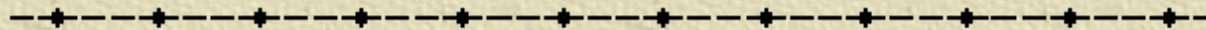




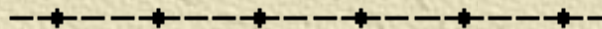
Trees and Shrubs



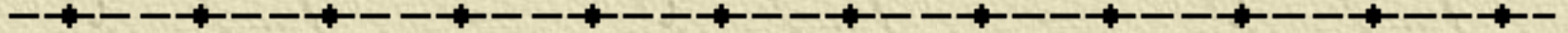
Master Gardener Program

UW Cooperative Extension Service

Laramie County



Arborist



- ✦ Someone who makes a career of the caring for trees in an urban setting.
- ✦ Planting, transplanting, pruning, diagnosing problems, recommending treatments, disease care fertilizing, pest management and appraisals.

Tree City USA designation

- ✦ Sponsored by The National Arbor Day Foundation in cooperation with the USDA Forest Service and the National Association of State Foresters,
- ✦ City that has a tree program, a plan of action for tree care.



Trees in General

- ✦ Reduce air pollutants by 25%.
- ✦ Reduce noise pollution.
- ✦ Use about 26 lbs of Carbon Dioxide/year.
- ✦ Can cut air conditioning cost by 10 to 50%
- ✦ Windbreaks can reduce heating costs by 10-40%.
- ✦ Increase the value of properties by 15%.

Trees in General

- ✦ Tree roots grow **surface to 24 inches** deep.
- ✦ Anchoring roots go **3 to 7 feet** deep.
- ✦ Roots **do not** go dormant in the winter.
- ✦ Best time to plant a tree? Any time the ground isn't frozen.

Tree Biology



✦ Monoecious

◆ Bears both types of flowers

- Pine Trees, lindens

✦ Dioecious

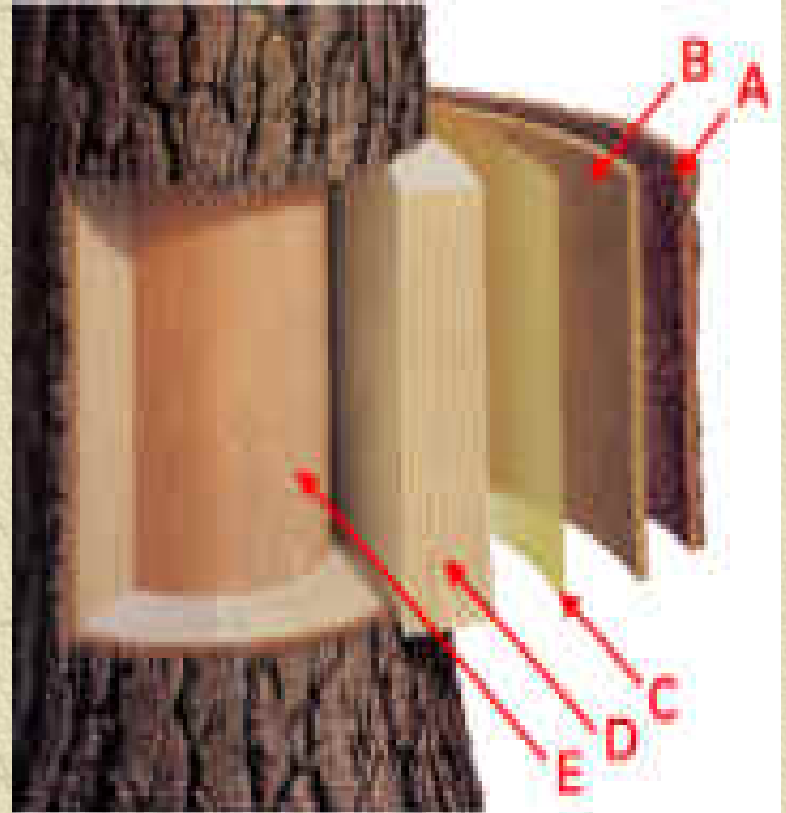
◆ Bears only one type of flower

- Cottonwoods, Willow, Pistachio, Holly

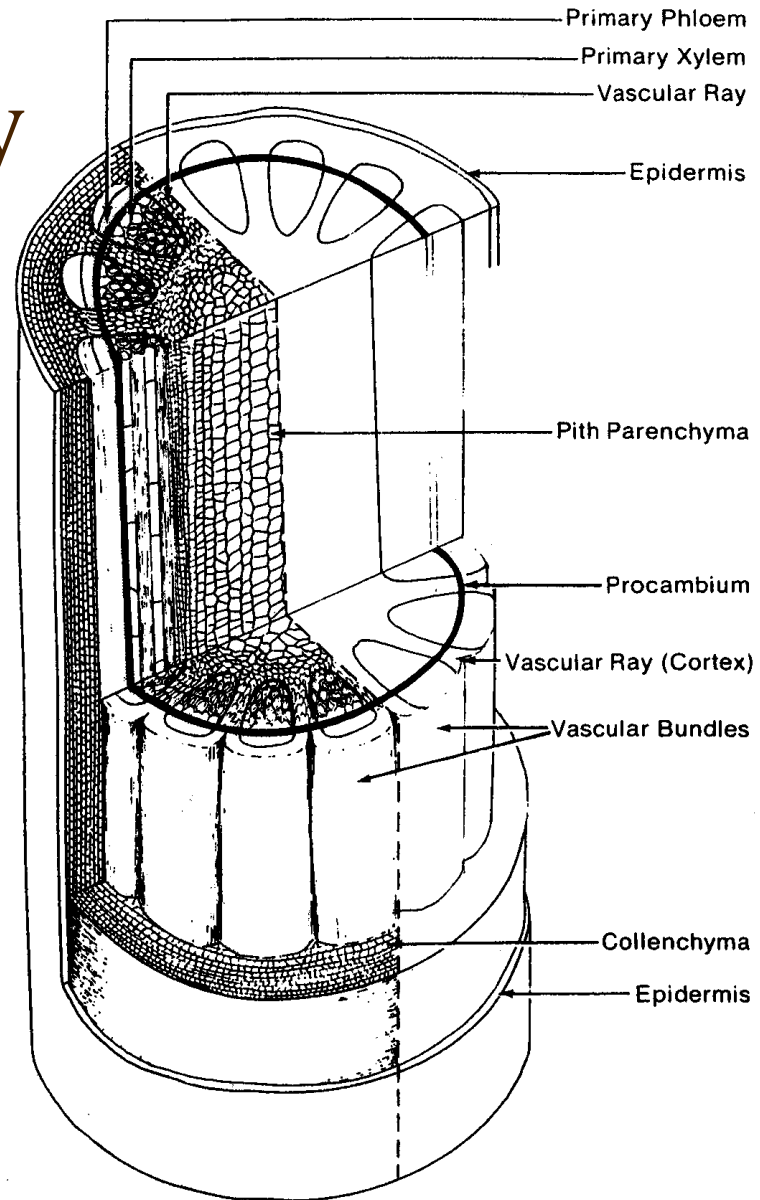


Tree Biology

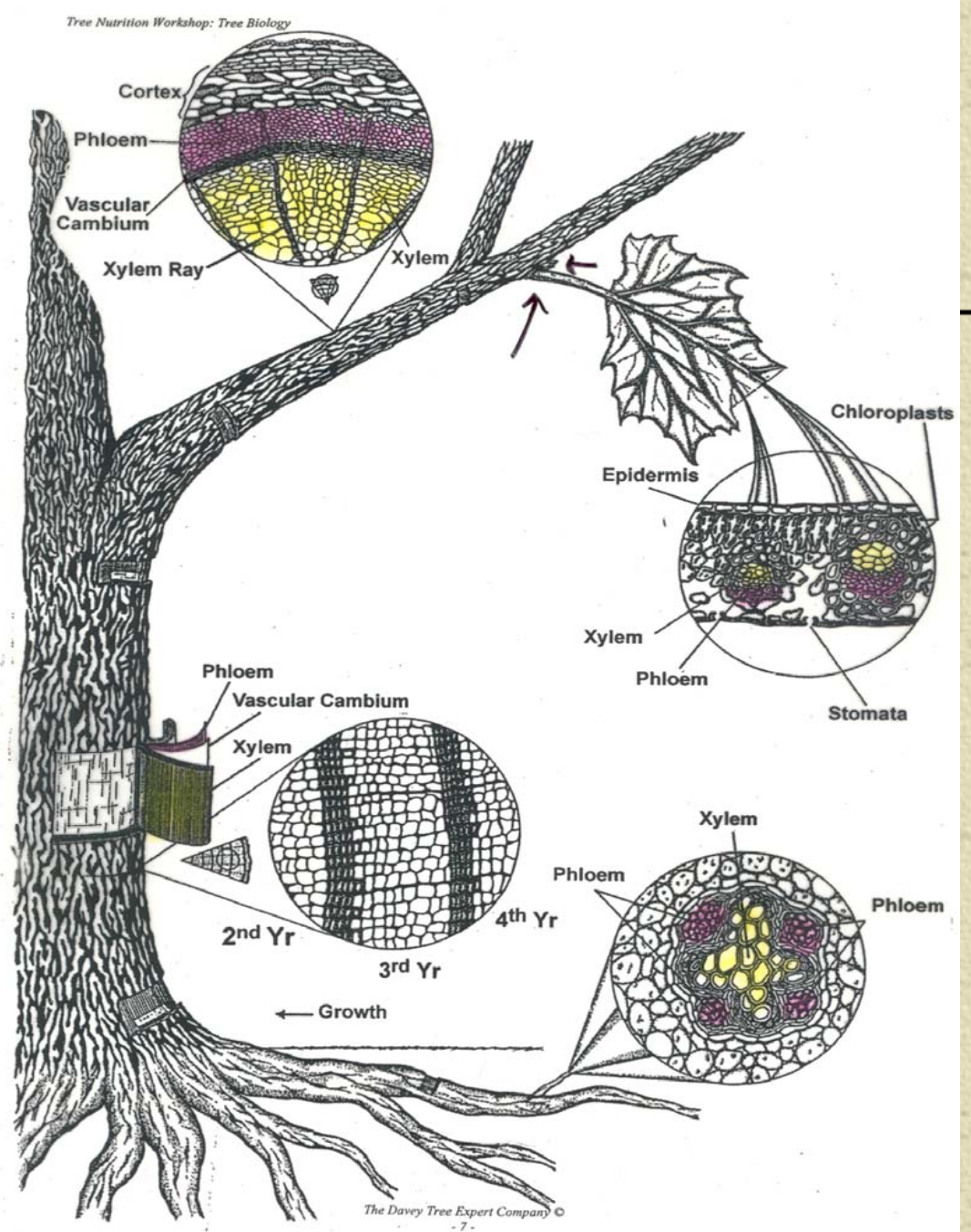
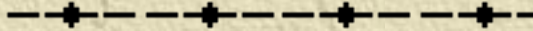
- ✦ A. Bark
- ✦ B. Phloem
- ✦ C. Cambium
- ✦ D. Xylem/sapwood
- ✦ E. Heartwood/pith



Tree Biology



Tree Biology



Tree Biology

✦ Woody Twigs:

- ✦ Primary growth is typically herbaceous, transition into a woody form.
- ✦ Lenticels: scattered bumps that may look like scale insects on smooth young bark are breathing pores.
- ✦ Leaf Scars: remains of a previous year's leaf, method of ID, specific to that species.

Tree Wound Healing

Scars or wounds are first covered with callus, arising from the division of cells near the wound surface.

Cork slowly encroaches from the area around the injury.

For healing to be effective it is important that woody branches be cut as close as possible to the supportive trunks since is difficult for cork to grow over stumps.

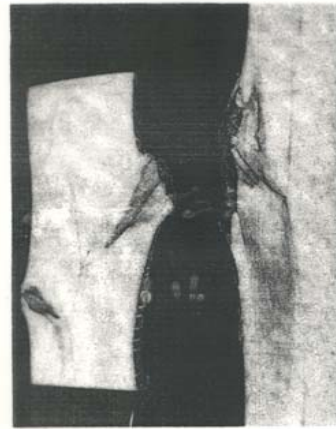


Figure 5-5. Reaction by a tree to proper branch removal (left) and to flush-cut pruning (right). Note the large area of discoloration in flush-cut sample. (Courtesy Kenneth R. Dudzik, N.E. Forest Experiment Station)



Figure 5-6. Wound closure after proper branch removal. The cut was made outside of the branch bark ridge (left arrow) and the branch collar (right arrow).

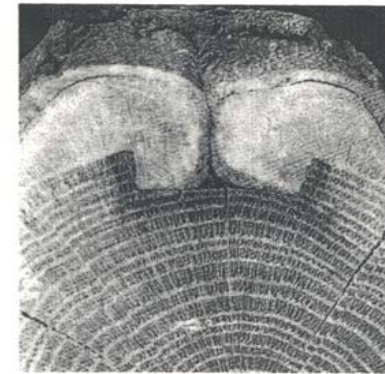


Figure 5-4. Wound closure in white oak.

Tree Growth Cycle

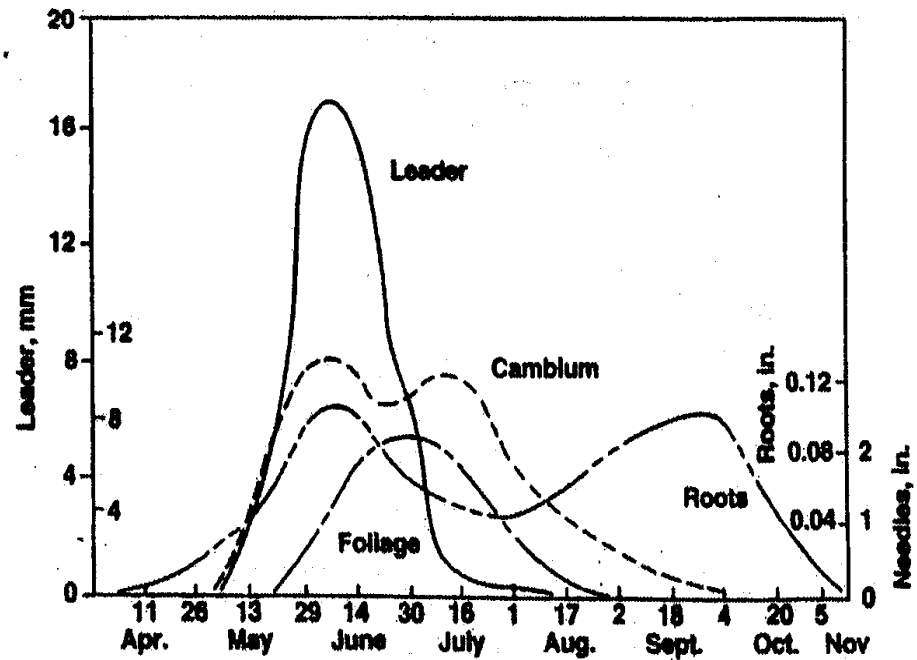
✦ Season

✦ Temperature

✦ Photoperiod

✦ Water

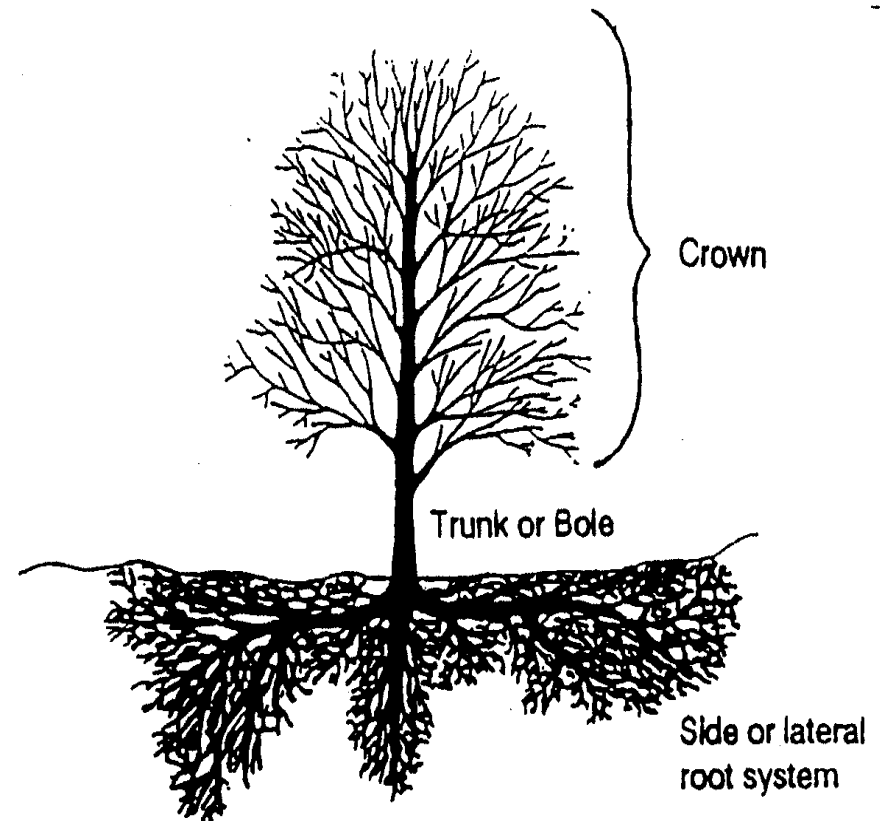
1. Season, temperature, photoperiod, water



The Davey Tree Expert Company ©

Tree Structure

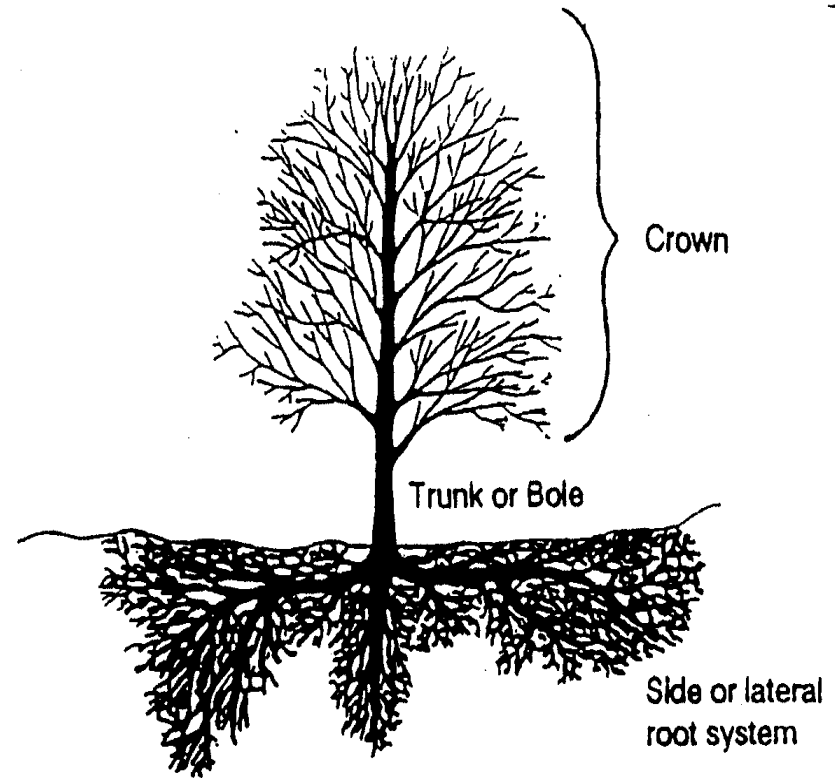
-
- ✦ 5% Leaves
 - ✦ 15% Stems
 - ✦ 60% Trunk
 - ✦ 15% Wood Roots
 - ✦ 5% Absorbing Roots



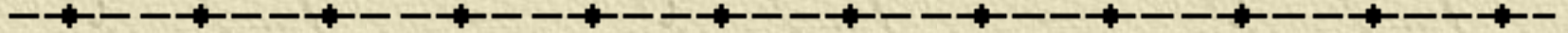
Tree Structure

✦ Root Growth Form is a function of:..

- ◆ Genetics
- ◆ Stage of Maturity
- ◆ Soil Conditions



Tree Roots

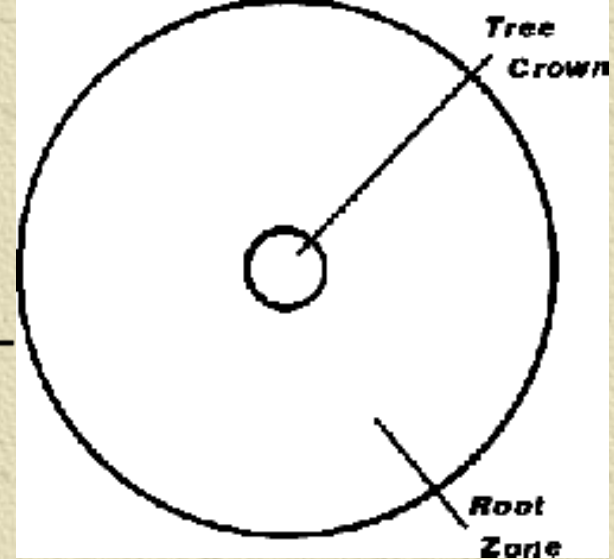


- ✦ Are aggressive and active most of the year.
- ✦ Don't enter a dormant period.
- ✦ Always ready to take advantage of favorable soil conditions.
- ✦ Will grow beneath or into materials
- ✦ Will find structural faults and take advantage of that weakness.

Tree Roots

- ✦ Tree root systems consist of large perennial roots and smaller, short-lived, feeder roots.
- ✦ Large, woody tree roots and their primary branches increase in size and grow horizontally.
- ✦ Do not grow deeper than 3 to 7 feet.
- ✦ Root functions include water and mineral conduction, food and water storage, and anchorage.

Tree Roots



- ✦ Most tree roots are located in the top 6 to 24 inches of the soil.
- ✦ Occupy an area two to four times the diameter of the tree crown.
- ✦ Roots obtain water, oxygen and minerals from soil.
- ✦ They do not grow toward anything or in any particular direction.

Tree Roots



- ✦ Soil compaction, change in soil depth and improper watering can injure roots, increasing stress and susceptibility to disease and Insects.
- ✦ To avoid root disease, maintain a healthy, vigorous environment around a tree.
- ✦ Once a root system is severely affected, the tree usually must be removed.

Tree Roots

✦ Compaction

◆ Trees biggest problem:

- Roads.
- Parking lots.
- Foot traffic.
- Poor soil prep.
- Livestock.



Tree Biology

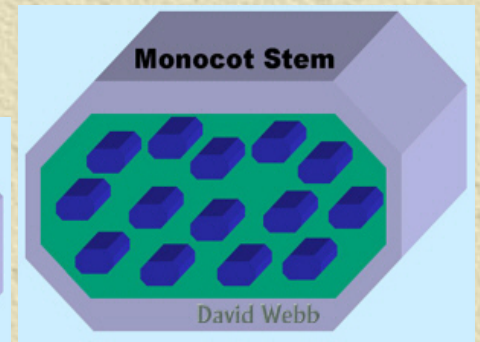
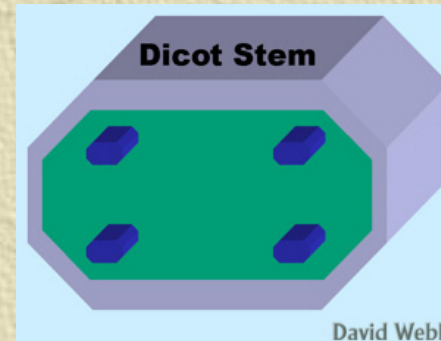
✦ Mono-cot

◆ Palm Trees, grass



✦ Dicot

◆ Pine tree



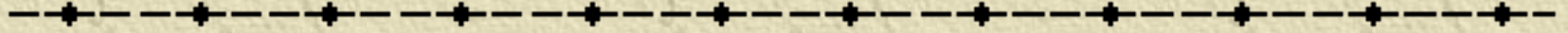
Cold Hardiness



✦ 3-stages

- ◆ Short days, cool nights.
- ◆ Killing frost.
- ◆ Super cooled cells that do not freeze.

Cold Hardiness



✦ Tissues of plants vary in hardiness

- ◆ Leaf bud

- ◆ Twigs

- ◆ Roots

Two Main Type of Diseases

✦ Biotic or Pathogenic Disease

◆ Need three factors for this

- A host plant
- A parasitic organism
- Environmental conditions

✦ Abiotic Disorders

Biotic or Pathogenic Disease

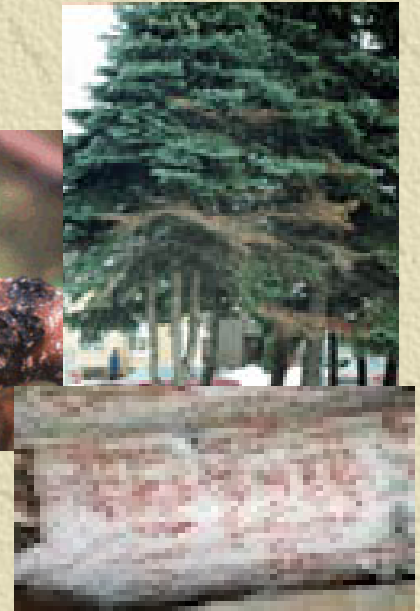
✦ **Canker**: dead areas on the stem, bark or cambial area caused by : fungi, bacteria or other living agents.

- ✦ Plant stress
- ✦ Drought
- ✦ Freeze damage
- ✦ Soil conditions
- ✦ insects



Types of Canker

-
- ✦ Cytospora Canker.
 - ✦ Siberian Elm canker.
 - ✦ Black Canker on Aspen.
 - ✦ Thyronectria Canker on Honeylocust.



- ✦ The disease especially affects trees with root damage, which are often found in areas under construction, or trees that have been recently transplanted.

Treatment of Canker

- ✦ Increase plant vigor and sanitation.
- ✦ Remove all infected limbs and other areas.
- ✦ Clean wounds to avoid further spread of infection.
- ✦ Remove dead bark to dry out the diseased area and help the tree defend itself against insect and fungal attacks on the cankered area.
- ✦ **Do not** apply any tar, oil-based paint or other wound dressing, allow the cleaned tissue to dry out on its own.

Fungus

- ✦ Verticillium Wilt.
- ✦ Anthracnose.
- ✦ Apple Scab.
- ✦ Dutch Elm Disease.
- ✦ Horseshoe fungus.
- ✦ Mushrooms.
- ✦ Marssonina blight.
- ✦ Needle Cast.
- ✦ Powdery Mildews.
- ✦ Septoria Leaf Spot.



Virus

✦ Symptoms vary dependent on host.

- ◆ Prunus necrotic ring spot virus.
- ◆ Tomato ringspot virus.
- ◆ Grapevine fanleaf virus.
- ◆ Apple mosaic virus.
- ◆ Rose mosaic complex.

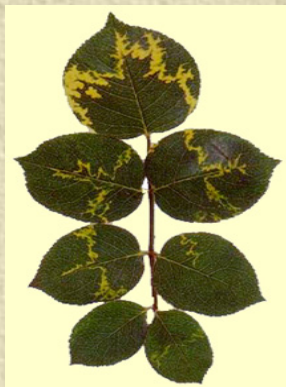


photo 2-27 - E. V. Podleckis

Abiotic Diseases



-
- ✦ Iron Chlorosis.
 - ✦ Leaf Scorch.
 - ✦ Misapplied Herbicides.
 - ✦ Drought (winter and summer).
 - ✦ Lawn mowers.
 - ✦ Too much water.
 - ✦ Squirrels and other mammals.
 - ✦ Wind induced spirals and cracks.
 - ✦ Lightning.



Grass



-
- ✦ Grass is highly competitive, energy demanding plant.
 - ◆ Hotter in the summer.
 - ◆ Colder in the winter.
 - ◆ Drier than those growing in natural cover or with a mulch.

Drought, Mitigating the effects on trees

- ✦ Avoid extensive pruning.
- ✦ Avoid planting in shallow soils.
- ✦ Mulch for winter and summer protection.
- ✦ Remove competing groundcover.
- ✦ Deep water.
- ✦ Fertilize properly, if at all.
- ✦ **Mulch.**

Cold Damage

- ✦ Intracellular freezing (within the cell), ice crystals form within the cell causing the cell to rupture.
- ✦ Sunscald, dehydration of bark tissue resulting from sudden temp changes usually Dec through Feb.

Cold Damage

- ✦ Extra-cellular Freezing (between the cells), desiccation of the cell wall, can survive if it occurs slowly.
- ✦ Frost Crack, start on the inside of a trees as a result of defects from an injury, change of temperature or drought stress.
- ✦ Ring Shake, separation along thin walled cells in the region between annual growth rings.

Salt Tolerance of Trees and Shrubs.

Low salt tolerance

Maple (some)

Roses

Viburnum

Willows

Euonymus

Barberry

Linden

Walnut

Moderate salt tolerance

◆ Birch

◆ Spruce

◆ Firs

◆ Privet

◆ Pyracantha

◆ Current

◆ Boxelder

◆ Juniper

◆ Arbor Vitae

◆ Buffalo berry

◆ Ponderosa

◆ Green Ash

◆ Red Cedar

Fertilizers and Fertilizing

All fertilizers are salts.

Do not:

- ✦ Use high Nitrogen fast release fertilizers.
- ✦ Fertilize late summer or fall in cold climates.
- ✦ Use tree fertilizer spikes.
- ✦ Inject directly into the tree.

Fertilizers

Do:

- ✦ A soil test to know what is needed.
- ✦ Fertilize in early to later spring.
- ✦ Use a low nitrogen slow release fertilizer.

Note: Foliar feeding: quick fix, short term, may burn leaves.



Environmental Tolerances

- ✦ Moisture: crucial factor, site analyzed as to water potential,.
- ✦ Water Spenders: use water freely but in deep soils has extensive root systems that absorb water from a large volume of soil. As long as some of their roots are in moist soil they can survive. Black Walnut, Plane Tree, Mulberry, Cottonwood.

Environmental Tolerances

- ✦ Drought Evaders: avoid water stress by drying up or dropping their leaves or becoming virtually dormant during dry periods.
- ✦ Air Pollution: many species will weaken, reduce their growth, suffer leaf injury.
- ✦ Air pollution may involve many chemicals from a number of sources. Fluorine or sulfur dioxide is especially toxic to plants. Tolerant: Ginkgo, London Plane, Pin Oak, and Tree of Heaven.

Planting a Tree



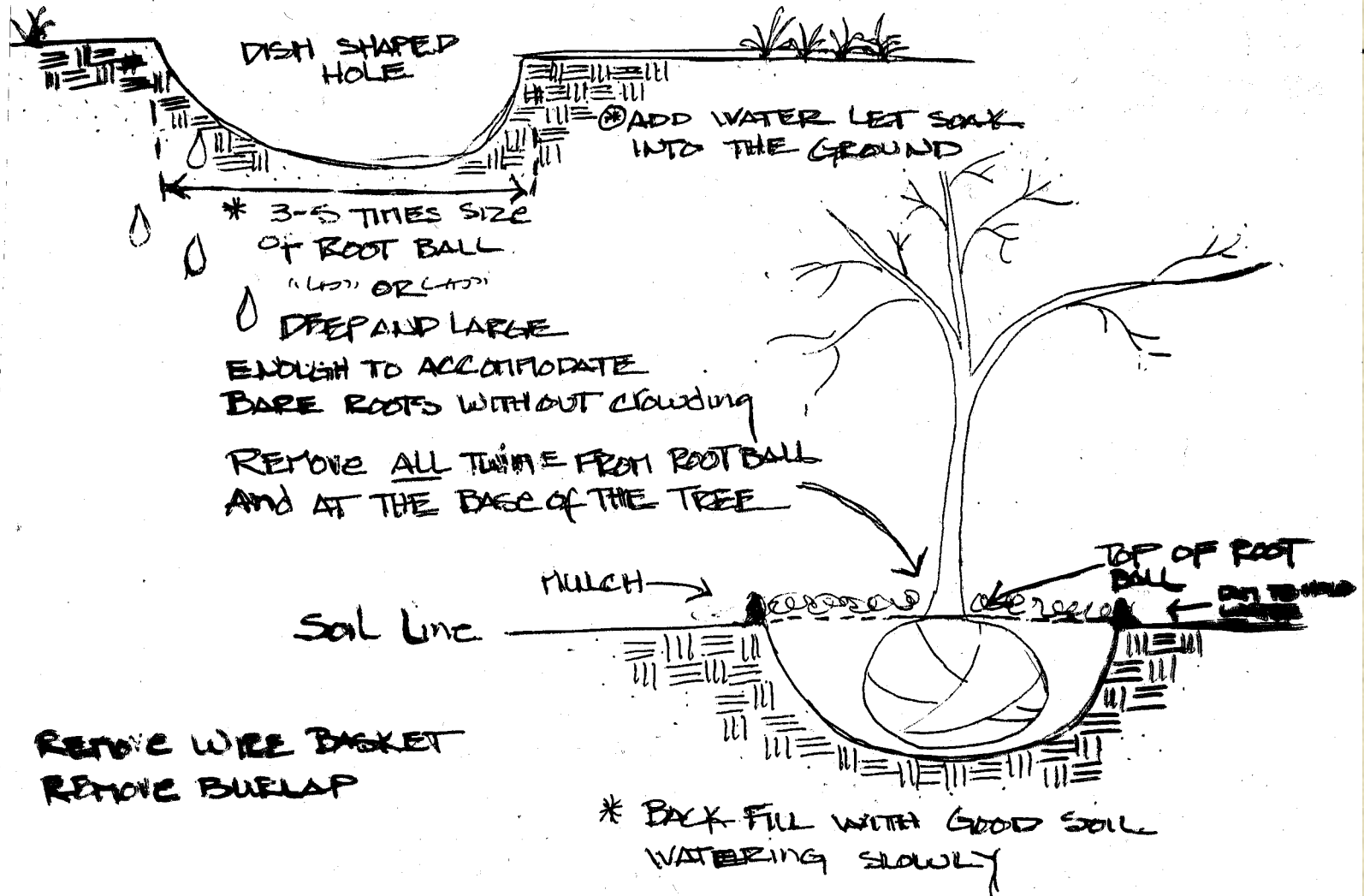
✦ Call before you dig:

✦ Wyoming One Call 1-800-348-1030

Or

1-800-849-2476

Planting a Tree



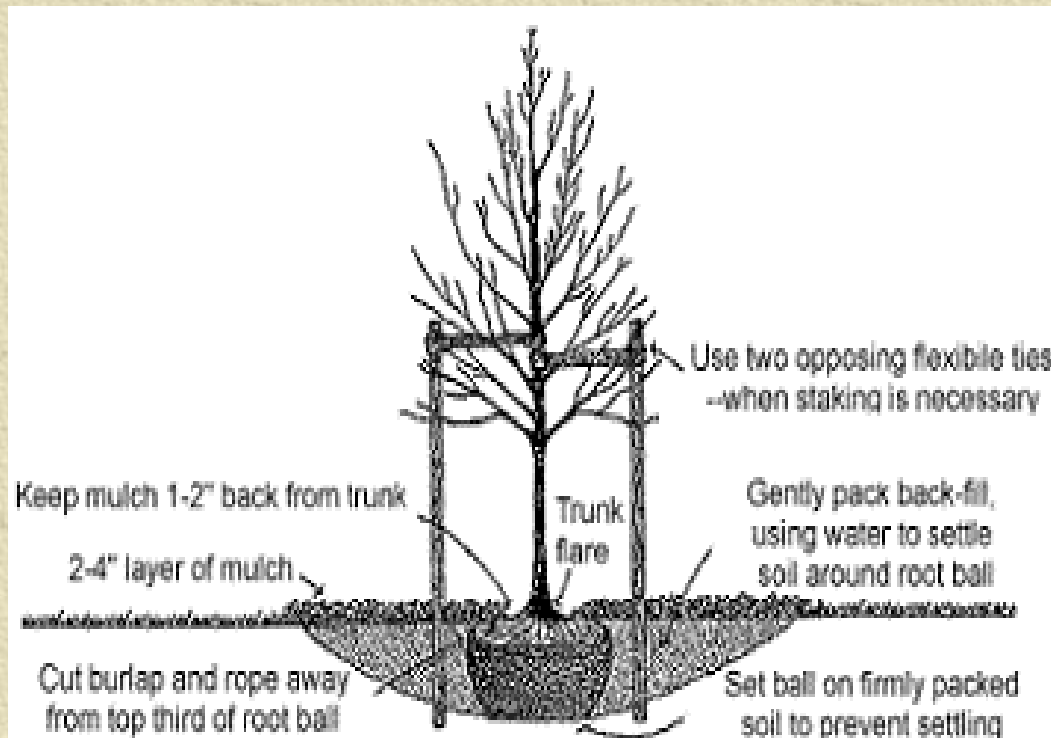
Planting a Tree

- ✦ Smaller trees establish more quickly.
- ✦ It takes 2-3 years for tree roots to go into native soil.
- ✦ 90% of the root system is lost when dug up from the nursery.
- ✦ Back fill with native soil and organic matter.



Best time to plant?

- ✦ Anytime the ground isn't frozen.
- ✦ Ideal planting time is early spring.



Transplant Shock



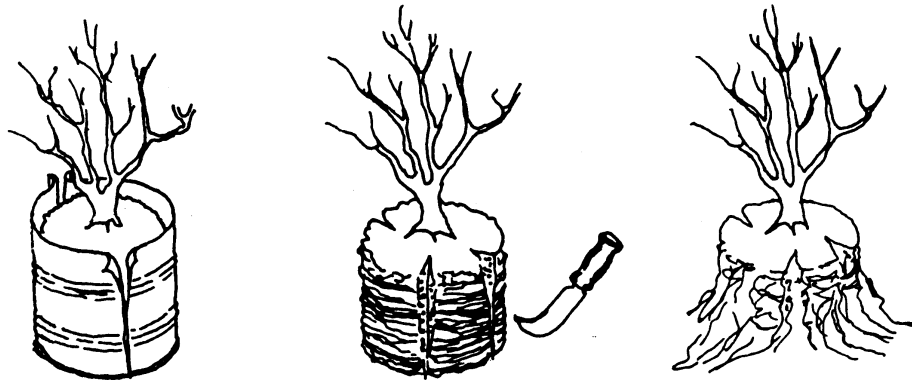
- ✦ Failure to establish.
- ✦ Can occur up to six years after planting.
- ✦ Due to improper site preparation or lack of follow up maintenance.
- ✦ Planted too shallow, planted too deep.
- ✦ Planted into compacted soil.

Mulching a tree



Planting Shrubs

CONTAINER PLANTS



City Ordinances

- ✦ **12.16.040 Responsibility of property owners.**
- ✦ A. It is the duty of the owner of property abutting any public street, alley or sidewalk rights - of - way, or other public place, to properly maintain and care for all trees, shrubs, hedges or vines located upon or affecting these areas.
- ✦ The director of forestry shall have the authority to require such property owners to provide proper maintenance, which includes, but is not limited to, providing a fourteen (14) foot clearance above street and alley surfaces and an eight (8) foot clearance above sidewalks.

Evergreen Trees

- ✦ Conifer Aphids.
- ✦ Iron Chlorosis.
- ✦ Pine Needle Scale.
- ✦ Pine Tip Moth.
- ✦ Spruce Bud Worm.
- ✦ Spruce Gall Aphids.
- ✦ Needle Miner.



Fir Trees

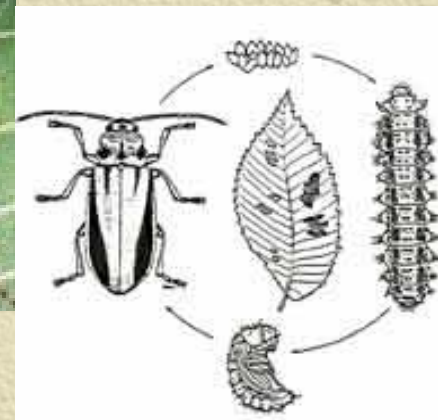
❄️ White Fir, Douglas Fir.

- ◆ Tussock moth.
- ◆ Needle cast.
- ◆ Cooley spruce gall.
- ◆ Bark beetle.
- ◆ Galls.
- ◆ Aphids.
- ◆ Fungal problems.



Elm Trees

- ✦ Elm Leaf Beetles.
- ✦ Elm Scale.
- ✦ Iron Chlorosis.
- ✦ Aphids.
- ✦ American Elms w/Dutch Elm Disease.



Cottonwoods- Aspen Trees

- ✦ Aphids.
- ✦ Cytospora Canker.
- ✦ Iron Chlorosis.
- ✦ Leaf Miners.
- ✦ Oyster Shell Scale.
- ✦ Bud Ball Mites.
- ✦ Fungus.
- ✦ Bacteria.
- ✦ High Hazard Tree.



Crabapple Trees

- ✦ Fire Blight.
- ✦ Aphids.
- ✦ Oyster shell Scale.
- ✦ Pear slugs.
- ✦ Iron Chlorosis.
- ✦ Need pruning.



Catalpa

- ✦ Can be messy.
- ✦ Low water needs.
- ✦ Sooty mold
- ✦ Aphids
- ✦ Verticillium wilt
- ✦ Mealybugs.



Ash

- ✦ Bores.
- ✦ Sawfly.
- ✦ Leafcutter bees.
- ✦ Anthracnose.
- ✦ Gall midge.
- ✦ Scale.
- ✦ Tent caterpillars.



Maple Trees

- ✦ Leaf roller.
- ✦ Leafhopper
- ✦ Anthracnose
- ✦ Septoria
- ✦ Eriophyid Mites
- ✦ Cottony maple scale
- ✦ Boxelder- tends to hollow out.



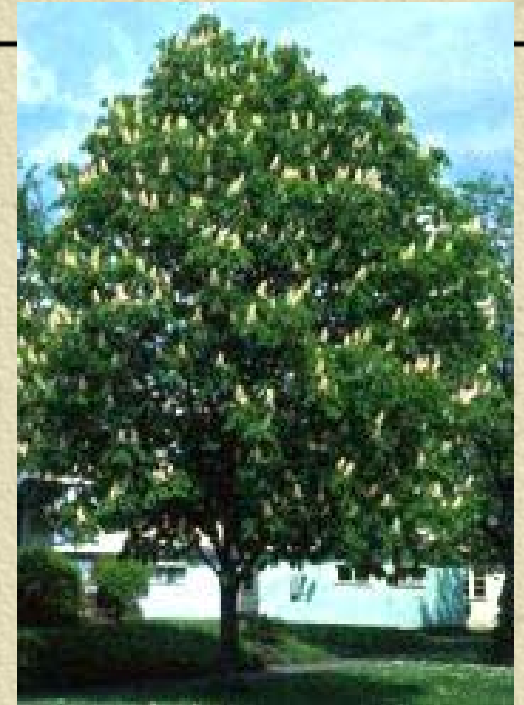
Linden Trees

- ✦ Very susceptible to some herbicides. Do not use liquid herbicides or use "weed and feed" fertilizers within the tree root zone.
- ✦ Aphids.
- ✦ Mites.
- ✦ Bees.
- ✦ Blooms in June.



Ohio Buckeye/Horsechestnut

-
- ✦ Blooms in May.
 - ✦ Needs summer water.
 - ✦ Can be messy.



Honeylocust

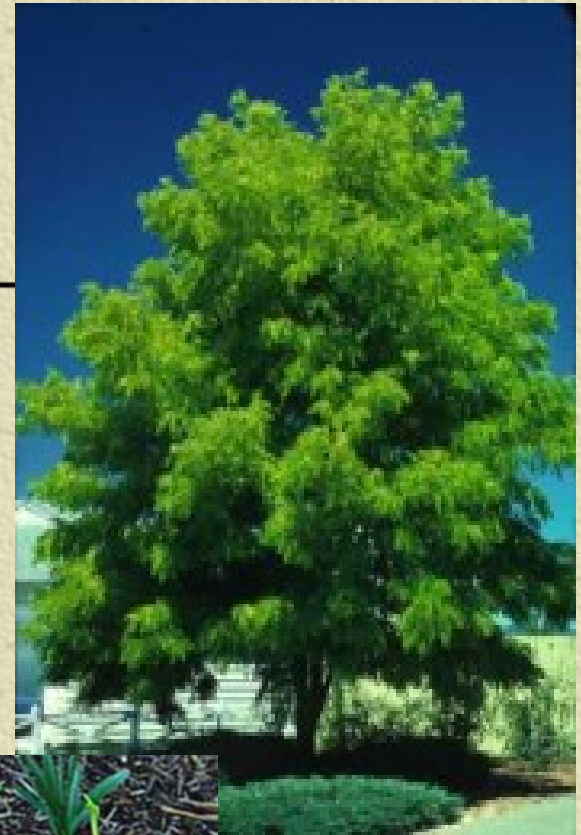
✦ Caterpillars

✦ Honeylocust plant bug.

✦ Podgall midge.

✦ Leafhopper.

✦ Spider mites.



Hackberry

- ✦ Caterpillars.
- ✦ Fall Cankerworm.
- ✦ Iron Chlorosis.
- ✦ Hackberry budgall psyllid.
- ✦ Hackberry Nipplegall.



Oak Trees

- ✦ Burr Oak.
- ✦ Gamble Oak.
- ✦ Anthracnose.
- ✦ Leaf & Twig Gall.



Lilac Shrubs

- ✦ Ash Borer.
- ✦ Iron Chlorosis.
- ✦ Leaf Cutter Bee.
- ✦ Lilac Leaf Miner.
- ✦ Powdery Mildew.



