If Only Trees Could Talk…

They’d tell us what they like best (or more likely what we do wrong)!

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If trees could talk, many would say….

• “Help, I can’t breathe!”
• “Geez, I like soil, mulch and nitrogen but I just can’t take anymore!”
• “My beautiful taper, please don’t bury it”
• “Oh no, my roots are choking me”

“Help, I Can’t Breathe”

• Plants require oxygen as much as water
  • Use oxygen taken up by root hairs from soil pore space
  • How much oxygen?
    • 15 - 25% - roots grow well
    • 5% - roots stop growing
    • 2% - roots die

Low Oxygen Soil Due to

• Saturated soil
• Overwatering young trees
• Poorly drained soil
• Interfaces
• Excessive fill or mulch
• Planting too deep

Correct Watering Tips for Young Trees

• Water when soil beginning to dry
  • “Rule of thumb” for new trees
    • 3 to 5 gallons per week
    • 8” deep and 12” outside hole
  • Drip irrigation, trickling hose, or 5 gal. perforated bucket
Soil Interfaces

- Difference in texture of potting mix and native soil
- Creates drainage issues
- Roots do not readily penetrate dense clay or compacted soil, tend to circle
  - Dig wide planting hole and roughen sides
- Do not amend backfill only
  Creates an interface

"Geez, I like soil but....."

- Don't add soil over roots
- Reduces soil oxygen
- Fill will not stop surface roots
- Can (will) kill trees
  - Slow decline

"Geez, I like organic mulch but....."

- Not deep
  - Reduces soil oxygen
  - Roots grow in mulch
  - Dry out in summer
  - Winter kill
- Not piled against trunk
  - Trunk decay
- Rodent homes

Correct Mulching

- ONLY 2 to 4" deep
- At least a 4' to 6' diameter ring; the wider the better

"Geez, I like nitrogen but....."

- Fertilization often not needed
  - Trees have one flush of growth
- Trees in lawns receive nitrogen from turf fertilization
  - May need iron or manganese in Nebraska
- Do not fertilize at planting unless
  - Construction has removed topsoil
  - Soil test determines needed

Excess Nitrogen Issues

- At planting:
  - Fast release nitrogen sources may burn new roots
  - Canopy growth at expense of root growth
- Excess N increases trees need for water and susceptibility to pests
- Excess nitrogen can reduce beneficial soil mycorrhizae
**My beautiful taper, please don’t bury it**

*Photo: Kelly Feehan, UNL*

**Plant at Correct Depth**

- Do NOT plant at same depth tree was in container
- WAIT to dig hole until taper or first lateral root found
- Plant so root flare is just below or slightly above soil grade

*Photo: Nebraska Forest Service*

**Correct Tree Planting**

- Dig a wide but not deep hole!
- Find taper first!!
- Dug or rototilled area
- Sliding sides
- 2-3 times diameter of root ball
- Firm subsoil to prevent settling

*Diagram: Kansas State University*

**Oh no, my roots are choking me!**

*Photo: Eric Berg, Nebraska Forest Service*

**Girdling Roots**

- Cut encircling roots – stressful and roots tend to continue in circle!
- Break up root ball and tease out roots
- Better than cutting. Still stressful

*Photos: Eric Berg, Nebraska Forest Service*
Buy in Root Trap Bags

If trees could talk, many would say......

• “Uffda, you just planted me and you’re already cutting some of me off?”
• “Oof, I’m staked so tight I can’t sway with the wind and my trunk is getting weak”.
• “Egads, I needed pruning years ago”
• “No, no, no...... please don’t top me”.

“Uffda, you just planted me and you’re already cutting some of me off.”

• Minimal, if any, pruning at planting:
  • Branches/leaves needed to recover from transplanting, for root growth
  • Avoids wound response during planting stress
  • Only remove double leaders, dead or severely damaged branches
  • Leave lower limbs

Benefits of Leaving Lower Branches

• Promotes root growth and trunk caliper
  • Auxins produced in canopy promotes root growth and cytokinins produced in roots promotes canopy growth
• Helps reduce sunscald and frost cracks
  • Removal of lower limbs contributes more than thin bark
  • Prune up gradually so unbranched trunk is not more than 1/3 height of tree
  • i.e. a tree should not be pruned up to provide six feet of clearance until it is about 18 feet tall
  • Remove lower limbs when about one inch in diameter

Remove Co-dominant Leaders when tree is young (at planting)

Leave lower limbs. Remove before about one inch in diameter
“Oof, I’m staked too high, too tight, too long”.

Good Staking

- Only if needed
- Low on tree – goal is to keep root ball from shifting
- Allow top of tree to move
  - Strengthens trunk and roots
  - Stimulates growth hormones
- Use wide material
- Remove after one year

“Egads, I needed pruning long ago....”

- Wait about 2 to 3 years after planting
- Years 3 – 15 most important for structure
- Smaller wounds “seal” quicker
- Make correct pruning cuts
- Do NOT use any type of wound dressing or paint

When you wait too long to prune......

Bad Structure to Prevent/Remove when tree is young (first 4 to 15 year)

- Co-dominant leaders
- Branches with included bark, narrow angles
- Branches with large aspect ratios
- Closely spaced vertical branches
- Poor radial spacing (most branches on one side)
- Crisscrossing branches

Remove Branches w/ Included Bark when tree is young (first 4 to 15 year)

Narrow angles can lead to ingrown bark
Strong Branch Unions have Small Aspect Ratios

- Branch diameter relative to trunk diameter, measured just above union
- Lateral branch should not be larger diameter than main trunk/or branch it’s attached to

Avoid Close Vertical Spacing

- 18” to 24” is good but how’s radial spacing?
- Too close

Avoid Multiple Branching From One Spot when tree is young (first 4 – 10 years)

Remove Crisscrossing Branches when tree is young (first 4 to 10 years)

“No, No, Please Don’t Top Me”

- Huge amounts of stored food removed
- Photosynthesis reduced
- All cuts are stub cuts
- Weakly attached suckers
- Decay sets in
- It’s just plain ugly
- This is not the fountain of youth for a tree

Pruning Effects on Trees

- Creates wounds - trees use resources/energy to respond
- Entry points for pathogens
- Removes stored food and reduces food production
- Roots are lost
- Disrupts hormonal pathways
- A little each year or every other/few years best
Tree Response to Wounds

- Wall off and seal – no healing
- Natural defense
  - Protective chemical boundaries form
  - New wood seals wound
- More and larger wounds use more resources and seal more slowly

Encourage Walling Off and Sealing

- Maintain healthy trees
- Don’t prune during stress periods
- Prune at or near best times of year
- Don’t over prune
- Prune before branches too large
- Make correct pruning cuts
- Do not use wound dressing/paints
  -Limits oxygen to wound
  - Petroleum based products can kill cells
  - May prevent drying and serve as food source for pathogens

Best Times of Year to Prune

- Past/current recommendation - when trees are dormant
  - With late winter, close to spring growth, considered ideal
- Newer recommendation - during early growth period
  - April, May, June in Nebraska
  - Cells most active so quick callus growth
- Pruning late winter, just before new growth, still good time
  - Defense systems good on cuts made just before or early in season of active growth
  - Easier to see branching structure
  - Helps reduce spread of diseases like fire blight/oak wilt

Worst Times of Year to Prune

- Mid to late summer through fall
  - Can delay dormancy
    - Especially elms and maples
- During stress periods
  - Drought, pest issues
- At planting

Correct Pruning Cuts

“Trees have very effective ways for confining their problems. Our treatments must respect natural boundaries”. Alex Shigo

Avoid Improper Cuts
“Select and Grow Right!”
Avoid Common Mistakes

• **Mistakes** we want to help avoid
• Overwatering, overmulching, overfertilizing
• Planting too deep
• Girdling roots
• Pruning at planting and waiting many years to prune; topping
• Staking too high on a tree, too tight, and for too long

Thank-you! Questions?