PLANT IDENTIFICATION I
LEARNING HOW TO IDENTIFY LANDSCAPE PLANTS

Our goal: Be efficient and make a positive and correct identification using the fewest number of steps.
WHY LEARN TO IDENTIFY PLANTS?

• We must properly identify a plant to know its specific:
  
  o Cultural needs
    - hardiness, soil tolerances, watering and pruning
  o Native range/origin
  o Genetic potential – size and habit
    - what does it want to be when it grows up?
  o Growing and dormancy periods
  o Exposure preferences
  o Seasonal color potential/landscape use
  o Propagation options
  o Disease and pest pressures

• To make sure you are getting the exact plant you want

• To demonstrate professionalism within the industry.
  o Speak the language. You are the professional.
HOW TO DO IT?

1. Understand that plants have a unique set of identifiable characteristics. For visual identification in the field, these characteristics may be classified as micro, macro, and gestalt or overall look.

2. Identify what are the unique set of observable characteristics that may be associated with a plant species.

3. Develop a means of associating these characteristics with the plant name.

4. Practice the spelling and pronunciation of each plant name. Repetition is the key to success, just like improving at any sports activity or musical instrument.
THE NAMING OF PLANTS

There are two systems for naming plants:

1. The common system for naming plants is dynamic and is simultaneously reliant on personal and general consensus and the ‘rule of the mob’.

2. The scientific system for naming plants is based on a patterned set of rules and laws and is immune to popular opinion.
PROBLEMS WITH COMMON NAMES

• Confusing and misleading
  o Yew pine - *Afrocarpus gracilior*
    • Neither a yew nor a pine

  o Bird-of-paradise – two plants locally *Caesalpinia pulcherrima, Strelitzia regina*

  o Evergreen elm, evergreen pear
    • *Neither are totally evergreen in central Arizona*
ADVANTAGES OF SCIENTIFIC NAMES

- They are recognized as the ‘real name’ of a plant by everyone everywhere
- They are often descriptive of a plant’s character, origin or its history
- You are assured of getting exactly the plant you want
SCIENTIFIC NAMES ARE BASED ON THE SCIENCE OF PLANT TAXONOMY

It’s the science that finds, describes, classifies, identifies, and names plants.

Taxonomy uses a system of rules that group plants into successive categories to show relationships resulting in a hierarchy.
SCIENTIFIC NAMES

- Kingdom (Plants, Animals, Fungi, Bacteria)
- Phylum
- Class
- Order
- Family
- **Genus**
- **species**

These 2 together identify the plant. This is the Linnaean binomial system of nomenclature developed by Carl von Linne 250 years ago.
An example:
Indian rosewood/*Dalbergia sissoo*

- Kingdom: Plantae
- Phylum: Spermatophyta
- Class: Eudicots
- Order: Fabales
- Family: Fabaceae
- **Genus**: Dalbergia
- **species**: sissoo

Note: Genus name is always capitalized, species is not
FAMILIAR SCIENTIFIC NAMES

- Nerium oleander
- Aloe vera
PLANT HYBRIDS

• **Hybrid** is the offspring resulting from cross-breeding different plants
  - *Prosopis alba* x *Prosopis chilensis*

• **Variety (var.)** is a natural variation within a species
  - *Pinus brutia* var. *eldarica*

• **Cultivar** is a cultivated variety
  - *Ruellia simplex* ‘Katie’

*Very important - make sure that if a particular hybrid, variety or cultivar is requested or spec’d in a job, you need to locate it or notify the designer or architect that it isn’t available*
Grapefruit is a hybrid of sweet orange and pomelo. Interestingly, sweet orange is a hybrid of pomelo and mandarin.
Parkinsonia tree hybrids

• Combo of three Parkinsonia species: *P. florida*, *P. microphylla*, and *P. aculeata*
X Chitalpa tashkentensis

- Combination or cross (X) of Chilopsis linearis and Catalpa bignoniodes
A **cultivar** is a selection of a plant that was made under cultivated conditions (by humans versus by Mother Nature).

The **cultivar name** is a unique name given to these plants because of some set of unusual decorative or useful characteristics.
Purple hopseed bush

Dodonaea  
Genus  
Capitalized

viscosa  
species  
not capitalized

‘Purpurea’  
Cultivar  
Capitalized  ‘with single quotes’
Melaleuca viminalis ‘Little John’
VARIETY SELECTIONS

• Varieties are a population of plants within a species that display clear differences, differences that occur in natural populations. A variety is a selection of a plant that was made under natural (not cultivated) conditions.
Leucophyllum frutescens var. green cloud

Never capitalized unless part of a proper name
PRONUNCIATION

• Follow guidelines for Latin or Greek
• Use commonly used pronunciation
  o Caesalpinia pulcherrima
  o Pittosporum tobira
• Give it your best shot!
• Don’t get into arguments over ‘correct’ pronunciation
• Check out the pronunciations on the Virtual Library of Phoenix Landscape Plants

http://www.public.asu.edu/~camartin/Martin%20landscape%20plant%20library.htm
PLANT IDENTIFICATION

• Scientific names (but not their pronunciation) are important for the exam.
• Some exam questions require you to know common names.
• **BUT**... Don’t rely on common names when you want something specific from a nursery.

example: bird of paradise
DON’T WALK BY AN UNKNOWN PLANT. NOTE IT. LEARN IT.

• Take a picture
• Take a piece
• Take time to learn it
• There’s an app for that!
PLANT IDENTIFICATION RESOURCES

- Individual people that know their plants
- Plants Societies
- Nurseries and their catalogs
- Books
- Botanical Gardens and Arboreta
- Conferences and Trade Shows
- Internet/Apps
PLANT PROBLEMS
ID TOOL

• Get a 16x hand lens if you don’t already have one. You will see a whole new world
• This is as basic a tool for a landscape professional as a pair of gloves
LEAF TERMINOLOGY
LEAF TERMINOLOGY

Blade
Petiole
Winged
SIMPLE LEAF

Blade

Petiole
LEAF AXIL AND NODE
LEAF ARRANGEMENTS

- **One leaf per node**
- **Opposite Leaves**
- **Fascicled**
- **Alternate Leaves**
- **Whorled Leaves**
- **Two leaves per node**
- **Three or more leaves per node**
LEAF TEXTURES

Glabrous

Pubescent
STIPULE

@2004, Gary Fewless
MARGIN

- Ciliate: with fine hairs
- Crenate: with rounded teeth
- Dentate: with symmetrical teeth
- Denticulate: with fine dentition
- Doubly Serrate: serrate with sub-teeth
- Entire: even, smooth throughout
- Lobate: indented, but not to midline
- Serrate: teeth forward-pointing
- Serrulate: with fine serration
- Sinuate: with wave-like indentations
- Spiny: with sharp stiff points
- Undulate: widely wavy
PATTERNS OF LEAF VENATION

Venation

- **Arcuate**: secondary veins bending toward apex
- **Cross-Venulate**: small veins connecting secondary veins
- **Dichotomous**: veins branching symmetrically in pairs
- **Longitudinal**: veins aligned mostly along long axis of leaf
- **Palmate**: several primary veins diverging from a point
- **Parallel**: veins arranged axially, not intersecting
- **Pinnate**: secondary veins paired oppositely
- **Reticulate**: smaller veins forming a network
- **Rotate**: in peltate leaves, veins radiating
Leaves come in many shapes, sizes and textures!

<table>
<thead>
<tr>
<th>Shape Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acicular</td>
<td>needle shaped</td>
</tr>
<tr>
<td>Falcate</td>
<td>hooked or sickle shaped</td>
</tr>
<tr>
<td>Orbicular</td>
<td>circular</td>
</tr>
<tr>
<td>Rhomboid</td>
<td>diamond-shaped</td>
</tr>
<tr>
<td>Acuminate</td>
<td>tapering to a long point</td>
</tr>
<tr>
<td>Flabelate</td>
<td>fan-shaped</td>
</tr>
<tr>
<td>Ovate</td>
<td>egg-shaped, wide at base</td>
</tr>
<tr>
<td>Rosette</td>
<td>leaflets in tight circular rings</td>
</tr>
<tr>
<td>Alternate</td>
<td>leaflets arranged alternately</td>
</tr>
<tr>
<td>Hastate</td>
<td>triangular with basal lobes</td>
</tr>
<tr>
<td>Palmate</td>
<td>like a hand with fingers</td>
</tr>
<tr>
<td>Spatulate</td>
<td>spoon-shaped</td>
</tr>
<tr>
<td>Aristate</td>
<td>with a spine-like tip</td>
</tr>
<tr>
<td>Lanceolate</td>
<td>pointed at both ends</td>
</tr>
<tr>
<td>Pedate</td>
<td>palmate, divided lateral lobes</td>
</tr>
<tr>
<td>Spear-shaped</td>
<td>pointed, barbed base</td>
</tr>
<tr>
<td>Bipinnate</td>
<td>leaflets also pinnate</td>
</tr>
<tr>
<td>Linear</td>
<td>parallel margins, elongate</td>
</tr>
<tr>
<td>Peltate</td>
<td>stem attached centrally</td>
</tr>
<tr>
<td>Subulate</td>
<td>tapering point, awl-shaped</td>
</tr>
<tr>
<td>Cordate</td>
<td>heart-shaped, stem in cleft</td>
</tr>
<tr>
<td>Lobed</td>
<td>deeply indented margins</td>
</tr>
<tr>
<td>Perfoliate</td>
<td>stem seeming to pierce leaf</td>
</tr>
<tr>
<td>Trifoliate/Ternate</td>
<td>leaflets in threes</td>
</tr>
<tr>
<td>Cuneate</td>
<td>wedge shaped, acute base</td>
</tr>
<tr>
<td>Obcordate</td>
<td>heart-shaped, stem at point</td>
</tr>
<tr>
<td>Odd Pinnate</td>
<td>leaflets in rows, one at tip</td>
</tr>
<tr>
<td>Tripinnate</td>
<td>leaflets also bipinnate</td>
</tr>
<tr>
<td>Deltoid</td>
<td>triangular</td>
</tr>
<tr>
<td>Obovate</td>
<td>egg-shaped, narrow at base</td>
</tr>
<tr>
<td>Even Pinnate</td>
<td>leaflets in rows, two at tip</td>
</tr>
<tr>
<td>Truncate</td>
<td>squared-off apex</td>
</tr>
<tr>
<td>Digitate</td>
<td>with finger-like lobes</td>
</tr>
<tr>
<td>Obtuse</td>
<td>bluntly tipped</td>
</tr>
<tr>
<td>Pinnatisect</td>
<td>deep, opposite lobing</td>
</tr>
<tr>
<td>Unifoliate</td>
<td>having a single leaf</td>
</tr>
<tr>
<td>Elliptic</td>
<td>oval-shaped, small or no point</td>
</tr>
<tr>
<td>Opposite</td>
<td>leaflets in adjacent pairs</td>
</tr>
<tr>
<td>Reniform</td>
<td>kidney-shaped</td>
</tr>
<tr>
<td>Whorled</td>
<td>rings of three or more leaflets</td>
</tr>
</tbody>
</table>
COMPOUND LEAVES

Pinnately Compound

Twice Pinnately Compound

Palmately Compound
COMPOUND LEAVES

*Fraxinus velutina* (Arizona ash) – 3 to 5 leaflets per leaf

*Fraxinus uhdei* (Shamel ash) – 7 to 9 leaflets per leaf
COMPOUND LEAVES

- Twice Pinnately Compound
COMPOUND LEAVES

Palmately Compound Leaves
ARMED STEMS
CITRUS HAS WINGED PETIOLES

CITRUS LEAVES WILL HAVE EITHER A MEDICINAL ODOR, A SPICED ODOR OR A NATURAL ODOR
SELECTING NEW PLANTS

HERE ARE SOME TOP TO BOTTOM QUALITY INSPECTION POINTS TO LOOK FOR...
Inspect the roots first.

If the roots are not good, it does not matter how much you like the rest of the plant...

Leave it at the nursery.
INSPECT FOR QUALITY

WHAT MAKES A QUALITY PLANT?

ROOTS

- Roots are not covered by ANA specs. It is up to you to be a smart shopper and inspect the roots. If a nursery won’t let you inspect the root ball, go to another nursery.
ROOT INSPECTION

• Have the roots been cut off at the bottom of the container?

• Bounce test for root development problems.

• Are there weeds growing in the root ball? Weeds are competition for water and fertilizer and a sign of poor plant maintenance at the nursery and a source of new weeds in your landscape.

• Look for kinked or girdling roots. If you buy the plant, you must correct the problem at planting.

  DON’T CUT BOUGAINVILLEA ROOTS!
IS YOUR PLANT ROOT BOUND?
INSPECT THE FOLIAGE

- LEAF SIZE – Do they look good?
- LEAF DENSITY – Are the leaves well distributed on each branch and throughout the crown? Are the branches themselves evenly distributed throughout the crown vertically and radially, or if not perfect, can it be faced for its planting location in the landscape?
- PROPORTION TO ROOTS – Is the top too much for the roots to support?
- IS THERE ANY INSECT DAMAGE?
- ANY SIGNS OF DISEASE?
- ANY SIGNS OF NUTRITIONAL DEFICIENCIES?

AVOID “SHRUBS ON A STICK”
INSPECT THE TRUNKS

- Straight trunks are nice but not as important as trunk taper. Good taper is important for strength. Good taper distributes wind forces downward incrementally.
- Check for nursery stake damage to trunk.
- Branches and small stems – Look for many evenly distributed over the entire trunk. They will increase trunk taper, caliper, and strength and feed the roots. Compromise with your customers regarding suckers/temporary branches for the long term benefits they offer.
INSPECT THE TRUNKS

CHECK FOR and AVOID:

- Co-dominant leaders
- Included bark
- Bark injury
- Topped trees or radical pruning
INSPECT THE TRUNKS

ROOT FLARE

• Locate it, inspect it, check roots from it and around it. Any girdling roots will have to be cut.
• Check plant depth in container. Beware of skinny stems propped up with mulch.
• Find a system to keep it visible for depth verification prior to granite or mulch placement.
TREES SIZE SPECIFICATIONS

• ANA – Arizona Nursery Association

Arizona Nursery Association Grower’s Committee Recommended Average Tree Specifications

Included in resource list for this class
<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Size</th>
<th>Height</th>
<th>Width</th>
<th>Caliper</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Acacia abyssinica</em></td>
<td>15</td>
<td>6.0</td>
<td>2.0</td>
<td>0.75</td>
</tr>
<tr>
<td><em>Acacia abyssinica</em></td>
<td>24</td>
<td>8.0</td>
<td>4.0</td>
<td>1.50</td>
</tr>
<tr>
<td><em>Acacia abyssinica</em></td>
<td>30</td>
<td>10.0</td>
<td>5.0</td>
<td>2.00</td>
</tr>
<tr>
<td><em>Acacia abyssinica</em></td>
<td>36</td>
<td>12.0</td>
<td>6.0</td>
<td>2.50</td>
</tr>
</tbody>
</table>
NATIONAL TREE AND SHRUB SPECIFICATIONS

AMERICAN STANDARD FOR NURSERY STOCK

• ANSI Z60.1–2004
  Approved May 12, 2004
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