Annual versus Perennial

- **Annual** = completes its life cycle within a single year
  - In trade, considered annual if useful landscape life is < 1 year
- **Biennial** = vegetative first year then reproductive the second, then dies
- **Perennial** = lives several to many years

Biennial Woody perennial
Herbaceous perennial

Reading Assignments

Pages 1-34 in *Landscape Plants For Texas And Environs, Third Edition* & Syllabus (lecture quiz 1)

(Note: Lecture exam bonus questions will come largely from the assigned readings)
**Trees**
- Perennial
- Woody, generally upright growth habit
- Single or multiple trunks
- > 4 to 6 in. DBH
- Height variable, few feet to 350'+
- Artificial distinctions, environmental dependent
- For this course:
  - Small Tree = < 20’ to 25’ tall
  - Medium Tree = 25’ to 50’ tall
  - Large Tree = > 50’ tall

**Shrubs (Bushes)**
- Perennial, rarely annual
- Woody, upright or spreading growth habits
- Single or multiple trunks
- < 4” to 6” in DBH
- Height variable, but typically <20’
- Artificial distinctions, environmental dependent
- For this course:
  - Small Shrub = < 4’ tall
  - Medium Shrub = 4’ to 8’ tall
  - Large Shrub = > 8’ tall

**Vines**
- Annual or perennial
- Woody or herbaceous
- Long trailing or climbing stems
- Special climbing structures
- Sometimes exhibit heteroblasty – Vine in youth, shrub at maturity
- English Ivy (Hedera helix)
- Poison Ivy (Toxicodendron radicans)

**Groundcovers**
- Woody or herbaceous
- Annual or perennial
- Usually low growing and spreading
- Heights of <2” to 3’ or 4’ tall
- Often forming a dense mat-like growth
- Best if exhibit good weed suppression
- Frequently used for erosion control
Scientific Names

Why not just use common names?
– Scientific names convey relatedness
– More than one common name per species
– More than one species per common name
– Common names vary from locale to locale
– Legal consequences
– Professionalism
– Product labeling (Ag. Chemicals, etc.)

– Latin Names, Binomial system, or Linnean system
– Started by Carl von Linne, known as Linnaeus
  • Species Plantarum, 1753
  • Previously named descriptively, very cumbersome
– System extended to families by A.L. de Jussieu
  • Genera Plantarum, 1789
– Rules for naming plant taxa standardized
  • International Code of Nomenclature for Algae, Fungi, and Plants (2011 … periodic updates)
    – Formerly The International Code of Botanical Nomenclature
  • International Code for Nomenclature of Cultivated Plants (1980, … periodic updates)
    – http://www.ishs.org/sci/icracpco.htm

– Not perfect system
– Rules can create frustration in gardening public when they dictate the revision of commonly accepted names
– Constant revision of genera, species, and particularly within species classifications
– Latin is dead language, so the pronunciation of names is debatable

To Key Or Not To Key?

Botanical Keys =
published systems of dichotomous (yes, no) decisions based on various morphological characteristics (flowers, fruit, roots, stems, buds, leaves, or plant habit) and / or geographic distribution used to determine the identification of unknown taxa
Vegetative Key to Common Palms (*Palmae* / *Arecaceae*) in Central Texas

1a. Fronds pinnately divided, feather-like form
   2a. Segments attached with basal fold convex side up (reduplicate) = *Brahea capitata* (Jelly Palm)
   2b. Segments attached with basal fold concave side up (induplicate) = *Phoenix canariensis* (Canary Island Date Palm)

1b. Fronds fan-like or costapalmate (fan-like, but with remnant midrib)
   3a. Fronds fan-like and less than 2 ft in diameter/length (minus petiole)
      4a. Petiole sharply spiny = *Chamaerops humilis* (Mediterranean Fan Palm)
      4b. Petiole undulate to dully serrate, not spiny = *Trachycarpus fortunei* (Windmill Palm)
   3b. Fronds costapalmate and typically greater than 2 ft in length (minus petiole)
      5a. Petiole entire, smooth edge
         6a. Developing a trunk
            7a. Dominant trunk thick and stout, maturing at < 50 ft tall = *Sabal mexicana* (Texas Sabal)
            7b. Dominant trunk thinner, maturing at 60 to 80 ft tall = *Sabal palmetto* (Palmetto Palm)
         6b. Trunk lacking, leaves originating from base, maturing at 3’ – 6’ = *Sabal minor* (Dwarf Palmetto)
      5b. Petiole armed with large curved spines
         8a. Trunk with swollen base, maturing at 50 to 100 ft tall, segments slightly to moderately filiferous = *Washingtonia robusta* (Mexican Fan Palm)
         8b. Trunk stout and tapering uniformly, maturing at 40 to 50, rarely 80 ft tall, segments moderately to strongly filiferous = *Washingtonia filifera* (California Fan Palm)

Why Not Just Use Keys?

- No key exists for all species
  - Example, Queen Palm (*Syagrus romanzoffiana*) and Date Palm (*Phoenix dactylifera*) not on the preceding key
- One wrong decision & you are hopelessly lost
  - Example, trunk development of young *Sabal* spp.
- Most useful for differentiating among closely related taxa
  - Example, problems such as Sago Palm (*Cycas revoluta*) which is not really a palm, but a Cycad (*Cycadaceae*)
- Often regionally specific
  - This key is useless in Florida, lower Rio Grande Valley
- Critical morphology feature may be missing
  - Wrong season for fruit/flower or sexually immature plants

**Taxonomic Classifications:**

<table>
<thead>
<tr>
<th>Taxonomic category</th>
<th>Scientific name of the taxa</th>
<th>Common name of the taxa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kingdom</td>
<td>Plantae</td>
<td>Plant kingdom</td>
</tr>
<tr>
<td>Phylum (Division)</td>
<td>Angiospermophyta (Magnoliophyta)</td>
<td>Fruit bearing plants</td>
</tr>
<tr>
<td>Plantae</td>
<td>Angiospermae (Magnoliopsida)</td>
<td>Flowering plants</td>
</tr>
<tr>
<td>Class</td>
<td>Dicotyledoneae</td>
<td>Dicotyledonous plants</td>
</tr>
<tr>
<td>Angiospermae</td>
<td>Rosidae</td>
<td>Rose superorder</td>
</tr>
<tr>
<td>Dicotyledoneae</td>
<td>Fabaceae (Leguminosae)</td>
<td>Legume order</td>
</tr>
<tr>
<td>Rosidae</td>
<td>Mimosoideae</td>
<td>Legume family</td>
</tr>
<tr>
<td>Fabaceae</td>
<td>Mimosoideae</td>
<td>Mimosa subfamily</td>
</tr>
<tr>
<td>(Leguminosae)</td>
<td>Acacia</td>
<td>Acacia genus</td>
</tr>
<tr>
<td>Mimosoideae</td>
<td>Acacia</td>
<td>Sweet Acacia</td>
</tr>
</tbody>
</table>

Hierarchical structure of classification. We deal with mostly family or lower in the hierarchy. Taxonomy = systematic classifications or groupings. Nomenclature = systematic naming of groups.

**Taxonomy**

- **Taxa** = divisions or groupings of plants
  - **Singular is taxon**
- **Species** = “a kind of plant or animal distinct from other kinds in marked or essential features that has good characters of identification, and may be assumed to represent a continuing succession of individuals from generation to generation”
  
  L.H. Bailey
Comments on Species

- Bell-shaped curve for characteristics
- Plants do not read books!!!
  - Do not always adhere to published descriptions
- Morphologically speaking fruit and flower structures are best ID features, but often not available
- Non-visible characteristics can be key features
  - Physiological traits, biochemical markers, and molecular genetic evidence
- Estimating underlying genetic relationships
- Species name consists of two words;
  - Species name = genus and specific epithet
  - Should be *italicized* or *underlined* in print
- Species type system $\rightarrow$ type specimen

Superspecific Taxa

- **Genus** = more or less closely related and definable group of plants containing one or more species
  - Genera = plural
  - Examples of plants in the genus *Tagetes*
    - *Tagetes erecta*
    - *Tagetes lemmonii*
    - *Tagetes lucida*
    - *Tagetes patula*
- **Family** = more or less closely related and definable group of plants containing one or more genera
  - Families = plural
  - Examples of plants in the family *Asteraceae* (Compositae)
    - *Tagetes*
    - *Helianthus*
    - *Aster*
    - *Zinnia*

Infraspecific Taxa

*Subspecies* = a distinctive subdivision of individuals with characteristics different than the species type, but insufficiently different to warrant species status

- Nearly always geographically related
  - Often represents incomplete speciation
  - Abbreviated “subsp.”
    - *Daucus carota* subsp. *carota*
    - *Daucus carota* subsp. *sativus* (cultivated carrots vs. Queen Ann’s lace)
    - Similar to variety, easy prey for over zealous taxonomists

*Varietas* or *Variety* = a distinctive subdivision of individuals with characteristics distinct from the species type, but not to the extent that they warrant subspecies or species designation

- Differ from the species in several important characteristics
  - Usually in response to some environmental gradient, but it is often not as discontinuous as with a subspecies
**Variety (continued)**

- Abbreviated as “var.”
  - Placed between specific epithet and variety
  - Italicize or underline variety name, but not “var.”
    - Cercis canadensis var. texensis
- Current trend is to use subspecies for former subspecies and variety categories and to use variety for what was once a forma designation
- Not the same thing as a cultivar or cultivated variety, varieties must be naturally occurring

**Infraspecific Taxa**

**Forma or Form** = a subdivision of plants within a species that differs in one or a few characteristics from the species type

- Often not geographical or environmentally related
- Seldom used classification today
  - Many groups previously designated as forma are today being designated as varieties
    - Abbreviated as “f.”
    - Wisteria sinensis f. alba

**Cultivar or Cultivated Variety** = subgroup within a species that is a cultivated clone or highly inbred line

- Key is that it is propagated and continued by cultivation and does not usually reproduce true to type unaided by man
- Designated by enclosing the cultivar name in single quotes, placed after specific epithet, subspecies, variety or forma names
  - Not italicized, capitalize first letter of each word
  - Typically a vegetatively propagated clone
    - Bulbine frutescens ‘Hallmark’
    - Bulbine frutescens cv. Hallmark
  - Sometimes a highly inbred line
    - Zea mays var. rugosa ‘Golden Bantam’

**Trademark Versus Cultivar Names**

- Cultivar names are not protected (i.e. in public domain)
- Plant patents are limited, 17-20 yr. duration
  - Generally cannot be “wild plants”
- Trademarks can be protected indefinitely
  - ™ versus ® designation
  - Also allows branding, example Texas Superstar®
  - Protect “found plants”
- Promotion of plants by trademarked names allows companies to control marketing of their cultivars
  - Creates major confusion in the trade
  - Substitute different genotypes
**Infraspecific Taxa**

*Hybrid* = progeny of 2 genetically different organisms

- Technically progeny from any two individuals that are not the same clone
- Typically assumed to be between two species (intergeneric or intrageneric interspecific hybrids) or two distinct inbred lines (example intraspecific hybrid corn or F1, bedding plants)

- *Intrageneric hybrid* = progeny of a cross between different species within the same genus
  - Common occurrence in plant kingdom
  - Designate with lower case “x” or multiplication symbol between the genus and specific epithet
  - *Brugmansia x candida* = *Brugmansia versicolor x Brugmansia aurea*

**Interspecific Taxa**

*Intergeneric Hybrid* = progeny from different species each within different genera

- Relatively rare occurrences
  - Perhaps questions the validity of genera differences
  - Designated with capital “X” or large multiplication symbol placed in front of the genus name

- *X Chitalpa tashkentensis* = *Catalpa bignonioides X Chilopsis linearis*
- *X Cupressocyparis leylandii* = *Cupressus macrocarpa X Chamaecyparis nootkatensis*

**Scientific Authorities**

(or as students ask what numbskull came up with this name?)

- The honor of naming a newly described plant taxon is accorded to the person who first publishes a valid description
- Hence the initials and/or letters following various taxa in a formal written context indicate the scientific authority (s) that named that taxon

  - *Acer rubrum* L.
  - *Brassica oleracea* L. var. *acephala* A.P. de Candolle
  - *Ziziphus obtusifolia* (W. Hooker ex J. Torrey & A. Gray) A. Gray

**Clarifying Some Design Terms**

- *Use Your Glossary!*
  - Many other terms used or referenced during lecture, labs and in your assigned readings are defined in the expanded glossary at the back of your text
  - If you still do not understand them or cannot find them
    - Write them down to ask in class