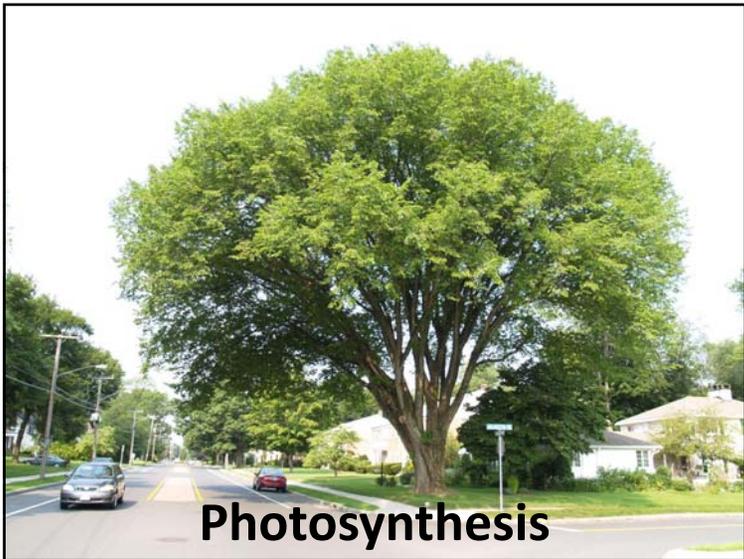


Introduction to Tree Biology

or, how the tree functions as a set of systems

- ## Nine Systems
- Photosynthesis
 - Hydrologic
 - Structural
 - Growth
 - Response
 - CODIT
 - Reproductive
 - Chronological
 - Death and Shedding



Photosynthesis

Carbon Dioxide + Water → Oxygen + Sugar
energy in = sunlight



Photosynthesis

Carbon Dioxide + Water → Oxygen + Sugar



energy from sunlight is now stored in the sugar

Respiration

Oxygen + Sugar → Carbon Dioxide + Water

energy out = metabolism

Sugars are the Building Blocks

Plants will use sugars to make:

Starches, Proteins, Fats, Oils,

Cellulose, Lignins, Wood,

Bark, Leaves,

and so on....

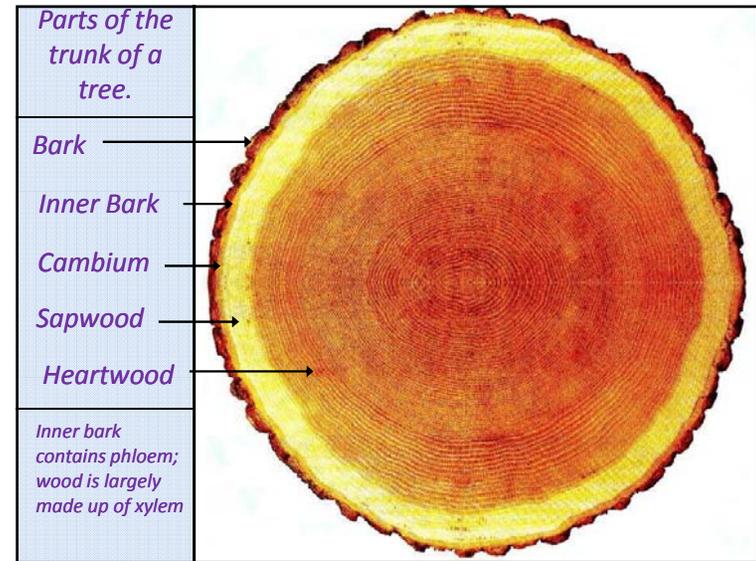
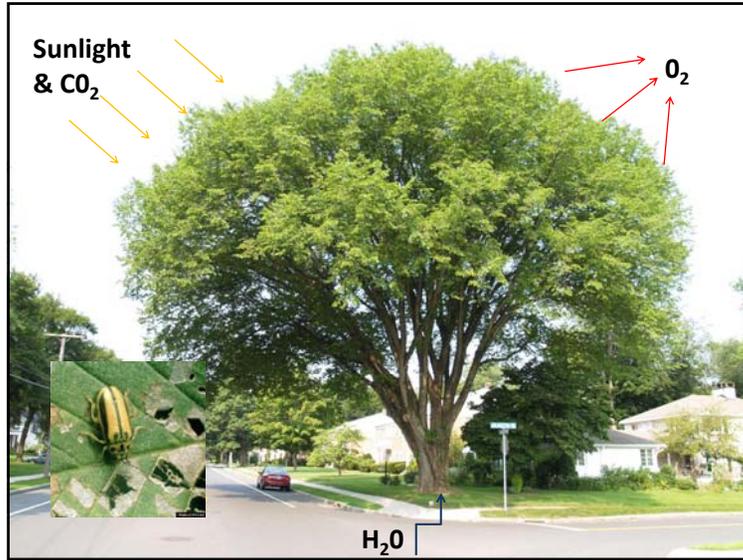
From simple sugars to ever more complex compounds....

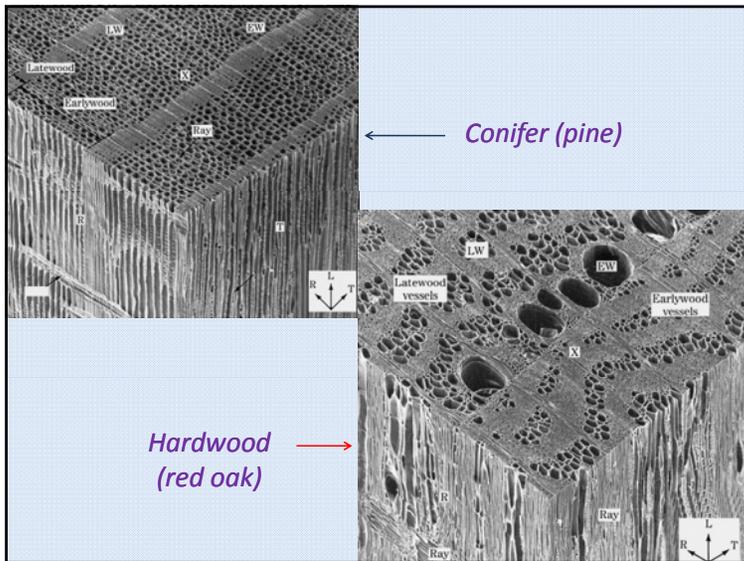
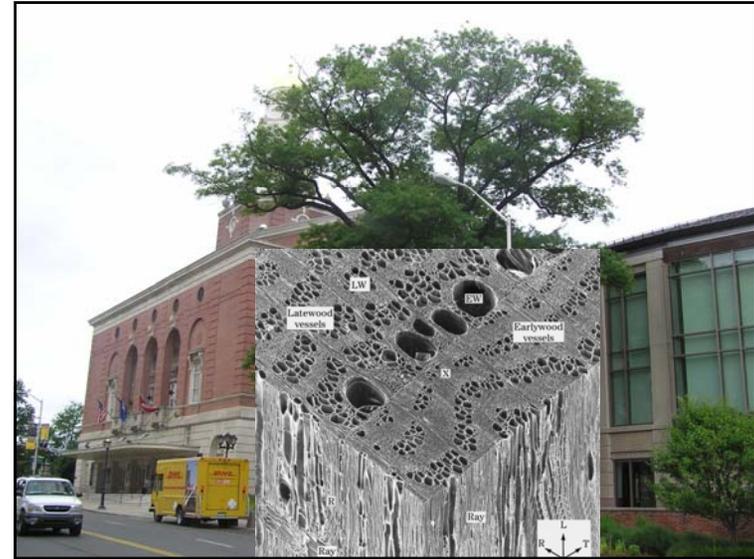


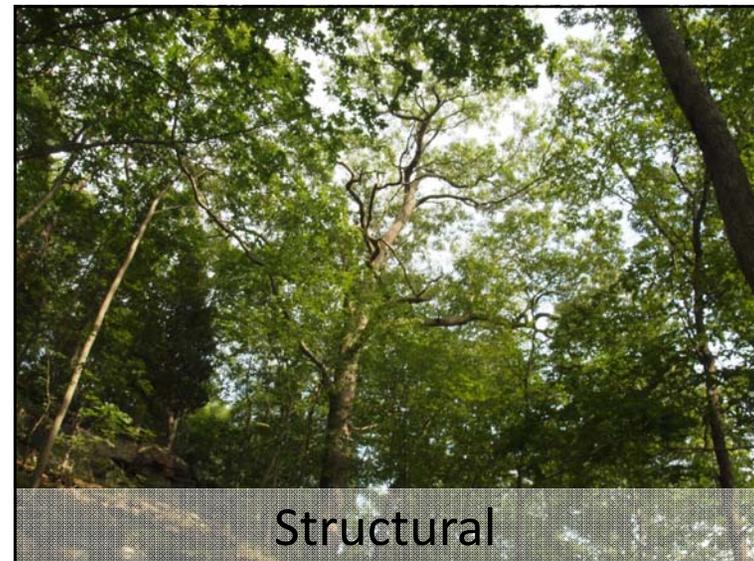
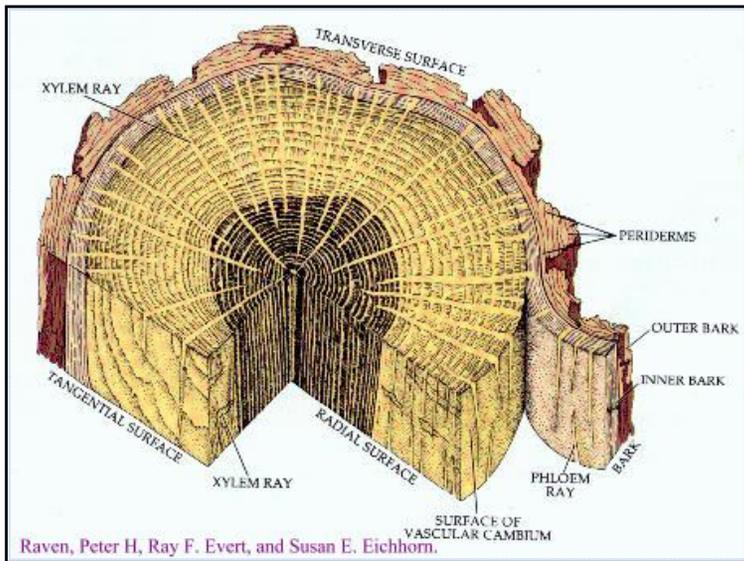
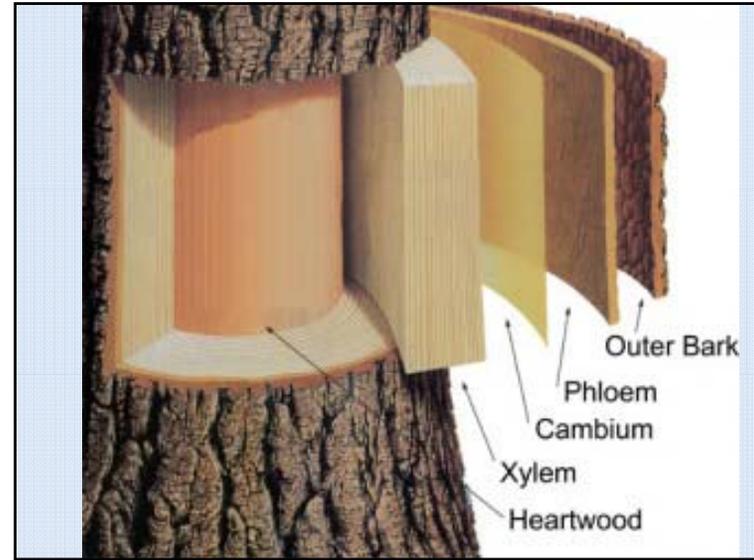
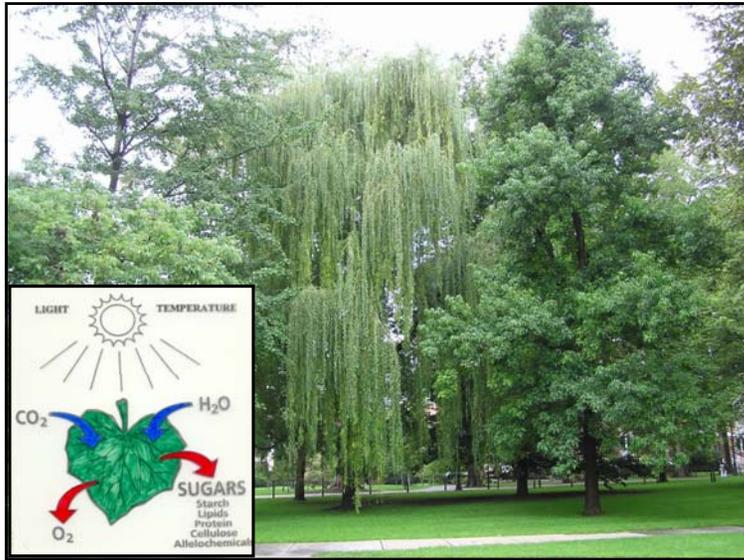
All of which sounds good to the rest of us who are alive on this planet...

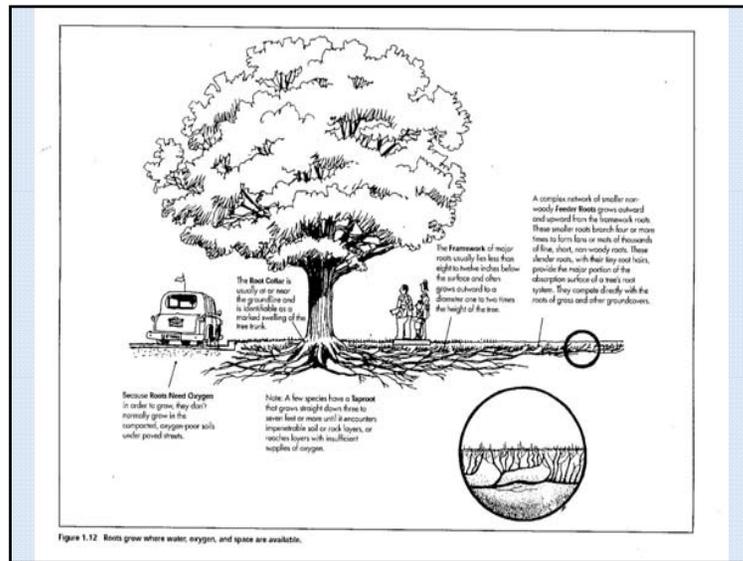


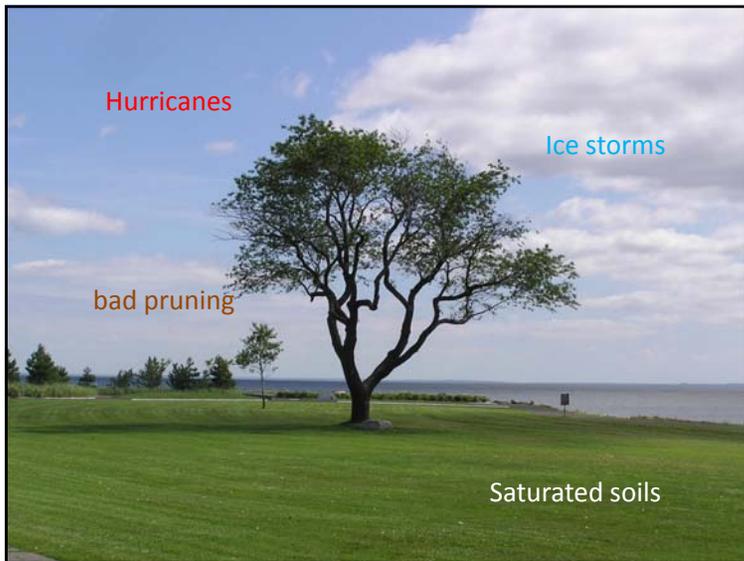
Photosynthesis = Chlorophyll = Green ≠ Leaves (not always)

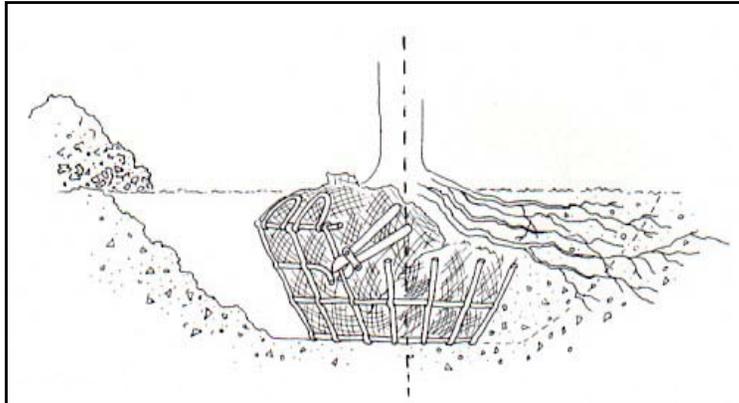




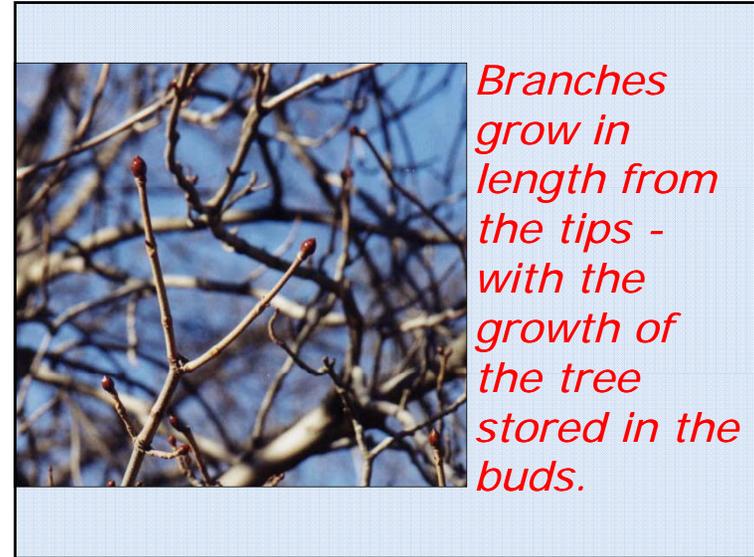






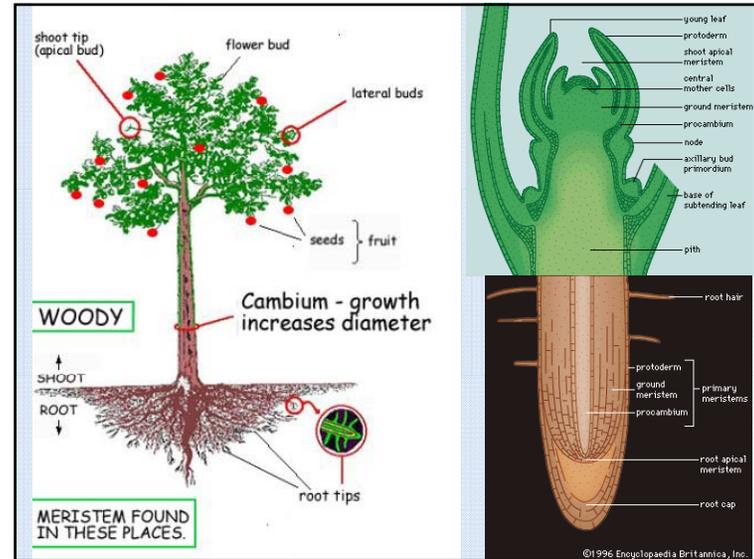


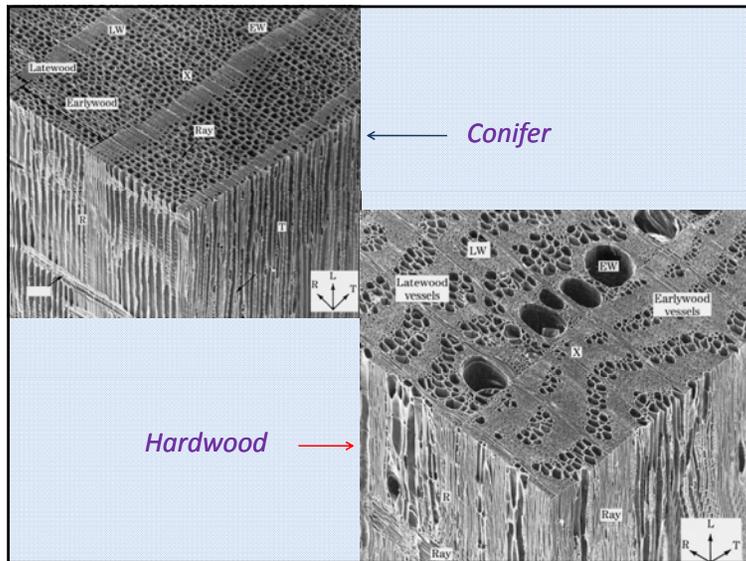
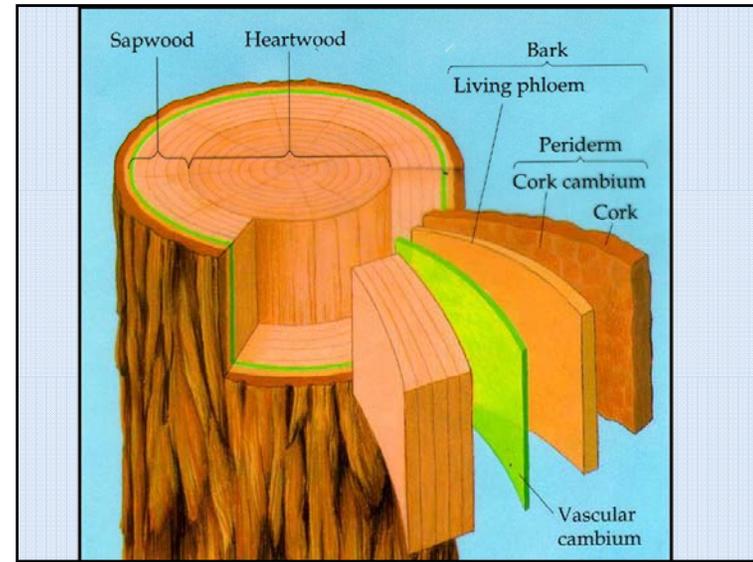
Tree roots grow from the tips, in the top 18 inches or so of the soil. When planting a tree, it is important to remove the burlap and wire from the root ball from the upper 18 inches of the root ball, after the root ball has been placed in the hole!



Branches grow in length from the tips - with the growth of the tree stored in the buds.

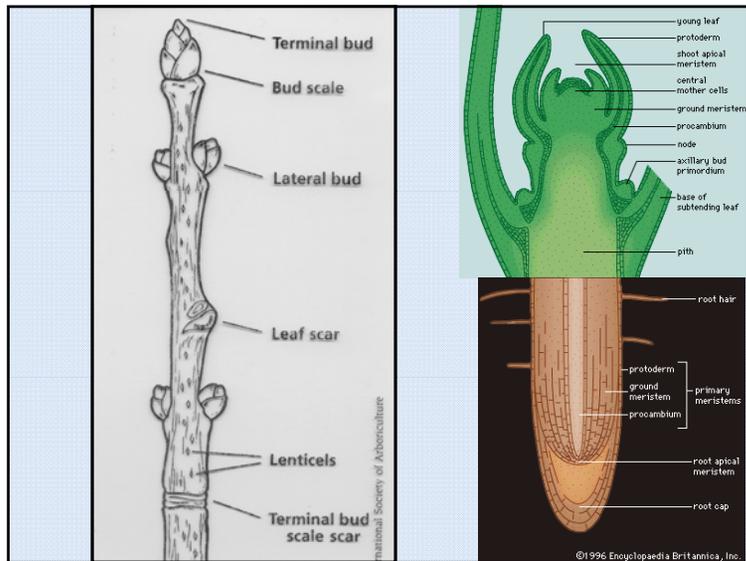
Trees grow in girth by means of the growth layer (cambium) that is located underneath the bark of the tree, including on the trunk and branches and around the roots.

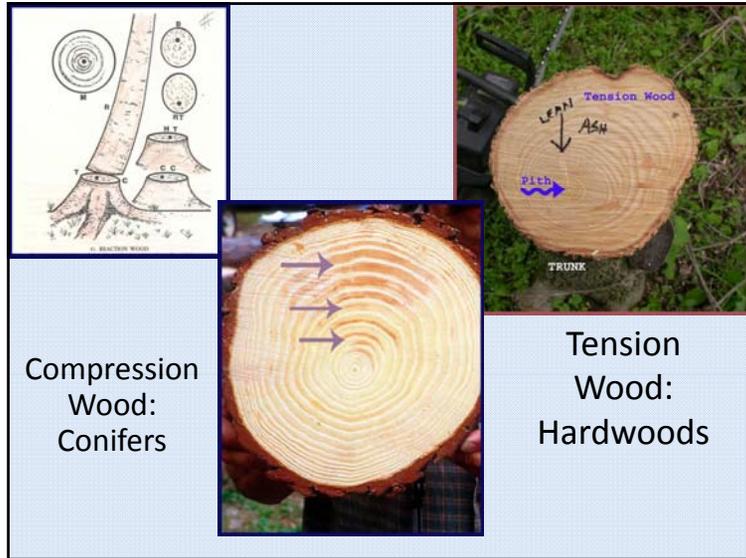














Terms

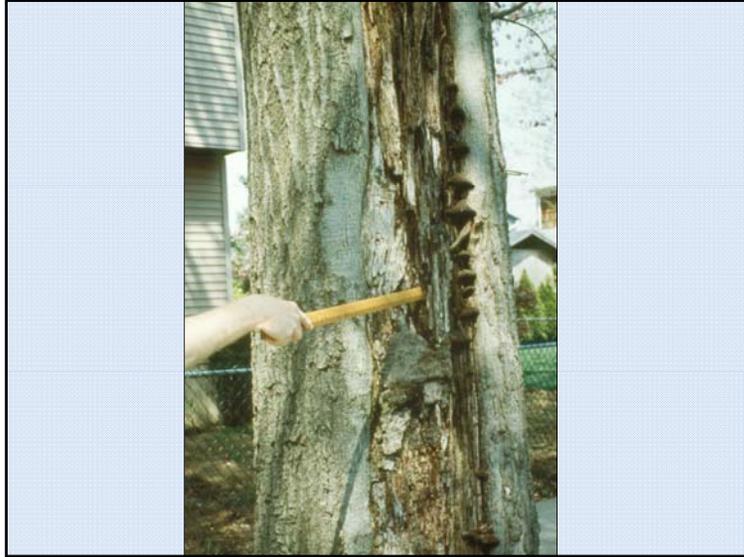
- Excurrent – strong central leader (e.g. pin oak)
- Decurrent – spreading branches (e.g. sugar maple)
- Geotropic – guided by gravity (most conifers)
- Phototropic – guided by access to light (most hardwoods)

(All plants are geotropic, in the sense that roots grow down from the seed and stems grow up)





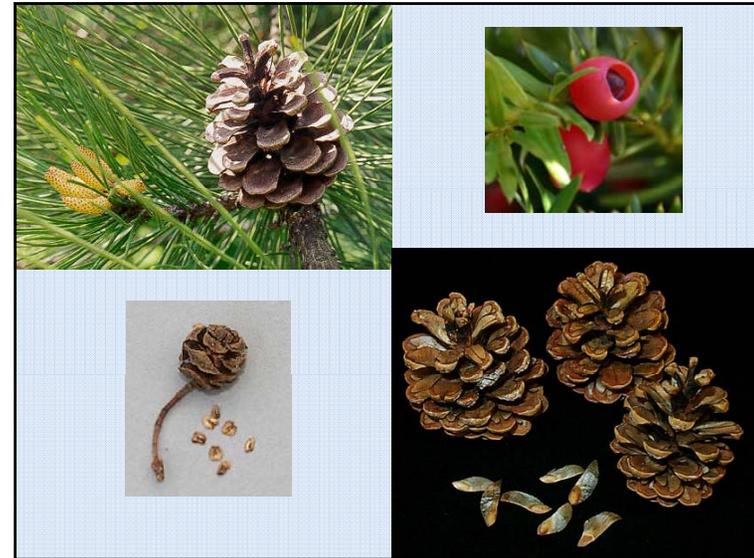
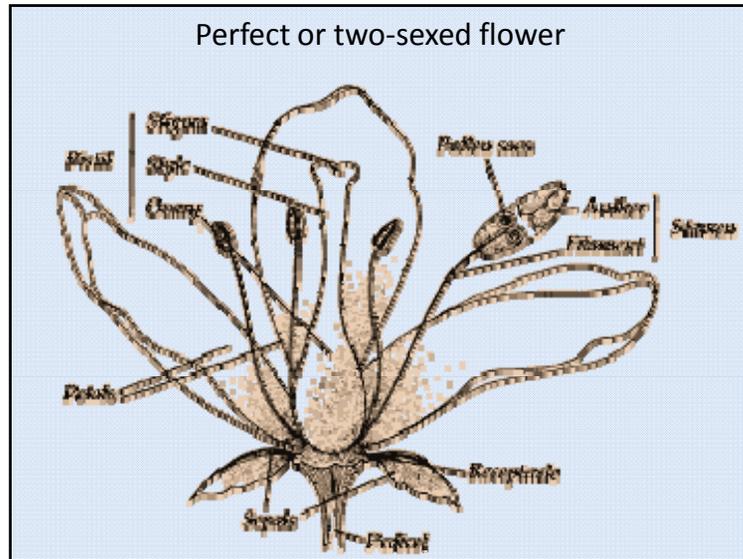
CODIT
*Compartmentalization
of Decay
in Trees*





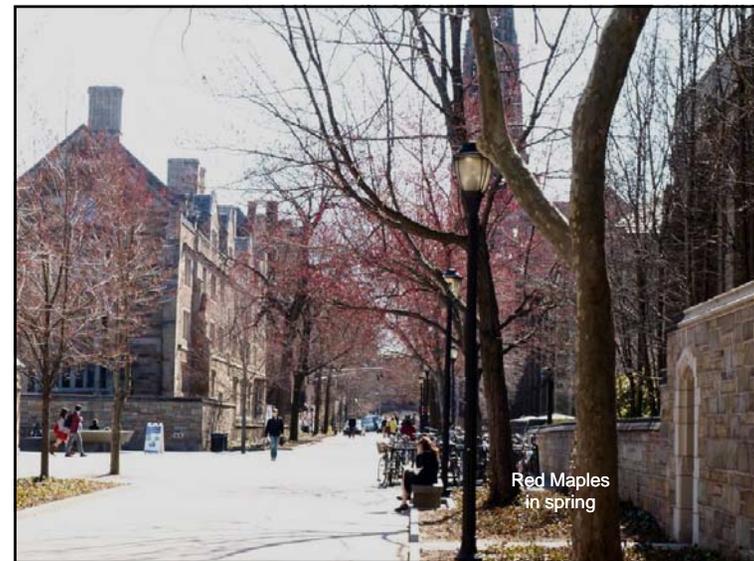
Why you need to know about reproduction in trees

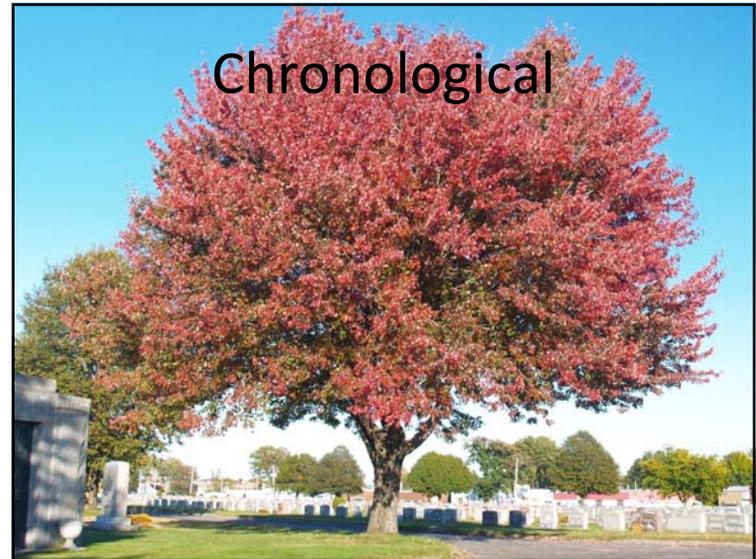
- Floral display (ornamentals especially)
- Fruits and fruiting issues
- Pollen (increasingly a problem in cities!)
- Pollinators – of concern for a few reasons
- Asexual reproduction – e.g. suckering



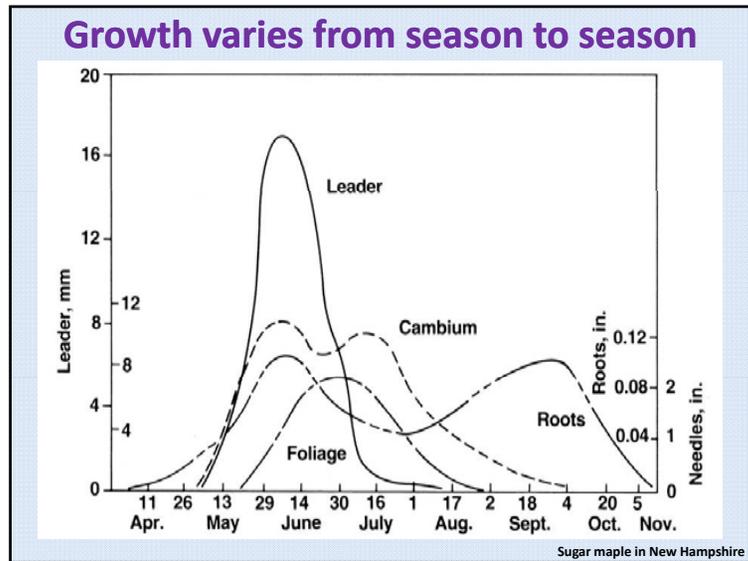
Male and Female Trees??

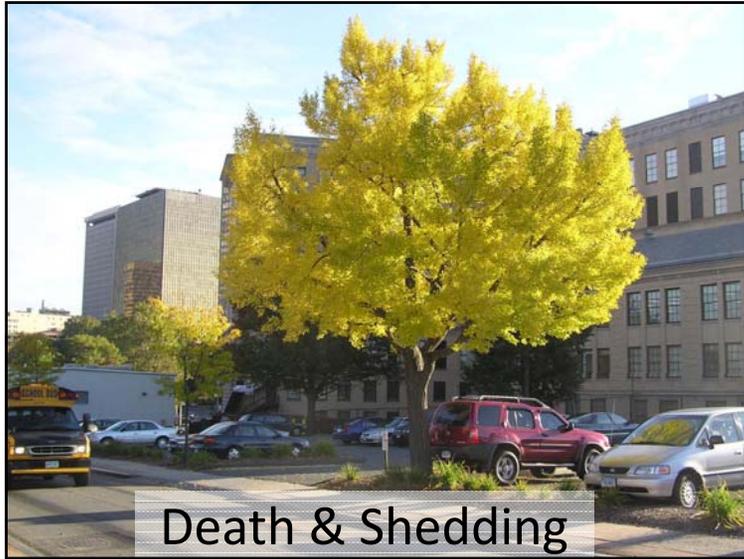
- Monoecious Trees: “one house” – individual male and female flowers on the same tree.
- Dioecious Trees: “two houses” – male and female flowers on different trees.
- Syncocious Trees – trees with ‘perfect’ flowers (the pawpaw (*Asimina triloba*) is an example)

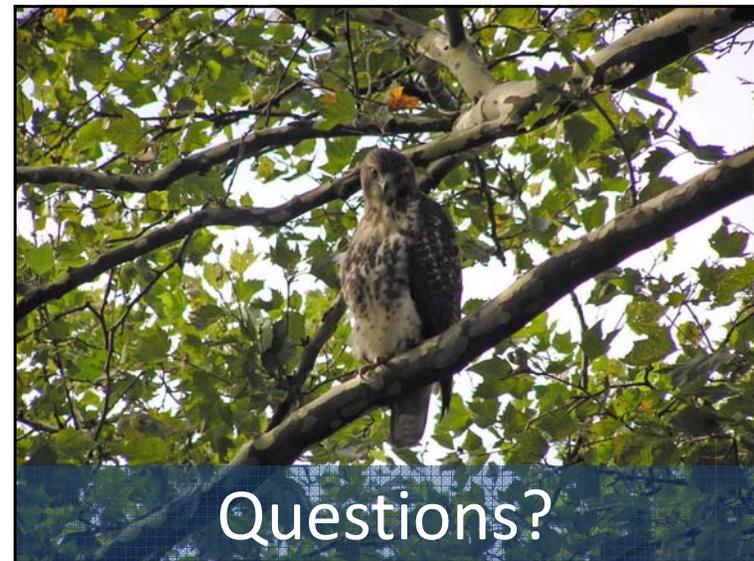
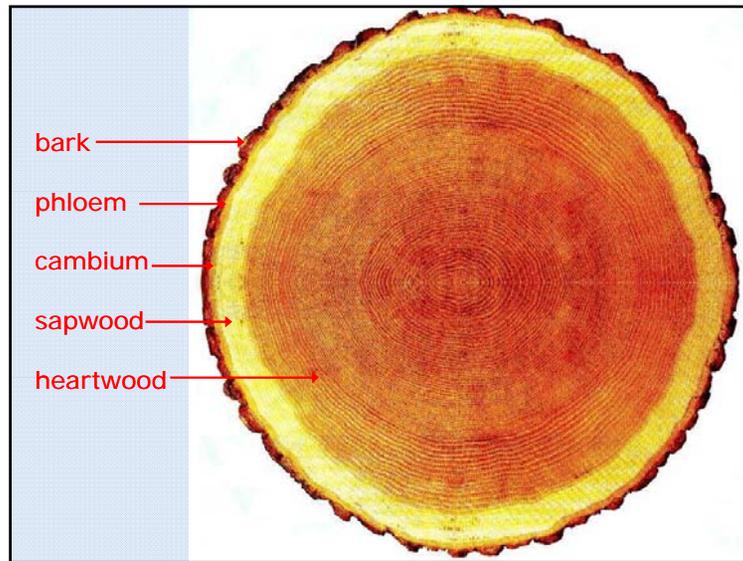












Summary

Trees are woody, highly competitive, highly organized organisms that photosynthesize, and use the products of photosynthesis to develop a variety of structures and conduct a variety of functions that are necessary to keep it alive.