





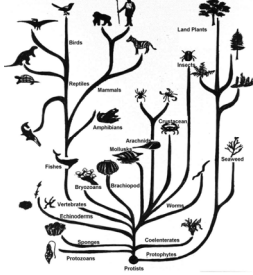


Dendrology
FORS 2319
Instructor: Dr. Jeremy Stovall
Lecture 5:
Taxonomy



Taxonomy

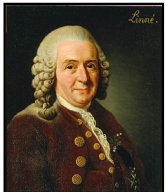
- Why?
 - Communication
 - Organization
- How?
 - Phylogeny
 - Hierarchical



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History

- Carolus Linnaeus, a Swedish Biologist
- 1730's to 1750's



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Taxonomy

- Division -ophyta
 - Class -opsida
 - Subclass -idae
 - Order -ales
 - Family -aceae
 - Genus
 - Specific epithet
- Binomial name: [*Genus*] + [*specific epithet*]

The diagram shows a central globe with a hierarchical tree structure. At the top is 'Taxonomic system', which branches into 'Plant kingdom' and 'Animal kingdom'. Below these are 'Division' and 'Phylum'. Further down are 'Class', 'Order', 'Family', 'Genus', and 'Species'. The diagram also includes 'Taxonomic ranks' and 'Taxonomic groups'.

CAPITALIZE
lowercase

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Species vs. Specific Epithet

Species (binomial needed)	Specific epithet (just 2 nd word)
• <i>Quercus alba</i>	• <i>alba</i>
• <i>Juniperus virginiana</i>	• <i>virginiana</i>
• <i>Diospyros virginiana</i>	• <i>virginiana</i>
• <i>Quercus nigra</i>	• <i>nigra</i>
• <i>Betula nigra</i>	• <i>nigra</i>

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Conventions

- Family & Genus are always capitalized
- Species epithet is never capitalized
- Always *italicized* or underlined
- Common names follow conventional rules of English
 - Proper nouns are capitalized (America, Texas, Douglas)
 - Capitalized otherwise only at start of sentence.

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More Common Name Conventions

- If a common name is not true to the taxonomy of the species, it is either hyphenated or made into a compound word
 - eastern redcedar (Cedrus = cedar, not Juniperus)
 - yellow-poplar (Populus = poplar, not Liriodendron)
 - crapemyrtle (Myrica = myrtles, not Lagerstroemia)
 - Osage-orange (Citrus = oranges, not Maclura)

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Taxonomy



- What does an X mean? *Prunus x yedoensis*

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Taxonomy

- Splitters vs. Lumpers
 - Varieties (~~variation~~)

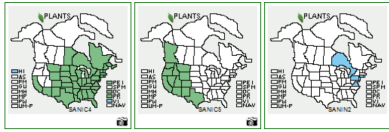


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Taxonomy

- Splitters vs. Lumpers
 - Subspecies
 - Abbreviate: **spp.**



Sambucus nigra subsp. *canadensis* American black elderberry
Sambucus nigra subsp. *cerulea* blue elderberry
Sambucus nigra subsp. *nigra* European black elderberry

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Taxonomy

- What about an unknown?
 - sp. vs. spp.

Hey Conor, what kind of blueberry is that?

I'll look it up, for now it's *Vaccinium* sp.



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Taxonomy

- What about an unknown?
 - sp. vs. spp.

Hey Melissa, what kind of salamander is that?

Some sort of dusky, let's go with *Desmognathus* spp.



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Taxonomy

How's timber cruising going Mike?

What about an unknown?
• sp. vs. spp.

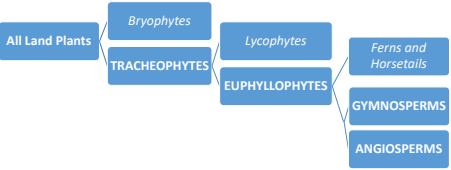
That *Rubus* spp. almost killed me!

sp. ≠ spp. ≠ ssp.



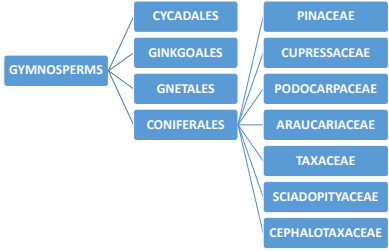
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Phylogeny of Trees



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Phylogeny of Gymnosperm Trees



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Cycadales

- Evergreen, dioecious
- Tropical
- Mistaken for palms

- 2-3 families
- 10-12 genera
- 305 species



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Ginkgoales

- Monotypic order
- *Ginkgo biloba* sole surviving species

- All other members extinct
- Living fossil



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Gnetales

- Gnetaceae
 - Woody vines & trees
 - Tropics
- Welwitschiaceae
 - One species, desert species →
- Ephedraceae
 - Used for stimulants, found in deserts of Southwest



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Coniferales

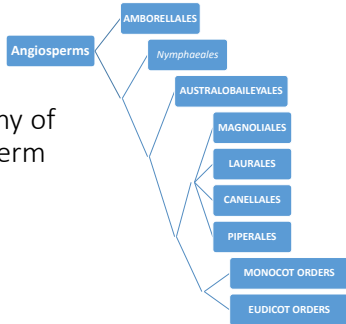
- Now called Pineales
- Contains cedars, pines, spruces, firs, larches, redwoods, cypress, junipers, and yews
- Probably single most valuable order globally \$\$\$



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Phylogeny of Angiosperm Trees



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Amborellales

- *Amborella trichopoda*
- New Caledonia (near Australia)
- Oldest angiosperm

- Like Ginkgo, monotypic
- Living fossil



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Australobaileyales

- Approx. 100 species
- Austrobaileyaceae
 - 2 Australian woody vines
- Schisandraceae
 - Asia & Carribean, numerous species
- Trimeniaceae
 - Southwest Pacific, handful of species

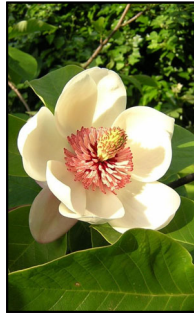


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Magnoliales

- Annonaceae
 - Custard Apples, 2000+ trees, shrubs, and vines
- Degeneriaceae
 - 2 species, Pacific Islands
- Eupomatiaceae
 - 2 species, Pacific Islands
- Himantandraceae
 - 2 species, Pacific Islands
- Magnoliaceae
 - Magnolias, 225ish species
- Myristicaceae
 - Nutmegs, 100s of species



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Laurales

- Atherospermataceae
- Calycanthaceae
- Gomortegaceae
- Hernandiaceae
- Lauraceae
- Monimiaceae
- Siparunaceae



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Canellales

- Canellaceae
- Winteraceae

- 136 species
- Fragrant
- Tropical, Africa, South America



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Piperales

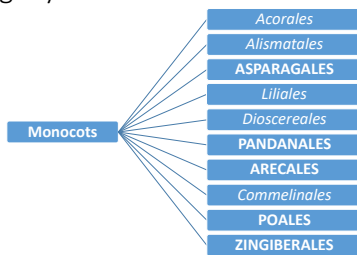
- Aristolochiaceae
- Hydnoraceae
- Lactoridaceae
- Piperaceae
- Saururaceae



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Phylogeny of Monocot Trees



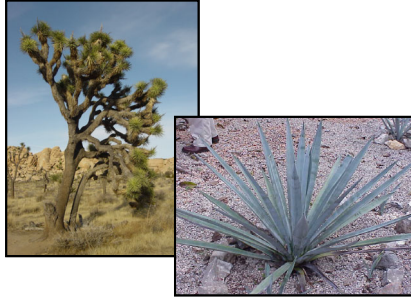
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Asparagales

- Orchids
- Agaves

- Numerous families
- Many species
- Mostly herbaceous



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Pandanales

- Tropical
- 5 Families

- Mistaken for palms



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Arecales

- True palms, formerly Palmaceae
- 202 Genera
- 2600 Species

- Economically important



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Poales

- Huge order, with numerous grass families
- Only a few grow as trees (bamboo)



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Zingiberales

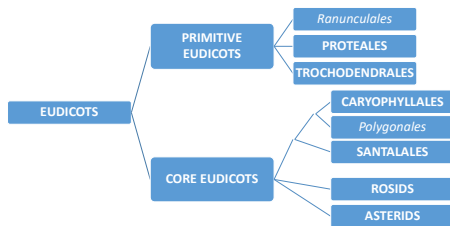
- Several families
- Many species
- Banana can reach 50 feet



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Phylogeny of Eudicot Trees




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Proteales


- Nelumbonaceae
 - Lotus (not tree)
- Proteaceae
 - South Africa, Macadamia
- Platanaceae
 - Platanus only genus
 - Northern hemisphere
 - 6 to 10 species



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Trochodendrales

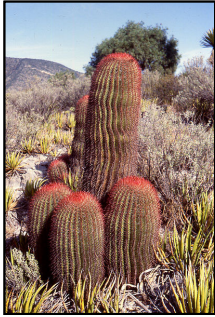
- Trochodendraceae
 - 2 species
 - Southeast Asia
- Secondary xylem w/o vessels



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Caryophyllales

- 33 Families
- 692 Genera
- 11,155 Species
- 6% of dicots
- Includes Cacti




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Santalales

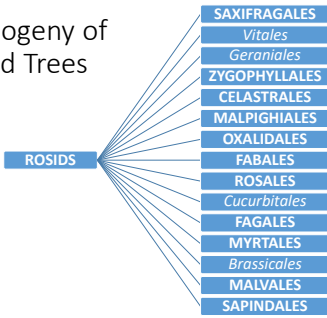
- Many parasitic
- Tropical & subtropical

- 5 Families
- Epiphytes, vines, shrubs
- Includes mistletoe



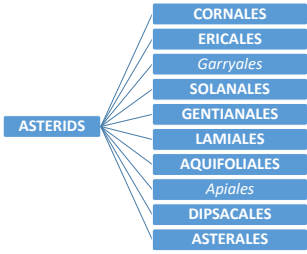
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Phylogeny of Rosid Trees



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Phylogeny of Asterid Trees



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Non-Taxonomic Taxonomy

- Soft pines vs. Hard pines
- White oaks vs. Red oaks
- True hickories vs. Pecan hickories
- Hard maples vs. Soft maples
- Yellow pines vs. White pines
- Hardwoods vs. Softwoods

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Soft vs. Hard Pines

<p>Soft</p> <ul style="list-style-type: none"> • 1 or 5 needles per fascicle • Fascicle sheath early deciduous • Unarmed umbos • Soft wood • Gradual late-early wood transition • No lab species 	<p>Hard</p> <ul style="list-style-type: none"> • 2-3 needles per fascicle • Fascicle sheath persistent • Armed umbos • Hard wood • Abrupt late-early wood transition • All lab species
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True vs. Pecan Hickories

<p>True</p> <ul style="list-style-type: none"> • 3 to 9 leaflets • Terminal leaflet largest • Unwinged husk • Occasionally ribbed suture • Imbricate scales on buds • 6-9 thin terminal bud scales • shagbark, mockernut 	<p>Pecan</p> <ul style="list-style-type: none"> • 7 to 13 leaflets • All leaflets similar in size • Husks broadly winged at the sutures • Valvate scales on buds • 4-6 fleshy terminal bud scales • pecan, bitternut
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Red vs. White Oaks

Red

- Acorns astringent (more tannin)
- Acorns mature 2 years
- Leaves with bristle-tipped lobes (or tip on unlobed)
- Wood without tyloses
- Loose cooperage

White

- Acorns palatable (less tannin)
- Acorns mature 1 year
- Leaves with NO bristle tips
- Wood with tyloses
- Tight Cooperage

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Red vs. White Oaks



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Hardwoods vs. Softwoods

Hardwoods

- Generally broadleaf deciduous species
- Don't necessarily have harder wood
 - Birches tend to have softer wood than most softwoods

Softwoods

- Generally needle-leaved evergreen species
- Don't necessarily have softer wood
- Longleaf pine tends to have harder wood than some hardwoods

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