

September 18, 2007
PMB 102/IB 102

-Introduction to Photosynthesis

-Leaf considered main site, but can occur in roots, stems.
-leaf consists of three tissue systems, epidermal, vascular and mesophyll.

-Mesophyll can be comprised of two distinctive types of cells, palisade parenchyma and spongy parenchyma.

-consider the "division of labor" by the parenchyma
-palisade have greater wall surface area and relatively less intercellular spaces

-spongy have less wall surface area and greater intercellular spaces.

-maximizing light absorption

- "sieve effect"

-epidermal modifications

-vascular tissues

-venation

-reticulate (dicots), versus parallel (monocots)

-transfer cells

-Leaf structure and environment

-Xerophytes

-thickened cuticle

-sunken stomata

- increased leaf thickness

-Lithops = "window plant"

-Hydrophytes

-thin, reduced vascular tissue, no cuticle, few to no stomata

-Sun/shade leaves

-Structure/Function Aspects of Photosynthetic systems

-Calvin cycle fixes CO₂ into C₃ compound = C₃ plant

-Structurally C₃ plants show typical mesophyll with palisade and spongy parenchyma

-C₃ plants show photorespiration

-C₄ pathway of photosynthesis

-fixes CO₂ initially into C₄ compound (an acid) = C₄ plant

-structurally C₄ plants have specialized mesophyll with a bundle sheath differentiated around vascular tissue (Kranz anatomy)

-C₄ plants eliminate photorespiration by compartmentalizing steps in internal bundle sheath cells

the O₂-sensitive

-C₃/C₄ intermediates

-have intermediate anatomy between C₃ and C₄ plants

-Crassulacean Acid Metabolism = CAM

-C₄ pathway operates, but no specialization in mesophyll

-separates C₃ and C₄ pathways in time, not spatially