Tree Selection

Todd P. West, Ph.D.
North Dakota State University
TREE SELECTION
Objectives

• Discuss the benefits of trees to the landscape and the environment.
• Describe the characteristics that should be considered prior to tree selection.
• Explain the characteristics of a tree that must be considered when selecting a species.
• Explain what to look for in selecting healthy, vigorous planting stock.
Introduction

- Trees are the largest, most dynamic and long-lived components of the urban landscape.
- They provide many positive benefits.
- Tree health and sustainability in the landscape are largely dependent on good selection before planting.
- Choosing the right tree for a particular site is one of the most important decisions to ensure:
  - Long-term benefits
  - Beauty
  - Satisfaction
- A poorly sited tree will eventually require more frequent and costly maintenance.
• Designs don’t always take into account horticulture principles in selecting plant material.
• Every landscape professional must learn the plants of the region and consider what is best for the site.
• Adaptability
  – A species genetic ability to adjust to different environmental conditions. Some spp. are more adaptable than others.
  – Red Maples (*Acer rubrum*) grow across a large range but still are not adaptable to high pH soils.
• “Right plant, right place”
Matching Tree and Site

• Set priorities in selection criteria for a tree.
• Many put the selection of function higher than site conditions as a selection criteria.
• Highest priorities are those that will affect the survival of the tree
  – Hardiness
  – Moisture requirements
  – pH adaptability
Selection Criteria

- Site Conditions
- Function
- Plant Features – Tree Characteristics
- Design Elements
  - Form and Size
  - Texture

- Sometimes functional goals cannot be met entirely because of site limitations.
- Example: screen is desired, an evergreen is ideal for year-round but site is shaded so broadleaf spp. might be selected because few needled evergreens grow well in shade.
Table 6.1

**Site characteristics**

<table>
<thead>
<tr>
<th>Climate</th>
<th>Soil</th>
<th>Planting site</th>
<th>Other plantings</th>
<th>Maintenance to be provided</th>
<th>Other requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardiness zone</td>
<td>pH</td>
<td>Buildings and other structures</td>
<td>Trees and shrubs</td>
<td>Irrigation</td>
<td></td>
</tr>
<tr>
<td>Rainfall/snowfall</td>
<td>Soil texture</td>
<td>Paved surfaces</td>
<td>Planting beds</td>
<td>Post-planting care</td>
<td></td>
</tr>
<tr>
<td>Sunlight/other lighting</td>
<td>Bulk density</td>
<td>Plans for future development</td>
<td>Groundcovers/flowers</td>
<td>Ongoing maintenance</td>
<td></td>
</tr>
<tr>
<td>Prevailing winds</td>
<td>CEC</td>
<td>Overhead and underground utilities</td>
<td>Turf</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposure</td>
<td>Nutrient analysis</td>
<td>Intended use of site</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soil volume</td>
<td>Intended function of plant</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Other requirements**
Soil Reaction (pH) and Type

• Urban soils tend to be disturbed, compacted and frequently shallow resulting in drought susceptibility.
• Potential for increased plant stress levels especially with respect to moisture.
• Test for compaction, pH, and fertility.
Space Constraints

• Many different limitations:
  – Overhead and underground utilities
  – Pavement
  – Buildings
  – Other trees
  – Visibility

• Make sure there is adequate space for growth to maturity.
Planting Distances From Power Lines

- **Tall Zone**: Tree heights taller than 40 feet
- **Medium Zone**: Tree heights less than 40 feet
- **Small Zone**: Tree heights 25 feet or less

**Root Damage Zone**

**Underground Utilities**
Human Activity

• Often overlooked.
• Top five causes of tree/shrub death are:
  – Soil compaction
  – Underwatering
  – Overwatering
  – Vandalism
  – Planting the wrong tree
• Account for more loss than all insect and disease-related deaths combined.
Arbor Cop is issuing citations for poor tree selection practices. The animations on the right reveal the damage caused by poor site selection. Drag and drop the citation to match the animation.

**NOTICE of CITATION**
City of Arborville - Pettisville County
Defendant has been charged with the following violations:
- Failure to consider plant hardiness
- Failure to consider drainage
- Failure to consider soil pH
- Failure to consider mature height
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Correct answers are highlighted in green, while your incorrect answers are in red.
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- Failure to consider drainage

Correct!
Function

Groups of plants can be used architecturally to form walls, canopies, or floors.

Plants can be used to screen the hot sun in summer and let the sun through in winter.

Plants can have an engineering use to reduce glare of lights.

Plants can form living sculpture.
Tree Characteristics

TABLE 6.2
Tree characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardiness</td>
</tr>
<tr>
<td>Growth habit/form</td>
</tr>
<tr>
<td>Size</td>
</tr>
<tr>
<td>Height</td>
</tr>
<tr>
<td>Spread</td>
</tr>
<tr>
<td>Root zone requirements</td>
</tr>
<tr>
<td>Attributes</td>
</tr>
<tr>
<td>Showy flowers</td>
</tr>
<tr>
<td>Attractive fruit</td>
</tr>
<tr>
<td>Attractive bark</td>
</tr>
<tr>
<td>Interesting foliage</td>
</tr>
<tr>
<td>Exceptional fall color</td>
</tr>
<tr>
<td>Resistance to insects and diseases</td>
</tr>
<tr>
<td>Drought tolerance</td>
</tr>
<tr>
<td>Tolerance of drainage problems</td>
</tr>
<tr>
<td>pH requirements</td>
</tr>
<tr>
<td>Salt tolerance</td>
</tr>
<tr>
<td>Light requirements</td>
</tr>
<tr>
<td>Known problems</td>
</tr>
<tr>
<td>Pests</td>
</tr>
<tr>
<td>Poor structure/weak wood</td>
</tr>
<tr>
<td>Propensity to form surface roots</td>
</tr>
<tr>
<td>Messy flowers/fruit/leaves</td>
</tr>
<tr>
<td>Thorns</td>
</tr>
<tr>
<td>Maintenance requirements</td>
</tr>
</tbody>
</table>

Types of trees:
- Pyramidal
- Full-crowned
- Fountain
- Weeping
- Columnar
- Spreading
- Vase-shaped
- Multistemmed
Native vs. Non-Native

• Native trees are found naturally within the used range.
  – Just because they are native to the U.S. doesn’t mean that they are native to your area.
  – Generally grow well within their native area.
• Non-native tree are introduced from other countries.
  – Can be invasive.
• Most urban landscapes are no longer “native” and have been greatly modified allowing non-native spp. to perform better than native spp.
• Key is to select plants that perform well in a given site.
Selecting Trees at the Nursery

• Once tree spp. has been selected, the next step is selecting high quality trees at the nursery.
• Always inspect trunk flare.
• Look for healthy, vigorous plants.
  – Don’t start with problems.
• Foliage should be evenly distributed on the upper 2/3 of trunk.
• Check for mechanical damage.
FIGURE 6-10  The wind load on the main trunk of the plane \( (Platanus \times acerifolia) \) tree (left) will be more evenly distributed than on the magnolia \( (Magnolia grandiflora) \) because more than one-half of the foliage is on branches that originate along the lower two-thirds of the plane tree trunk (the stake was never needed). Most of the stress on the magnolia will be concentrated just below the lowest branch.
Trunk Structure

- Best quality trees have a dominant central leader or trunk up to the top of the canopy.
- Trees of lesser quality have two or more leaders.
Branch Arrangement

• Major branches and trunks should not touch.

• Branches are less than 2/3 diameter of trunk.

• Permanent branches on large trees should be spaced 18 inches apart.

• Main branches on smaller trees should be 6 inches apart.
Quality of Old Pruning Cuts

Flush cut
Callus forming only around sides of flush cut. Branch collar no longer present.

Good cut
Trunk Moves Without Bending

Trunk bends along its length as it is pushed.

Trunk does not bend as it is pushed indicates a root problem.
Drag and drop the appropriate terms below into the boxes located on the drawing.

**Codominant Stems** - Avoid trees with codominant stems and select trees with a strong, central leader.

**Wilting Leaves** - Wilting leaves indicate insufficient water, but may also be a sign of root problems.

**Bad Branch Structure** - Learn how to identify the characteristics of a strong scaffold branch system.

**Soil on Trunk** - If you do not see the trunk flare, pull the soil back and look for it. Planting too deeply is a major contributing factor to future tree health problems.

**Broken Branch** - Avoid purchasing trees that have major scaffold branches broken.

**Trunk Wound** - A trunk wound can significantly disrupt water transport and may become the entry point for insects or pathogens.

**Girdling Roots** - Avoid purchasing trees with girdling roots. The problem is likely to worsen in the landscape.
Drag and drop the appropriate terms below into the boxes located on the drawing.

- Avoid trees with codominant stems and select trees with a strong, central leader.
- Wilting leaves indicate insufficient water, but may also be a sign of root problems.
- Learn how to identify the characteristics of a strong scaffold branch system.
- If you do not see the trunk flare, pull the soil back and look for it. Planting too deeply is a major contributing factor to future tree health problems.
- Avoid purchasing trees that have major scaffold branches broken.
- A trunk wound can significantly disrupt water transport and may become the entry point for insects or pathogens.
- Avoid purchasing trees with girdling roots. The problem is likely to worsen in the landscape.

Correct!
FIGURE 6-6  Smaller size nursery stock recovers from the stress of planting more rapidly than larger stock. The two spruce trees (*Picea* sp.) were planted at the same time, differing only in the size of the tree at planting (shown as the heavy dark circle in the the cross-sections). The tree on the left was smaller at the time of planting than the one on the right. The smaller tree, however, established more rapidly and had a larger trunk diameter 5 years after planting. *(Photo courtesy of Gary Watson, The Morton Arboretum, Lisle, IL.)*