PEGSMOR – Basics of Good Management

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PEGSMOR
Tree Management System
Life Stages of Trees:

1. Overview
2. Function
3. Form
4. Pruning
5. Planting
6. PEGSMOR
7. Summary
Master of our Domain?
Application of Arboriculture:

- Science and art of tree care
  - Selection
  - Planting
  - Management
  - Removal
There is a big difference . . .

Natural Forest

Community Forest
PEGSMOR & Understanding Trees:

- **Biological**
  - LEAVES:
    - Photosynthesis
    - Transport
  - BRANCH:
    - Support
    - Maintenance of Upright Form
  - STEM:
    - Support
    - Transport
  - ROOT:
    - Uptake of Minerals and Water

- **Mechanical**
  - LEAVES:
    - Wind Resistance
  - BRANCH:
    - Support, Maintenance of Upright Form
  - STEM:
    - Support
  - ROOT:
    - Anchoring
LEARN TO:
SEE, not just look,
ACT, not just wait,
LISTEN, not just hear,
TOUCH, not just watch.
Nature

Natural

The Body Language of Trees
PEGSMOD — Basics of Good Management
We all have a role to play:
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- Plant
- Establishment
- Growth
- Structure
- Mature
- Over-Mature
- Replace
PEGSMOR - “The System”
Nature vs. the Natural
Very few tree species are adapted for “open” growing conditions, and will have a tendency for poor branching structure.
Our Challenge:

- In nature pruning and structure develops naturally – those that don’t produce are “cut off”.

- In communities what we are effectively doing is trying to produce / maintain a vigorous tree with good structure, the whole time periodically removing a percentage of a trees ability to produce food (*to maintain vigor – this just does not make sense.*
Parts of a Tree

- Highly organized structure:
  - cells = tissues = organs = organism
- Trees have 3 main organs:
  - Leaves
  - Roots
  - Stem
Function of Leaves

“Capture” sunlight & manufacturing food

Photosynthesis

\[
(6)\text{CO}_2 + (6)\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + (6)\text{O}_2
\]

Carbon Dioxide + Water + ENERGY \rightarrow Glucose + Oxygen
Function of Roots

- Support & Anchorage
- Absorption of mineral nutrients & water
- Storage

Respiration

\[
\text{Glucose + Oxygen} \rightarrow \text{Carbon Dioxide + Water + ENERGY}
\]
Function of Stem

- Connector of SHOOTS & ROOTS
- Carriers (xylem) of water and nutrients roots – leaves
- Carriers (phloem) of food from leaves – all parts of the tree
- Support and structure
PEGSMOR – Basics of Good Management

Tree increases each year in height and spread of branches by adding on new growth of twigs.

Air supplies carbon the principal food of the tree taken in on under surface of leaves.

Leaves prepare the food obtained from air and soil and give off moisture by transpiration. Light and heat are necessary for the chemical changes.

The breathing pores of the entire tree, on leaves, twigs, branches, trunk and roots take in oxygen, flooding, poisonous gases, or smoke may kill a tree.

Heartwood (inactive) gives strength.

Sapwood carries sap from root to leaves.

Cambium (microscopic) builds the cells.

Inner bark carries prepared food from leaves to cambium layer.

Outer bark protects tree from injuries.

Surface roots.

Taproot.

Root tips or root hairs take up water containing small quantity of minerals in solution.
Gross Morphology (mass)

- 5% = leaves
- 15% = branches
- 60% = trunk
- 15% = woody root
- 5% = non-woody root

10% of the mass of a tree drives 100% of the growth process
Pruning definition:

- The purposeful wounding of a tree to meet a management objective
- “Capture” sunlight & manufacturing food

\[ (6)\text{CO}_2 + (6)\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + (6)\text{O}_2 \]

Carbon Dioxide + Water + ENERGY  $\rightarrow$ Glucose + Oxygen
- Pruning is purposeful wounding of a tree
- How do trees survive?

Trees have developed natural defenses to wall off and seal out decay

“Trees don’t heal – they seal”
Pruning Your Tree

- To improve form and function
- To improve aesthetics
- To improve visibility and safety
Objectives of pruning:

- **Crown management**
  - Cleaning
  - Thinning
  - Reduction
  - Restoration
  - Raising
General Pruning Guidelines

- Allow the tree to develop its natural shape
- Establish alternate branches, do **not** remove the central leader on trees
- Leave limbs which have strong, wide angles
- Use the 3 cut method when removing large limbs (over 2" diameter)
- Do **not** top trees
- Do **not** over-prune mature trees
Assessment: The First Step in Pruning

- Determine tree type and form
- Review where and why the tree needs pruning
- Determine the lowest branches you want at maturity, in 10 to 20 years
- Select sequence of branches to remove over the next 10 years
Basics of Pruning
Know Your Tree Anatomy

- Branch bark ridge
- Dead branch
- Living branch
- Branch collar
Where to Prune?

- First identify branch bark ridge and branch collar
- Cut just outside branch bark ridge and angle down and away from stem. Do not dig into branch collar.
- A proper cut does not damage branch bark ridge or branch collar.
Example:

- Callus ridge
- Decay associated with old dead stub
- New wound inflicted here

Oak

28. Proper pruning

Improper pruning
Conifers
living or dead branches

Hardwoods
dead branch live branch

branch collar

BBR's

cut first

branch collar

BBR's

cut first

branch collar

BBR's

cut first

branch collar

C
Pruning Larger Branches

The 3-cut method removes the weight of the branch and allows for a closer cut that will not damage the branch collar or trunk.
Good Cuts End Up Like Donuts
Example (good and bad)
Harmful Pruning Practices

A. Topping
B. Tipping
C. Bark ripping
D. Flush cutting
Know Your Tree’s Form

Excurrent Tree
(linden, red oak, pine)

Decurrent Tree
(elm, hackberry, maple, white oak)
Small Trees Get BIG!

- Prune branches while they are small (1-2 inches)
- Year 3 is a good time to begin pruning
Prune Early to Maintain Tree Health

- Weak V-shaped unions
- Damaged branches
- Sprouts/suckers
- Competing leaders
- Forks
- Rubbing branches
- Unevenly spaced branches
- Insect & disease problems
- Low, co-dominant stems
- Deformed branches
Stem and Branches
Prune to Improve Form
Prune to Improve Aesthetics

- Sprouts
- Damaged, diseased branches
- Formal appearance
- Form and health

Before

After
Prune to Improve Visibility or Safety
What we want to avoid . . .
Pruning (grafting) for fun
Tree Management System
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- Plant
- Establishment
- Growth
- Structure
- Mature
- Over-Mature
- Replace
Planting

- Right Tree Right Place Right Way
- Proper Planting Procedure
- Watering
- Mulching
- Staking
- Little or No Pruning
Basics of Good Tree Planting:

1. Look up for wires/lights
2. Dig shallow/wide hole
3. Find the top-most root
4. Place tree in hole
5. Position top root 1-2” above landscape soil
6. Straighten tree
7. Remove synthetic materials
8. Add backfill soil and firm the root ball
9. Add mulch to cover root ball sides
10. Stake if needed
PLANTING OUTLINE:

1. Site Selection
2. Plant Selection
3. Root Selection
4. Plant Placement
5. Planting Procedure
6. Planting Policies
7. Protect It
8. Provide for It

Develop a
Planting Overview:

* This Nebraska Statewide Arboretum graphic can be copied and distributed.

** Typical Tree Planting Detail **

- Dig hole 2-3x dia. of root mass
- Set root mass on undisturbed op. firm soil
- If staking is necessary, use two opposing belt-like straps
- Use plastic guard to protect from rabbit or mower damage
- Root flare should be visible @ base of trunk
- Use burlap, wire, string, rope, and tags
- Mulch 2-4" deep to drip line or beyond, keep mulch off trunk
- First lateral roots 12" below soil surface
- Place top of root mass at or slightly above existing grade (2" max)

*Note: Scale not included*
Tree Planting Information:

- treesaregood
- treelink
- NSA
Root Selection:

- Ball & Burlapped
- Containerized
- Bareroot
Let's get 1 trial installed:

Test impacts of root health by container type
- B&B
- Container
- Rootmaker / Root trapper
- Bare root?

- Goal to plant 1 location
- Planted 2 locations with 3 different trials

- HUGE kudos to CFSL staff, Alan Weiss, AG & HORT, City of Omaha & John Wynn.
Cold am ...
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Container Study

- As is
- Scored
- Squared
2nd planting – Depth Study
4 reps of each treatment:
- 4” above grade
- At grade
- 4” below
- 8” below
- 8” below + volcano mulch
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How successful is this really going to be?
Establishment: 1 to 4 years

- Root Replacement Period
- Maintain Mulch
- Limited Pruning
Growth: 5 to 15 Years

- Prune Every Three years
- Remove Weak Crotches
- Remove Dead Wood
- Remove Interfering Branches
- Maintain Mulch
"The Formative Years"

Remove Codominant Leaders and Weak Attachments when they are Small.

Before

After
“The Formative Years”

Branch Attachments with Included Bark Will Eventually Fail During a Loading Event

Weak Attachments

Will Become This!
Structure: 15 to 25 Years

- Prune Every Five Years
- Select Permanent Branches
- Remove Weak Crotches
- Remove Dead Wood
- Maintain Mulch
Maturity: 25 to 80 Years

- Prune Every 7 to 10 Years
- Remove Dead Wood
Over-Mature: 80+

- Prune Every 3 to 5 Years
- Remove Dead Wood
- Remove Defective Branches
Replacement

- Remove Tree
- Plant New Tree
Summary:

- Interrelated systems (Canopy/Stem/Roots)
- Trees have natural defenses (CODIT)
- Prune to maximize CODIT
- Proactive rather than Reactive
- Focus on the Formative years
- When in doubt . . . Cut it out
References

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Questions

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