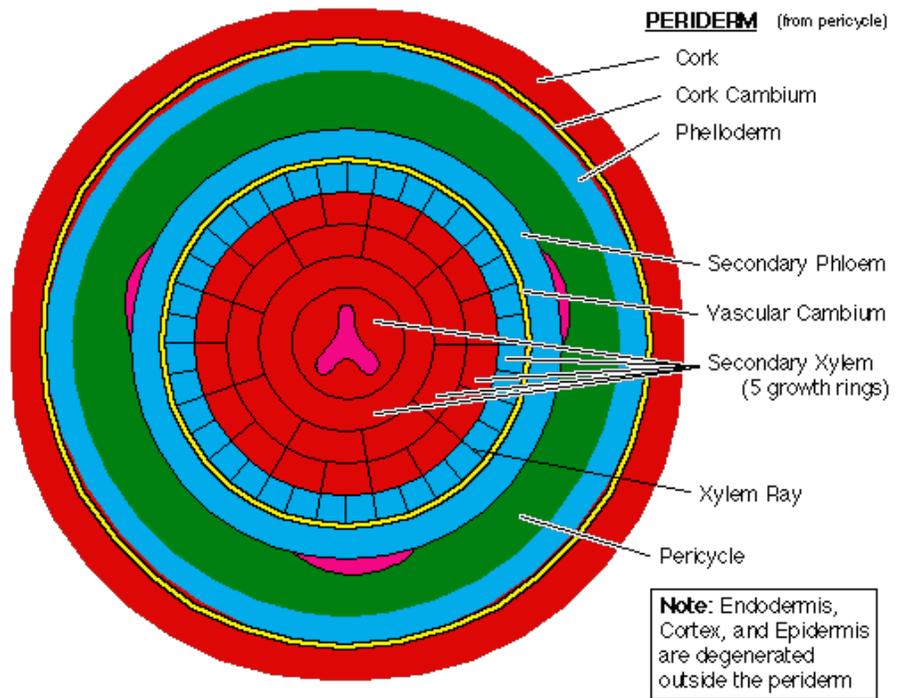
Secondary Plant Body - Root Anatomy

Woody Dicot Root Cross Section



IX. Primary Growth of Shoot

- a. Shoot apical meristem found at tip of plant stem and growth extends upward from top of stem, not bottom
- b. Node- where leaves attach to the stem
- c. Axillary buds- will form branches, which will have their own apical meristems on the ends



X. Secondary Growth of Shoot (dicots only)

- a. In shoot, tree rings formed from vascular cambium with introduction of secondary xylem
- b. Inner wood (xylem) becomes older, harder, and more resistant to decay and its wood cells die becoming heartwood (not necessary for survival)
- c. Sapwood surrounds heartwood and is living wood (vital to tree's health)
- d. Pith= made of cells from apical meristem

XI. Leaf Anatomy

- a. Spongy mesophyll- not packed tightly together and allows carbon dioxide and oxygen to reach palisade cells
- b. Palisade mesophyll- where photosynthesis takes place with bunched parenchyma cells

