Fall Tree Care

Fall is for Planting!

As the air temperatures cool and the soil temperatures are still warm; this is the best time of the year to plant new trees into the ground.

Plant root development underground is very rapid at this time of year. A tree can quickly become established into the soil before winter so that growth in the spring is significantly increased over spring plantings.

KEEPING PLANTS HEALTHY

The Right Plant In The Right Place

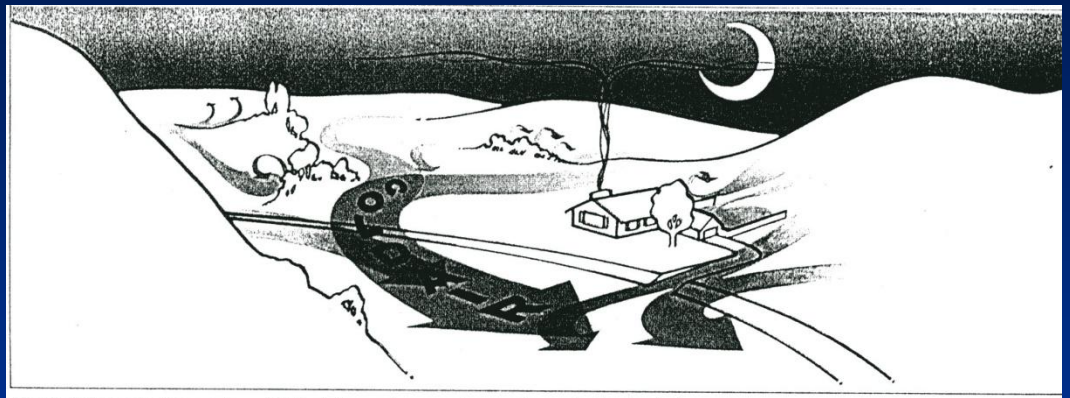
MICROCLIMATE

Geographic Location

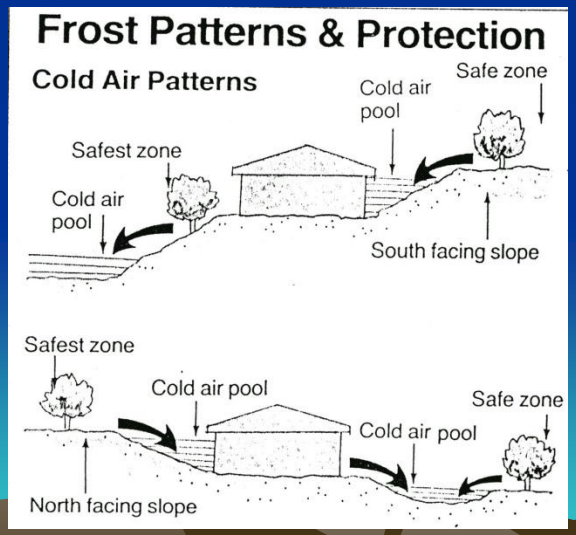
Elevation

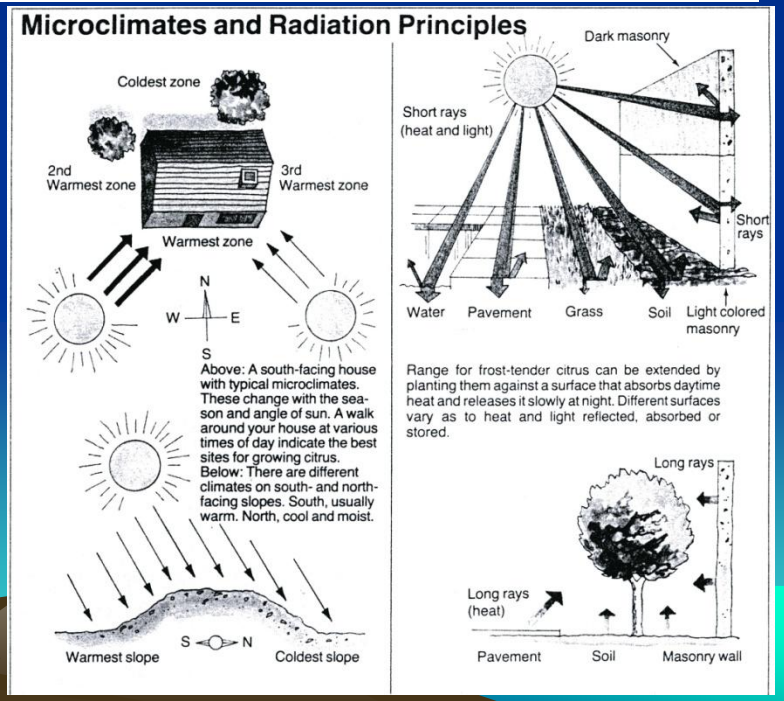
Topography

Exposure



Cold air travels like water—Cold air flows down and away from sloping land, damming up behind objects and settling in low spots. Plant frost-sensitive fruit on sloping land where cold air will drain away.





LIGHT

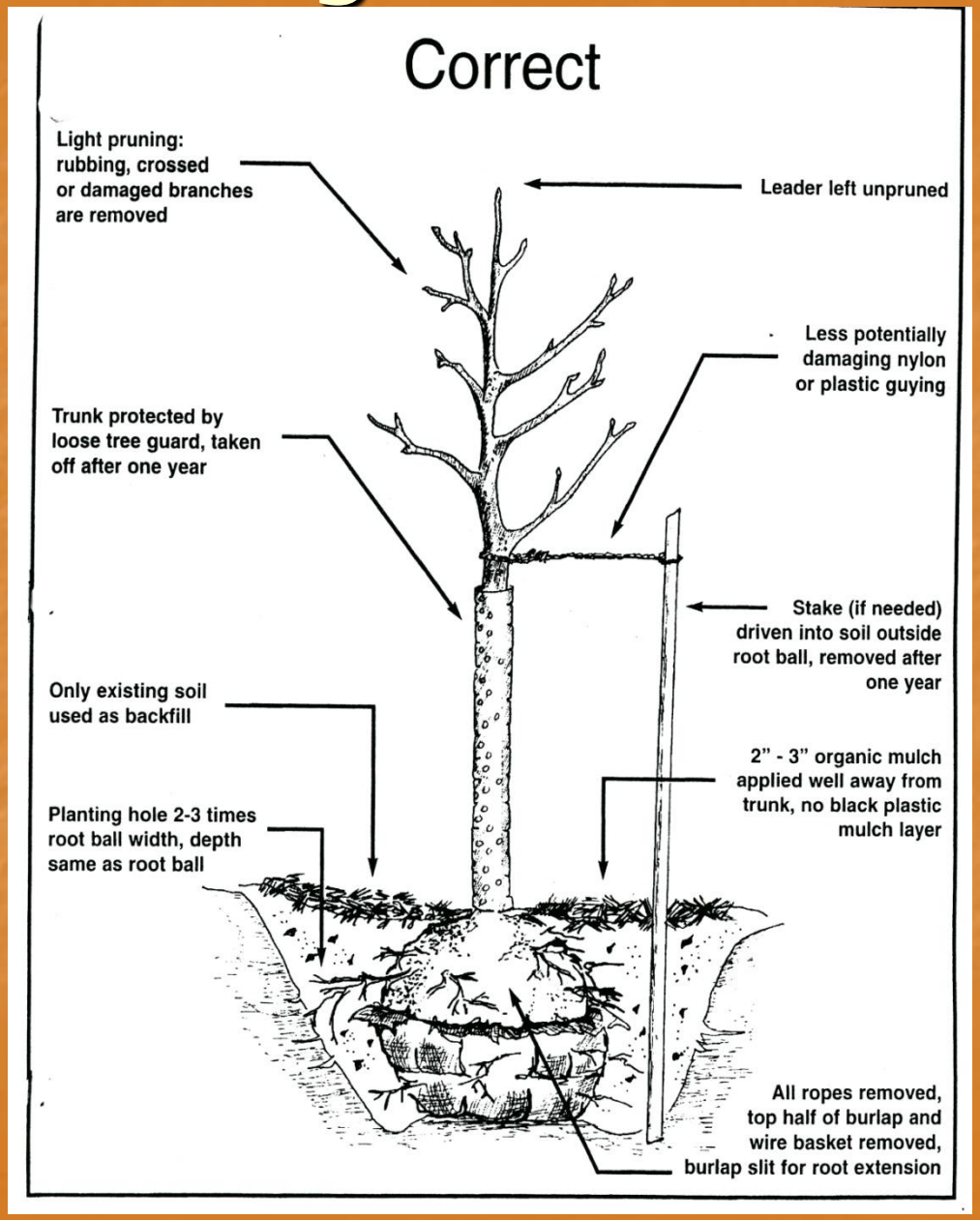
Exposure:

- Full Sun – South Facing
  - At least 8 hours per day
- Full Shade – North Facing
  - Most plants will tolerate some sun.
  - There are varying degrees of shade.
- Part Shade – East Facing
  - Filtered shade
- Part Sun – West Facing
  - Marine layer

Planting in the Ground

Little pruning is done during the 1st year. The more branches that are left, the more leaves for the tree to produce food to grow.

DO NOT add soil amendments when planting trees! These do no good in the long run and can deter root development into the native soil. They can also make drainage problems worse!

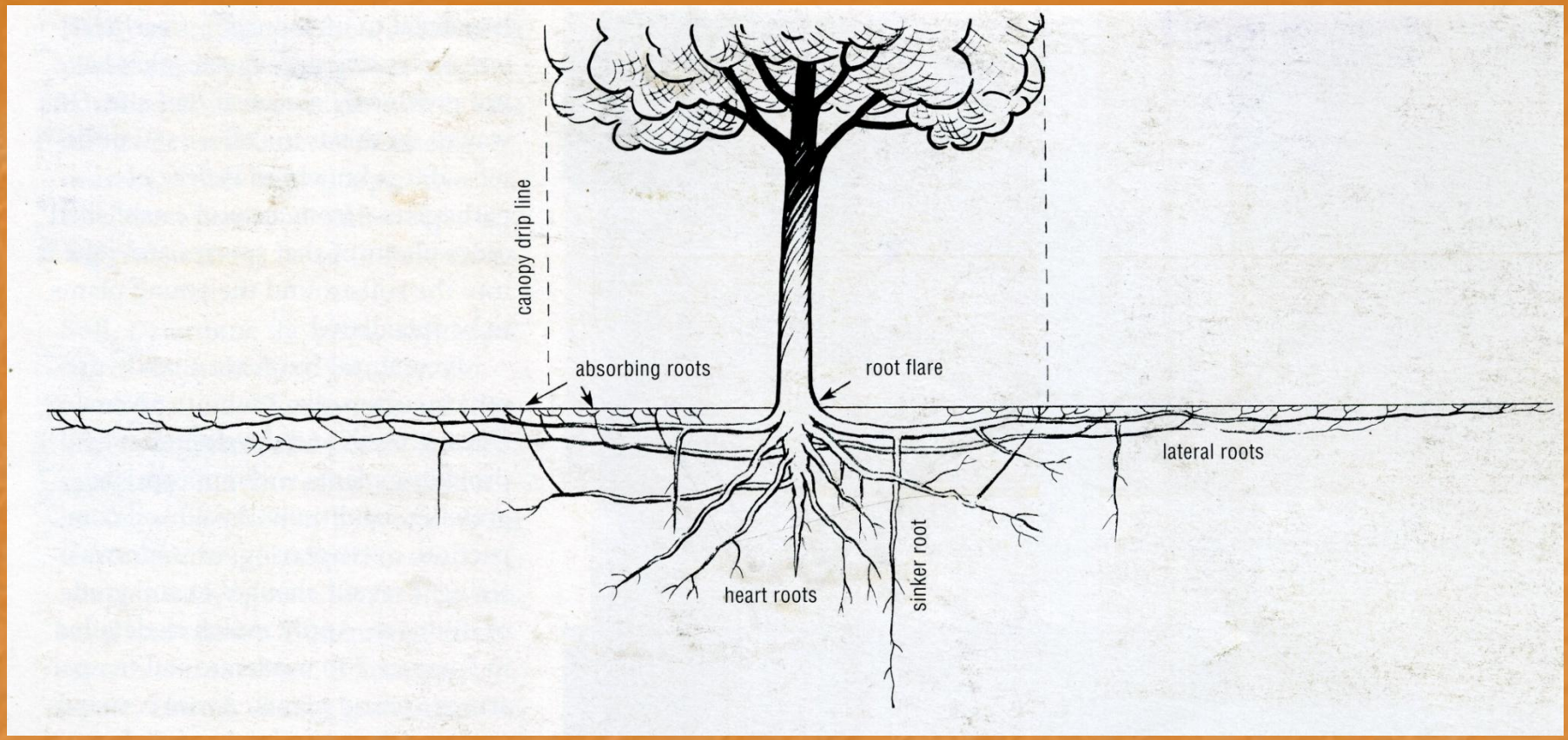


Where materials used to guy or stake trees comes into contact with the bark, the material should be at least 1" wide.

Never leave stakes tied tightly to the trunk. Instead place stakes away from the tree trunk and tie the tree loosely in 2 or 3 opposing directions if necessary to keep the tree upright.

Mulching the soil surface with an organic mulch is one of the BEST things you can do for your trees. Do not place mulch directly against the trunk of the tree.

Planting in the Ground



A plants root system has three primary functions: anchorage, food storage and absorbtion. The root hairs or Feeder Roots are the roots which function to absorb water and nutrients.

A healthy plant has feeder roots which extend two to three times the height of the plant in radius and extend down into the soil 1-3 feet. 90% of all roots are within the top three feet of soil!

SOIL

Texture:

Sand

Good aeration and drainage. Does not compact easily.

Poor water retention. Nutrient poor, does not hold nutrients well.

Clay

Good water retention. Nutrient rich and retains nutrients well.

Poor aeration and drainage. Compacts easily.

Silt / Loam

Best situation. Good water retention, aeration, drainage, nutrient availability and retention. Does not compact easily.

SOIL

pH:

Scale is 0 to 14
0 is most acid
14 is most alkaline
7 is neutral

Most Plants grow best in a pH range of approximately 5.5 to 7.8

Some secondary and micronutrients become chemically "locked up" when the soil pH gets too high.

SOIL

Soil Amendments and Mulches

Amendments are mixed into the soil. Mulches are laid on top of the soil.

- Organic and Inorganic

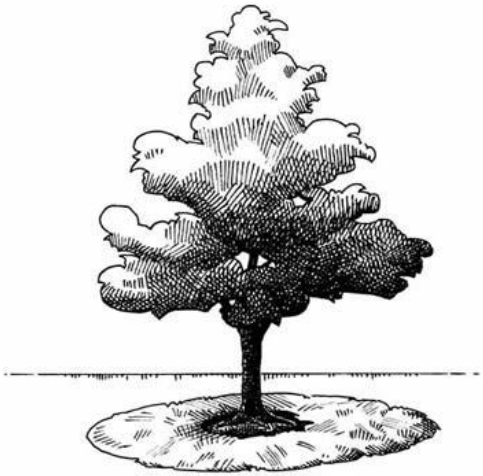
- Organic soil amendments **are not** recommended when planting trees. AT Best, they do no good, and at worst they impair the development of roots into the native soil as well as make drainage issues worse.

- If soil amendments are used, inorganic amendments are preferred. These include gypsum, soil acidifiers (such as soil sulfur) and starter fertilizers.

- Organic mulches are preferred. As they decompose they improve the soil ecosystem.

Mulches

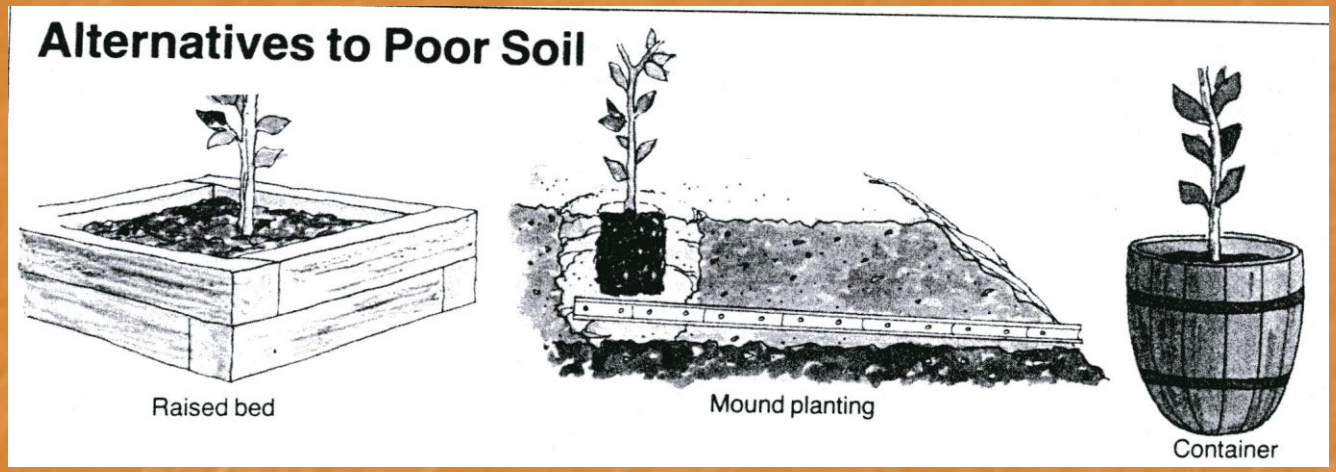
- Mulching a large portion of the feeder root zone is one of the most beneficial things you can do for your trees.
- Mulch should be at least 2 to 3 inches deep and should not touch the trunk of the tree or plant. It should extend beyond the drip line.
- Mulch will decompose and needs to be reapplied at least annually.



SOIL

Percolation / Drainage:

The movement of water vertically into the soil. A slope does not ensure good drainage. **Soil amendments <u>do not</u> improve percolation or drainage!**



- Percolation test:

  Dig a hole 2-3 feet deep and fill the hole with water twice. Time how long it takes for the water to drain completely away after the 2nd filling. If it takes longer than 12 hours to drain, the soil has poor drainage and the drainage should be corrected.

SOIL

The Soil is an Ecosystem!

Air ,Water & Minerals

Plants & plant parts – alive & dead/decomposing

Animals – vertebrates & invertebrates – alive & dead/decomposing

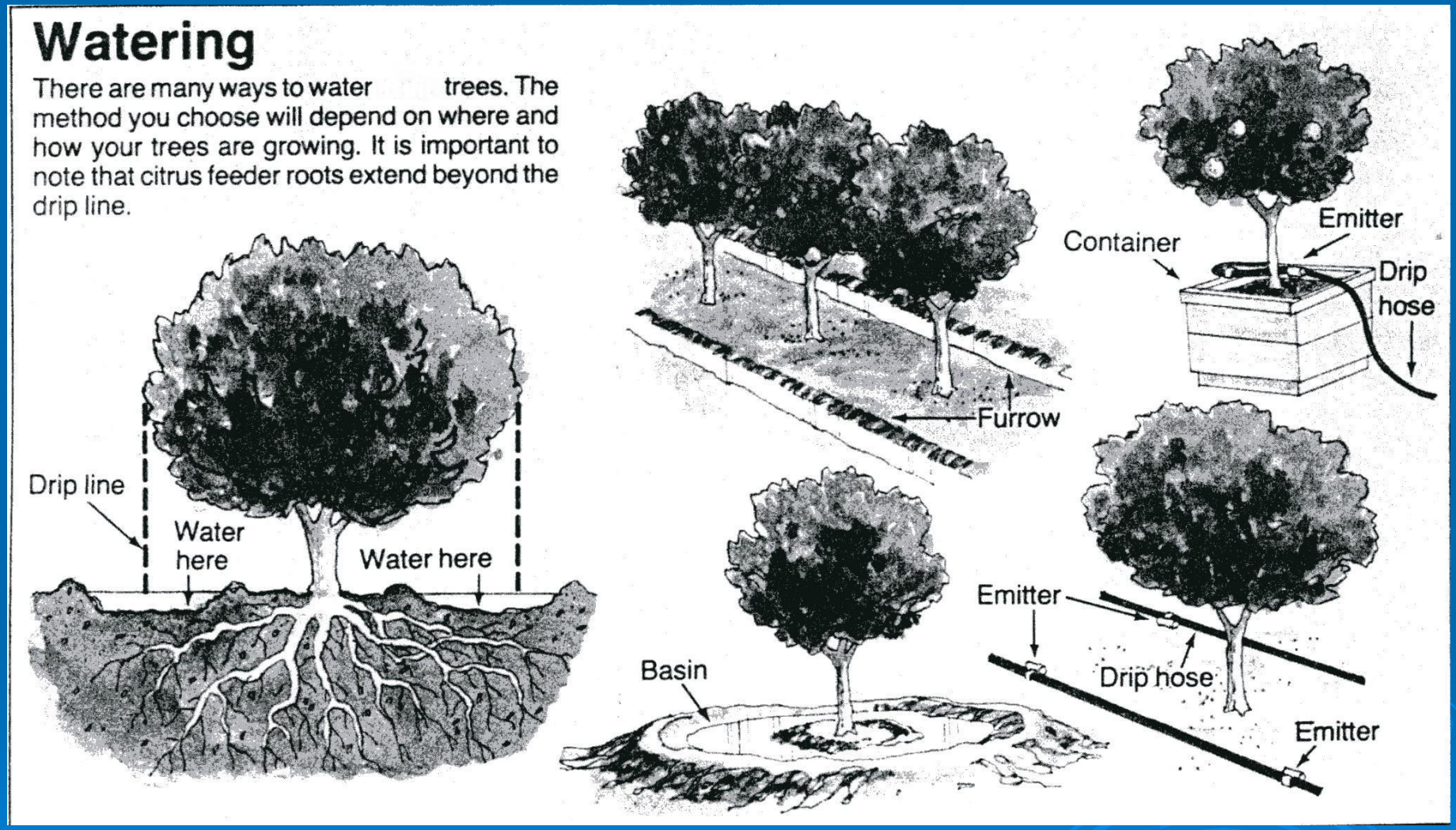
Fungi & bacteria – alive & dead/decomposing

Tilling the soil disrupts this ecosystem and damages plant roots!

Planting in Containers

- All container soils compact over time and need to be replenished. Always add fresh soil to the bottom of the root ball, never on top of the original soil.
- Use container or potting soils that are low in organic material or that have organics that decompose slowly to reduce the frequency of repotting.
- Container soils are generally sterile and plant health can benefit from the addition of mychorizzae or other beneficial soil organisms to the growing medium.
- Container soils leach nutrients more rapidly than soils in the ground and must be watered more frequently due to the limited root area of the container.
- All growing containers MUST have drainage holes to provide adequate water drainage and aeration.

Watering



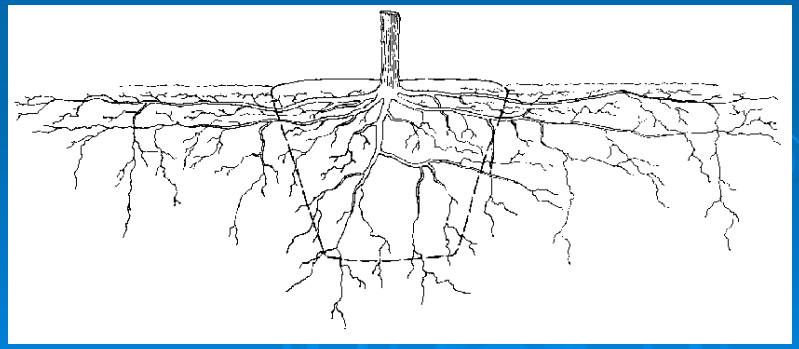
- The trees age and size as well as the soil, climate, season and other factors affect watering. There are three key principles to proper watering.

KEYS TO PROPER WATERING

Water the proper area – the Feeder Root Zone!

Water near the trunk or stem on newly planted plants so that you wet the original root ball.

Water at the dripline **and beyond** on plants which are established in the ground. (The plant may take from a few weeks to a one year or more to become established depending on the type and size of the plant, the time of year that it was planted, soil conditions, cultural practices and other variables.)



Water further away from the trunk or stem as time progresses and as the plant grows larger in diameter.

KEYS TO PROPER WATERING

Water with sufficient amount of water – enough to thoroughly wet the entire depth of the Feeder Root Zone.

1” of water penetrates the ground 1’ in sandy soil, it takes 2” of water to penetrate the ground in clay soil.

90% of feeder roots are found in the top 3’ of soil! (70% are in the top 1’ of soil.)

Water to an average depth of 1’ to 3’ at each watering for plants that have been established in the ground. Smaller plants generally have shallower root systems than larger plants. As a general rule, water to a depth of 6” to 1 foot for plants 1’ or less in height, to a depth of 2 foot for plants 1’ to 4-5 feet in height and to a depth of 3’ for plants larger than 5 feet in height.

For plants in containers, water with enough water to leach excess salts out of the container and to thoroughly wet the entire root ball at each watering.

KEYS TO PROPER WATERING

Water at the correct interval – often enough to keep the plant from wilting, but infrequently enough to allow air to penetrate the soil.

Roots can drown if the soil is kept constantly wet!

Watering frequency will vary with the time of year, location, size of the plants, soil, weather conditions and many other variables.

On average:

Water new plants in the ground 1-2 times per week.

Water older established plants in the ground 1 time per week to 1 time per month depending on the variables.

Water plants in containers 1-3 times per week.

There are very few exceptions where plants should be watered every day! Watering too frequently will exclude oxygen from the soil and cause roots to drown as well as promote diseases!

PLANT NUTRITION:

Primary Nutrients

Nitrogen-Phosphorous-Potassium

Secondary Nutrients

Calcium-Magnesium-Sulfur

Micronutrients

Boron-Manganese-Copper-Zinc-Iron-Molybdenum-Chlorine

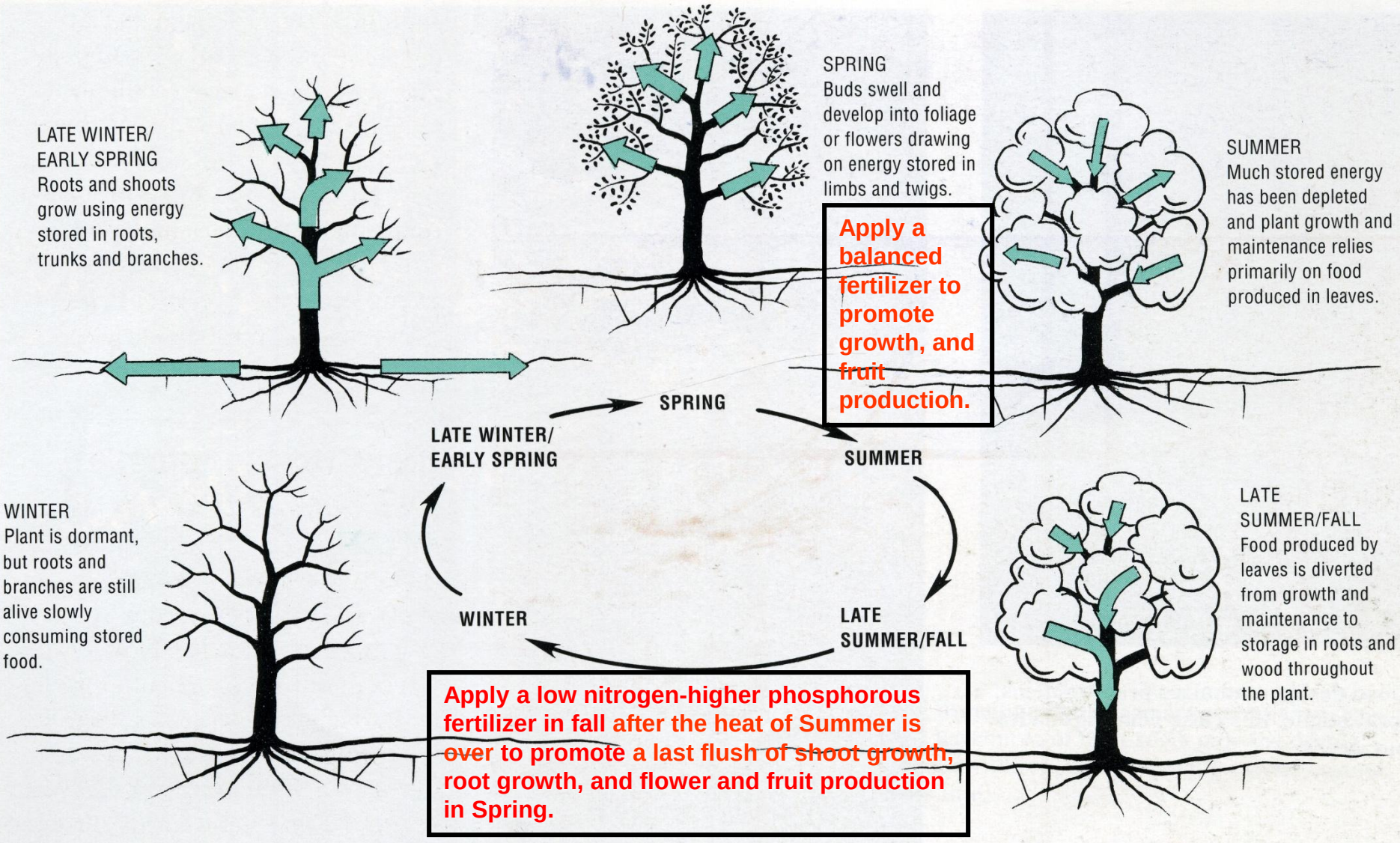
Fertilizers are not plant foods!

Types of Fertilizers

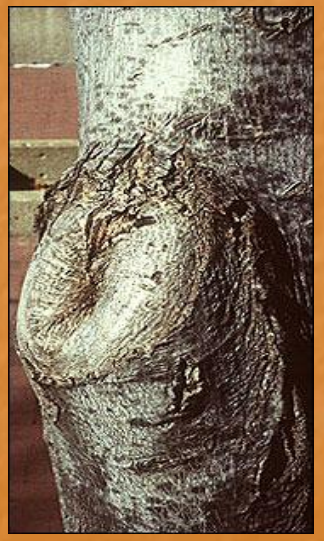
- Organic – Most rely on soil organisms to convert them to nutrients which are available for absorption by plant roots.

- Conventional ie. Synthetic
  - Fast release
  - Slow release
  - Time release

Timing Fertilizers to Seasonal Growth



Natural Target Pruning



Making Proper Pruning Cuts

Natural Target Pruning - Definition

- Natural target pruning, as defined and described by Alex Shigo is a radical change from the conventional method used by arborists since the advent of the chain saw to remove branches from hardwood and coniferous trees.

- In natural target pruning the objective is to leave the branch collar on the primary stem or tree trunk while removing the remainder of the branch.

Natural Target Pruning
Making Proper Pruning Cuts

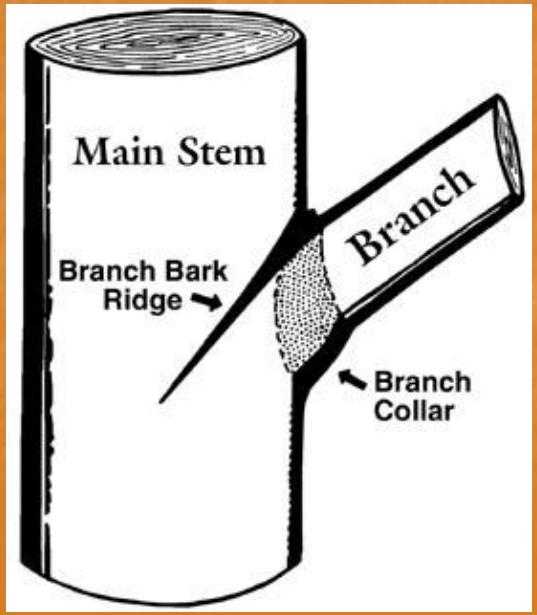
- Good pruning involves removing as much of the branch as possible without leaving a stub or flush cutting.

Stub Cut

Flush Cut

Where to Cut: Natural Target Pruning

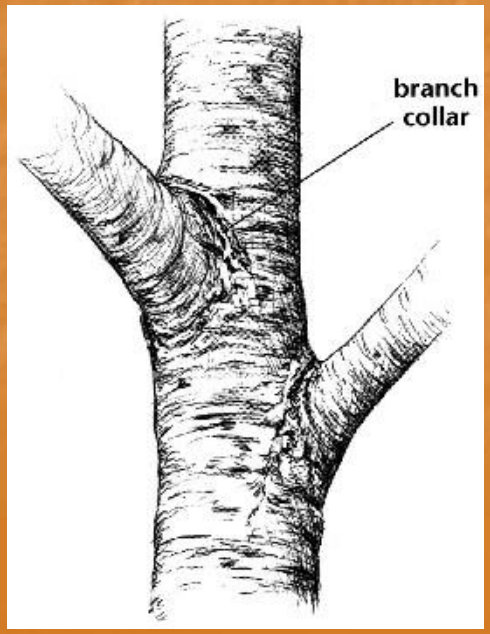
- Good pruning cuts are called *natural target cuts* by arborists, who use two targets on the tree to show them where to make the cut.
- These targets are the *branch collar* and the *branch bark ridge*.

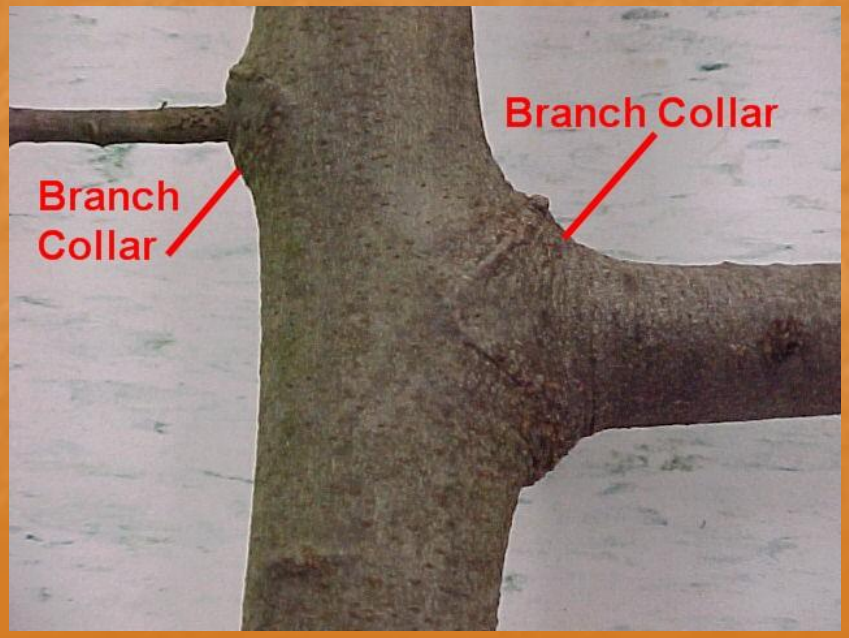


The Branch Collar

- The branch collar is evident on many species of tree, some more than others. It is the base of the branch where the natural branch taper begins to flare out as it connects to the limb or trunk.

- The branch collar is (typically) a swollen, wrinkled area at the branch base where branch and trunk (or branch and branch) tissues come together.





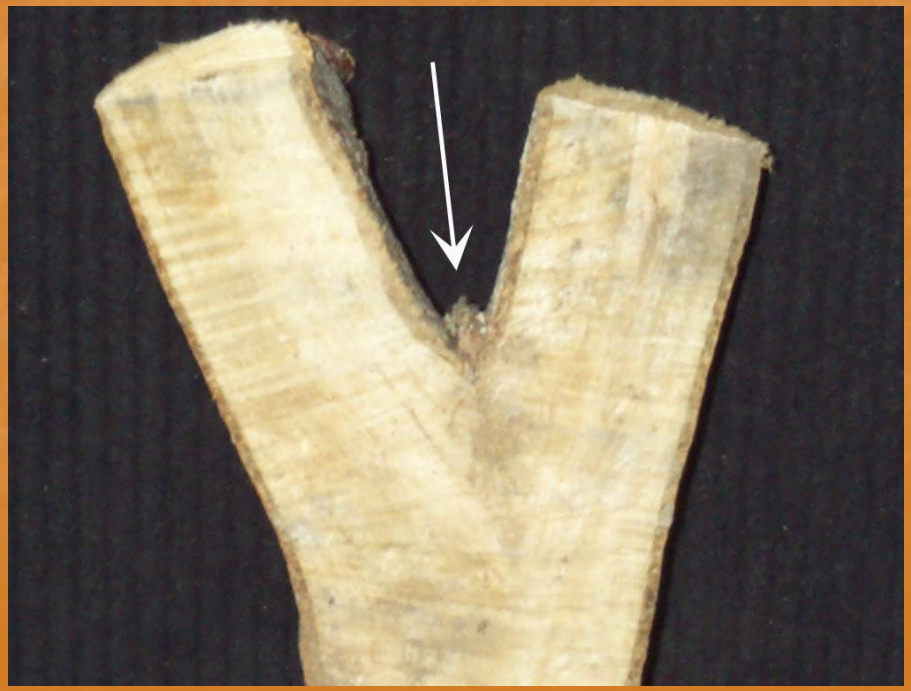
The Branch Bark Ridge

- Every branch has internal tissues that separate it from the trunk. These tissues are instrumental in the process of wound closure and self-defense and must be protected and maintained during pruning.

- As this internal branch tissue forms, the bark is forced upward to form a raised ridge on the trunk that separates the branch from the trunk. This raised area is the branch bark ridge.

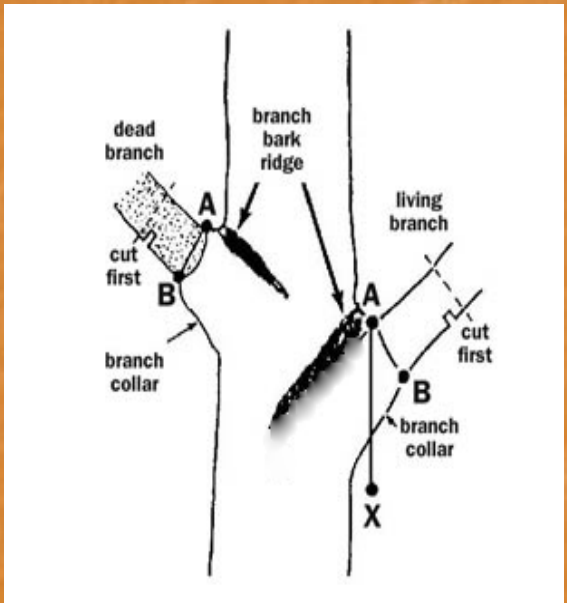
The Branch Bark Ridge

- The branch bark ridge is an area of excess bark that accumulates where two branches meet. It extends down the branch or trunk on either side of the branch crotch.



A Natural Target Cut

- A natural target cut leaves the branch bark ridge and branch collar on the tree without leaving a stub.
- The cut passes just outside the branch bark ridge on top and usually slants out and down, leaving a bump but no stub (from A to B on the diagram). The cut is made on the outside of the branch collar.



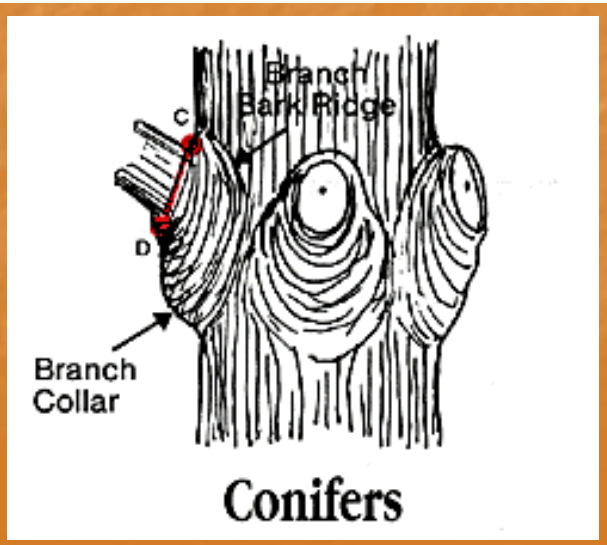
- **The branch collar should never be injured, cut into or compromized in any way.**

A Natural Target Cut

- Though the "targets" usually are easy to see on most broadleaved trees, some trees like sycamore constantly lose bark and don't accumulate a branch bark ridge.

Do not injure the branch collar when pruning

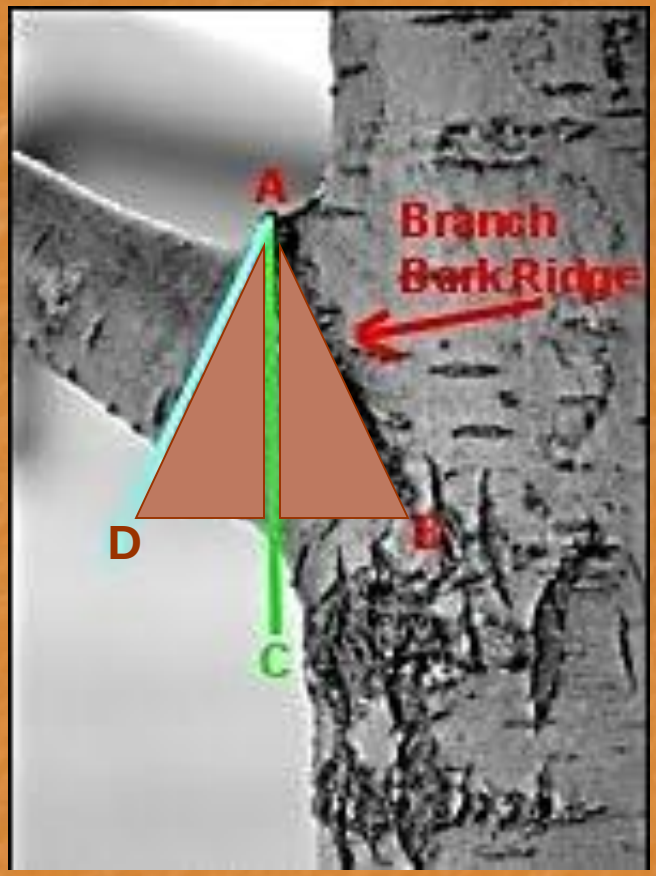
- Conifers also may not accumulate a typical branch bark ridge. In both cases, cut outside any swollen or wrinkled branch collar.



Conifers

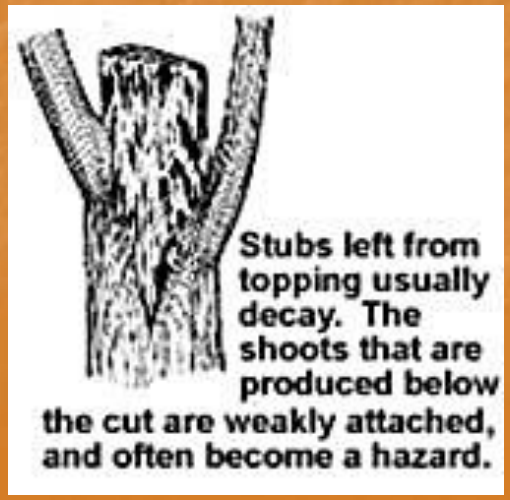
A Natural Target Cut

- Some trees make it a little harder on us to find the branch collar and the target cut, but for them there is another rule of thumb generalization developed by Dr. Alex Shigo.
- Find the top of the branch bark ridge (A). The top of the cut is made at the top of the branch bark ridge.
- Make an imaginary vertical line from the top of the branch bark ridge straight down to the ground (line A-C). Now determine the angle between this vertical line and the bottom of the branch bark ridge (angle C-A-B).
- Reverse this angle on the opposite side of the vertical line A-C (angle C-A-D). The natural target cut is made along the line of this reversed angle (line A-D).



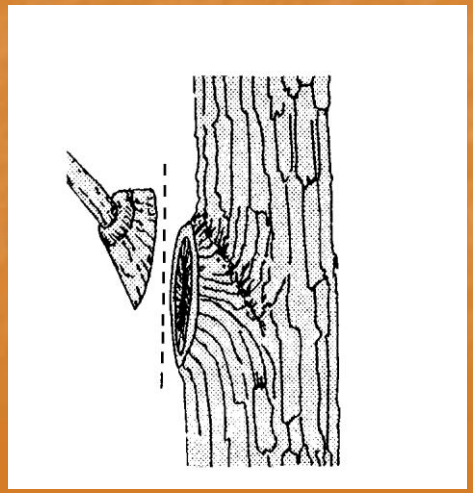
Stub Cuts

- Stub Cuts are pruning cuts that are made too far outside the branch bark ridge or branch collar. These cuts leave branch tissue attached to the stem.
- Disease organisms "incubate" on the dying stub that remains. Eventually the stub becomes a pathway for decay organisms to enter the tree trunk and cause serious wood decay.
- Heading cuts are pruning cuts that shorten a branch or stem so far back that a large stub is created. In this case, the stub decays, creating health problems for the tree.



Flush Cuts

- Flush Cuts are pruning cuts that originate inside the branch bark ridge or the branch collar, causing unnecessary injury to stem tissues.
- Flush cuts can, and usually do, lead to a myriad of defects, including radial cracks, circumferential cracks, discolored wood and wood decay.
- Flush cuts are improper and may break the protective chemical barrier and allow decay organisms to colonize stem tissue. The spread of this decay will eventually end in the demise of the tree.

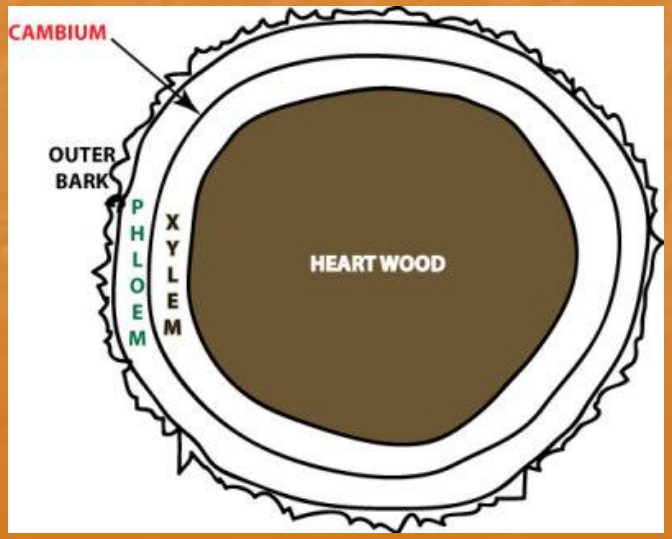


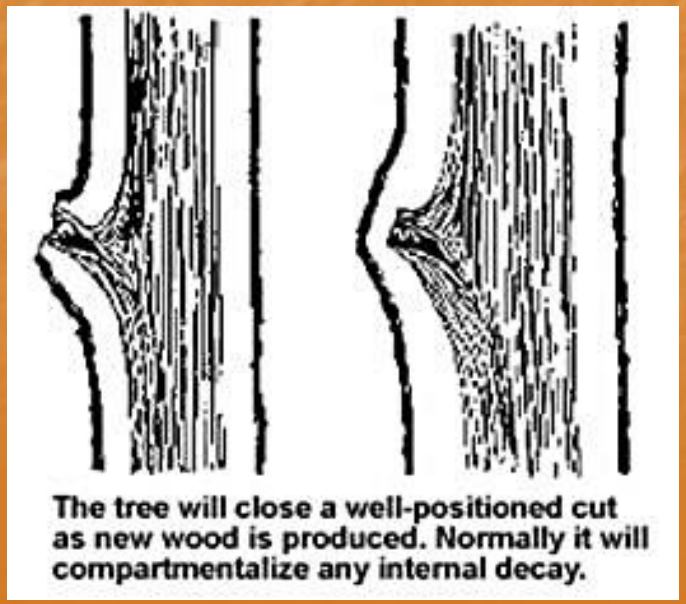
Making a Proper Pruning Cut

- Proper pruning means removing the branch so that the branch collar is not injured or removed. No cuts should start behind the branch bark ridge.
- When removing dead branches, never cut into the callus tissue which has formed at the base of the branch. Remove the branch beyond the callus ridge so that no living material is severed or detached.
- Three things contribute to the desired result of making a proper pruning cut:
  - 1. The Branch Bark Ridge is retained.
  - 2. The Branch Collar is intact.
  - 3. The final cut line correctly aligned.
- **There are no set pruning angles applicable to every tree - only targets - the branch bark ridge and branch collar. Correctly using the targets as guides should ensure the right final cut every time!**

Healing Response to Pruning

- Healing naturally follows pruning or wounding. It starts in the cambium, a thin layer of cells between the wood and bark.
- Two areas of the cambium, the *bark ridge* at the junction of two limbs, and the *branch collar* function to close off the wound between the plant and the pruning cut.
- For fastest healing, prune close to the main branch without injuring the bark ridge or branch collar areas.




The tree will close a well-positioned cut as new wood is produced. Normally it will compartmentalize any internal decay.

Healing Response to Pruning

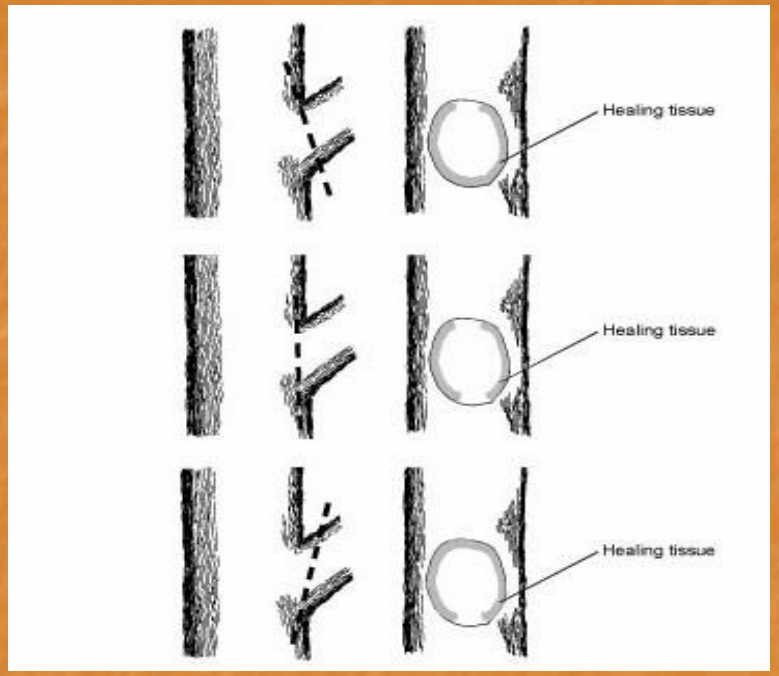
- Natural target cuts start to seal over quickly as *woundwood*, sometimes called *callus*, forms at the wound edges (callus forms first and becomes woundwood as it matures and becomes woody).

- Woundwood usually forms in a continuous ring around a natural target cut, eventually sealing over the wound as it grows together.

Healing Response to Pruning

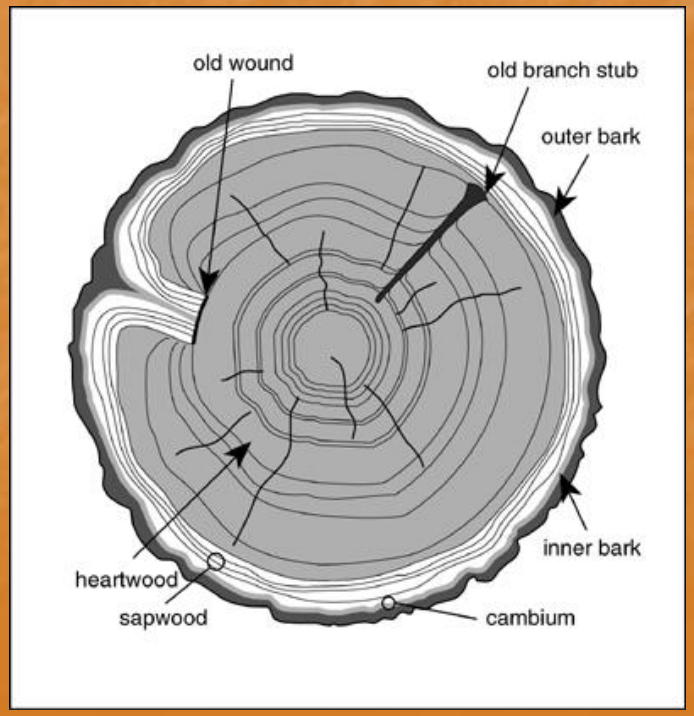
- Gaps in the woundwood at the top and/or bottom indicate flush-cuts, cuts that were made too close to the stem.

- Though such wounds may eventually seal, they have a greater chance for dieback, decay, and crack formation than natural target cuts.



Healing Response to Pruning

- The term "seal," rather than "heal," is used to describe tree wound closure, since the wound still exists inside the tree even after it no longer shows on the outside.



Compartmentalization of Wounds

- Trees have a natural defense response to wounds and pruning cuts. They form four types of walls to compartmentalize the area thus preventing the spread of decay organisms.
- The decay or injury remains but is sealed off and does not increase in size if the walls are stronger than the decay organisms.
- Natural target pruning initiates the wound response and promotes the compartmentalization of the wounded area as quickly as possible.

Wound Dressings

- Wound dressings or pruning paint are cosmetic and do nothing to promote healing of the pruned area.

- Research has shown that such dressings can actually promote decay by keeping the wound protected and moist — perfect conditions for the growth of decay microorganisms.

Included Bark

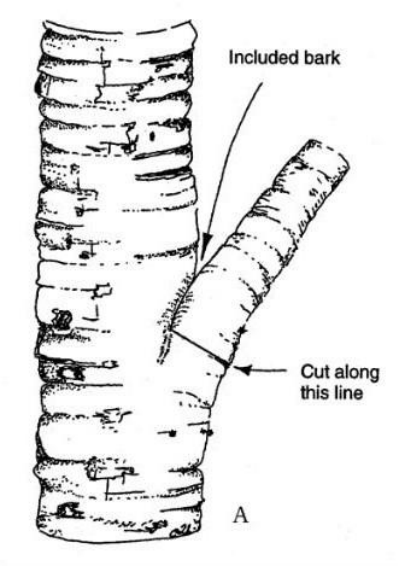
- Sometimes the bark where two branches meet turns in instead of out, forming a seam of *included bark* inside the tree instead of a branch bark ridge. Areas of included bark often die and become decayed.

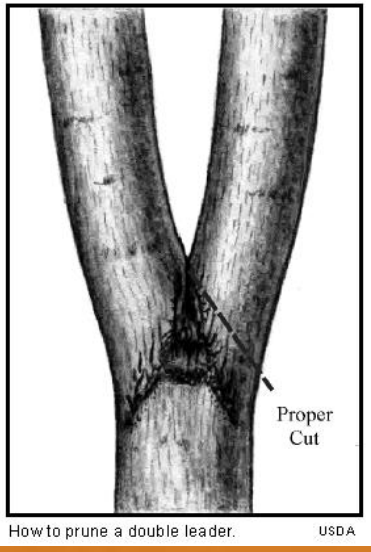
- These areas are naturally weaker than branch attachments with normal branch bark ridges.

- Included bark is especially common on certain species or cultivars, but can be found on any tree. It is more common where branches attach to one another at a very narrow angle, but it can occur with wide attachment angles.

Included Bark

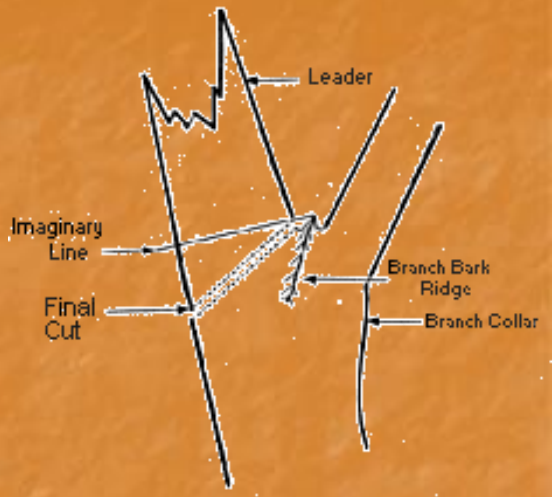
- Included bark prevents strong attachment of branches, often causing a crack at the point below where the branches meet.
- Codominant stems that are approximately the same size and arise from the same position often form included bark.
- Remove a branch that has included bark by cutting from the open crotch down and out (or cut up to the crotch).
- This actually leaves a small stub on or in the tree, but cutting farther down may cause serious trunk wounds.





Pruning Leaders or Co-dominant Stems

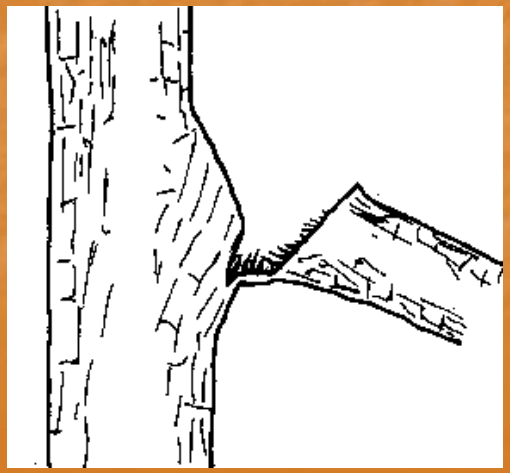
- Pruning to remove a leader or main stem sometimes is called crown reduction or drop-crotch pruning.
- A leader can be pruned off where another branch is attached if the remaining branch is healthy and vigorous and at least 1/3 the diameter of the leader to be removed (so a 6” leader could be removed at a 2” branch).
- When cutting back to a lateral, a natural target pruning cut is made by bisecting the angle between the branch bark ridge and an imaginary line made perpendicular to the leader or the branch being removed.
- The cut should slope out and down away from the branch bark ridge, with the bottom of the cut straight across from the bottom of the branch bark ridge.
- No more than about one-quarter of the foliage should be removed from the branch that is being shortened.
- Co-dominant stems are pruned similarly. Removing some of the lateral branches from a co-dominant stem can reduce its growth enough to allow the other stem to become dominant.



Pruning Large Branches

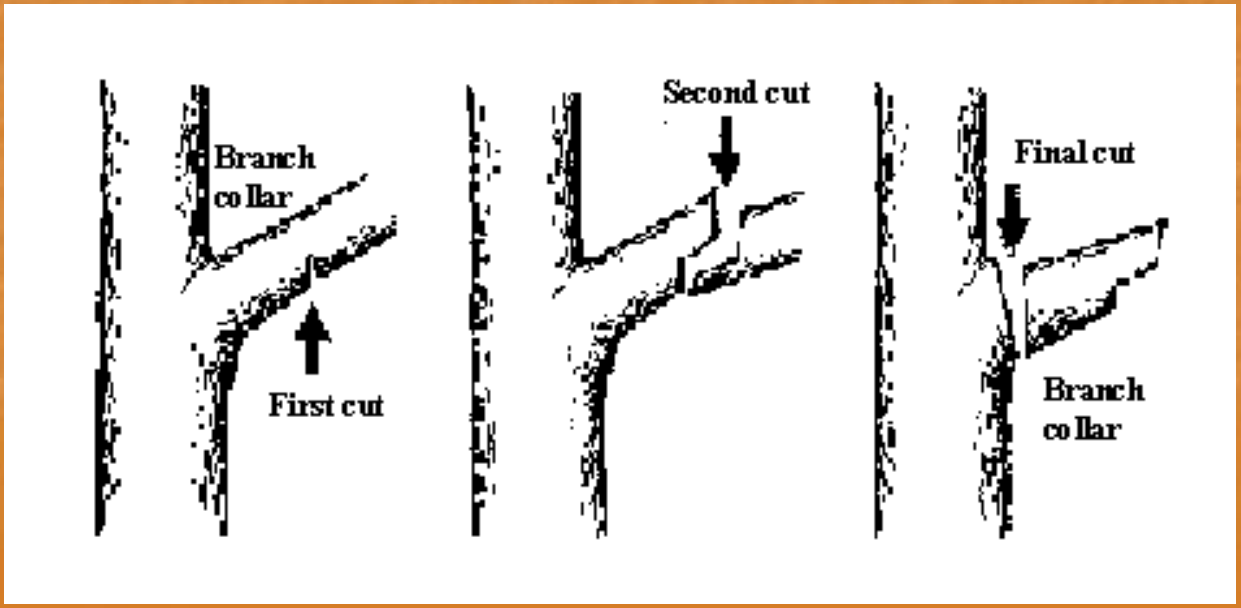
- To remove large branches (over one inch in diameter) use the three-step cutting method.

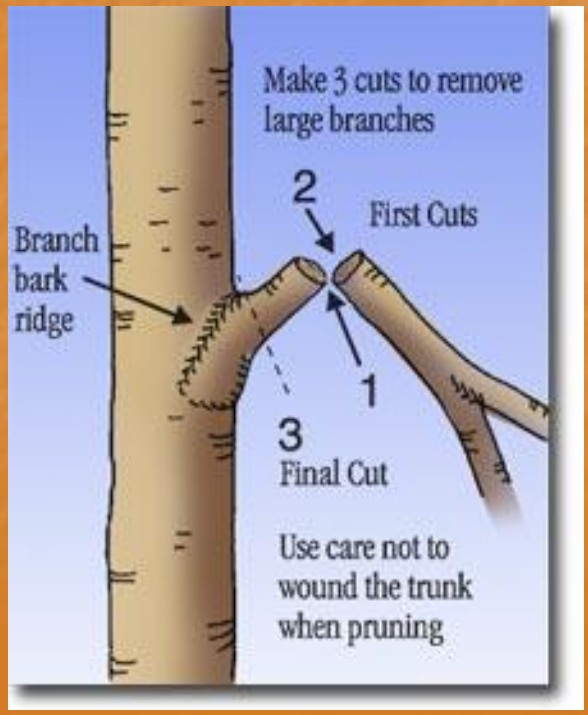
- This removes the weight of the limb before the final cut and eliminates the possibility of stripping the bark down the side of the main trunk.



The three-step cutting method:

- 1. Undercut one-third of the way up through the branch one or two feet out from the trunk to prevent bark stripping.
- 2. Cut down and remove limb. A top cut directly into or slightly outside of the undercut will remove most of the branch weight.
- 3. Trim branch stub at branch collar. Make a final natural target cut that removes the stub. Final cuts can be made from the bottom up to the crotch if the branch angle is tight and tools won't fit in the crotch.





Natural Target Pruning

- Natural target pruning is a way to minimize the detrimental effects caused by pruning wounds.

- Remember, that a wound on a tree is a wound forever. Trees seal or compartmentalize a wound, they do not heal a wound.

- The goal of any responsible pruner is to reduce the harmful effects of their pruning wounds. This is done by pruning in such a way as to facilitate the closure and compartmentalization of these wounds as quickly as possible by following the principles of natural target pruning.

- **Do not:**
  - make flush cuts behind the branch bark ridge.
  - leave living or dead stubs.
  - injure or remove the branch collar.
  - paint cuts.

PRUNING:

Reasons for Pruning:

Structural Strength

REMOVE:

Crotch angles < 30 degrees

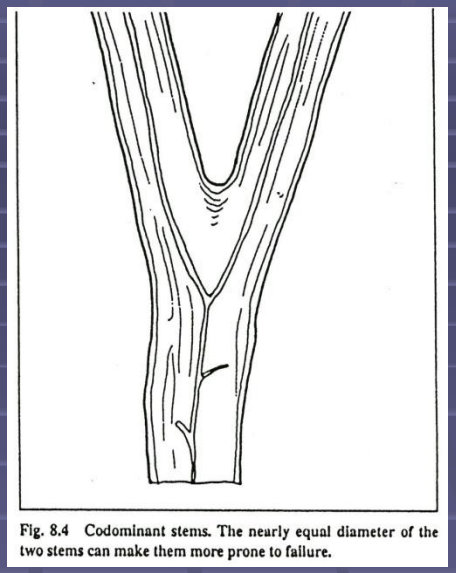


Fig. 8.4 Codominant stems. The nearly equal diameter of the two stems can make them more prone to failure.

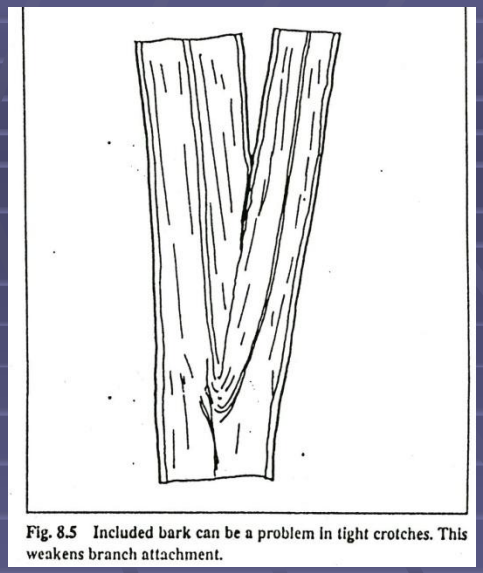
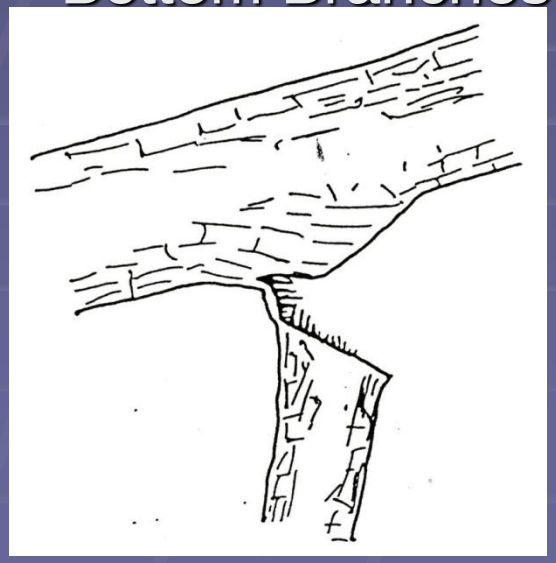


Fig. 8.5 Included bark can be a problem in tight crotches. This weakens branch attachment.

Bottom Branches

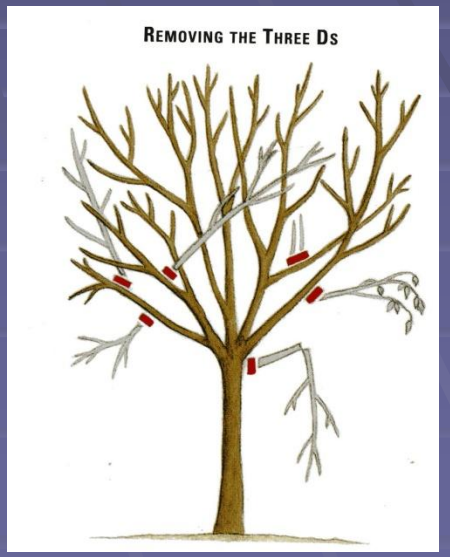


Health Remove:

Dead branches

Damaged branches

Diseased branches



PRUNING:

Reasons for Pruning:

- Shape
- Fruit or Flowers
- Size – Never top trees!

Timing:

Improper timing can predispose plants to attack by insects or diseases!

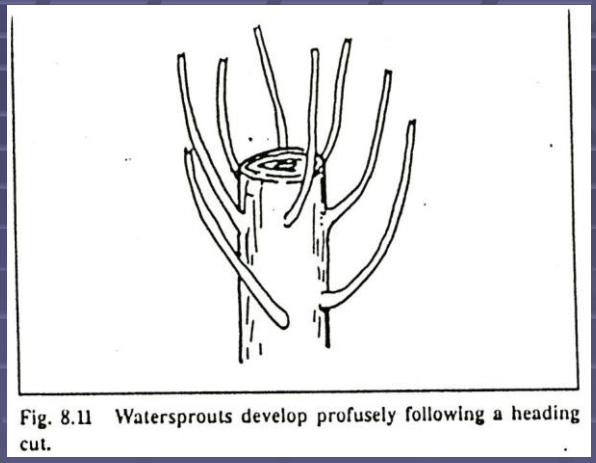


Fig. 8.11 Watersprouts develop profusely following a heading cut.

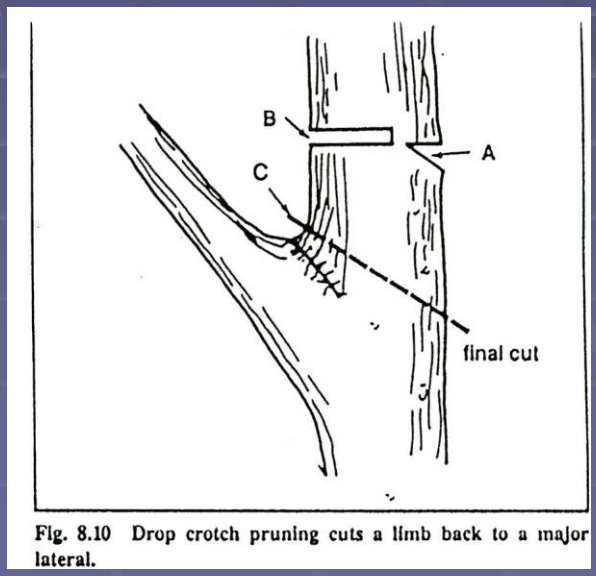


Fig. 8.10 Drop crotch pruning cuts a limb back to a major lateral.

Controlling Weeds

- Weeds and groundcovers compete with tree roots for water and nutrients. Keeping the soil free of vegetation and covered in mulch beyond the drip line is best for tree health.

- Control weeds and vegetation by using mulches and herbicides (organic or inorganic).
  - Pre-emergent herbicides
  - Post-emergent herbicides
    - Contact
    - Systemic

KEEPING PLANTS HEALTHY

Selecting the right plant for the location is critical to reducing pest and disease problems!

Cultural practices can prevent, predispose, or cause plant pests and diseases!

The health of a plant is frequently dependant on the health and development of the plants root system. Cultural practices, environmental conditions and pests or diseases which damage a plants root system can frequently predispose a plant to other problems.

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