

KEEPING PLANTS HEALTHY

The Right Plant In The Right Place

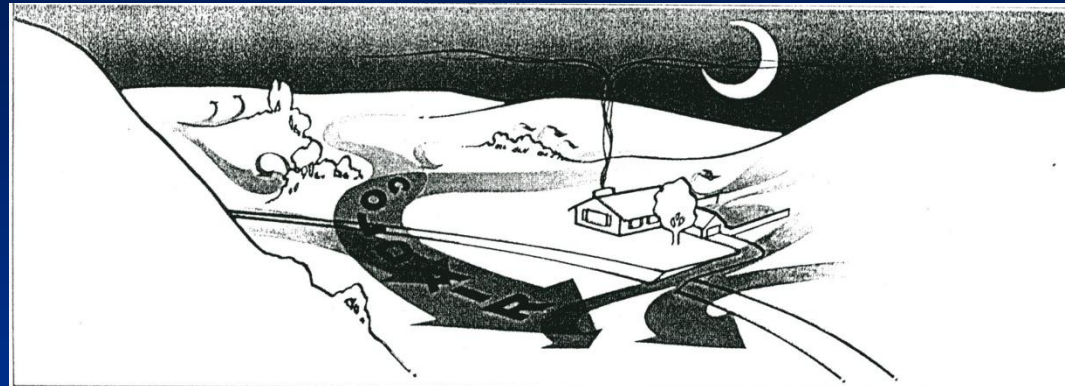
MICROCLIMATE

Geographic Location

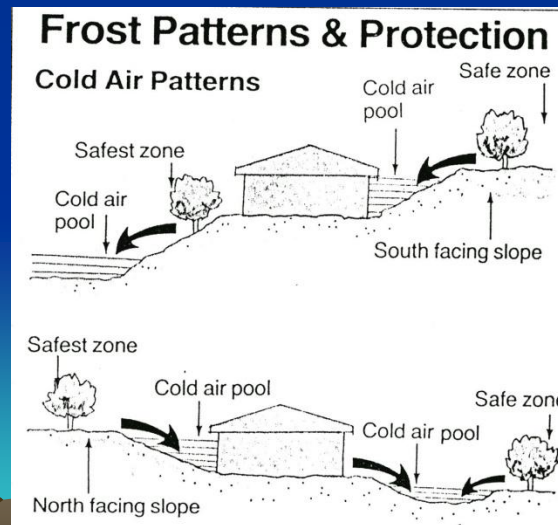
Elevation

Topography

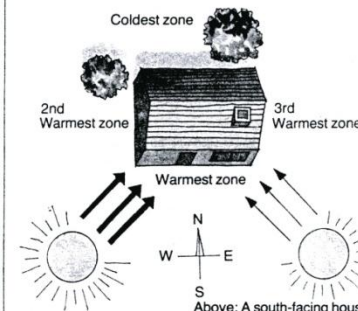
Exposure



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.

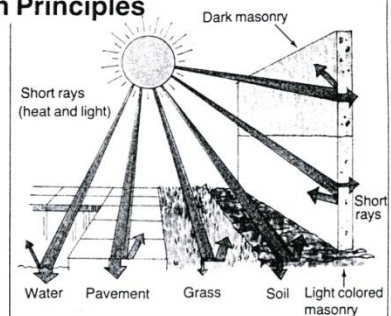
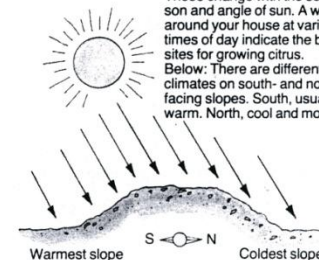


Microclimates and Radiation Principles

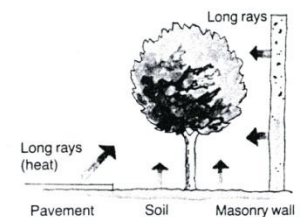


Above: A south-facing house with typical microclimates. These change with the season and angle of sun. A walk around your house at various times of day indicate the best sites for growing citrus.

Below: There are different climates on south- and north-facing slopes. South, usually warm. North, cool and moist.



Range for frost-tender citrus can be extended by planting them against a surface that absorbs daytime heat and releases it slowly at night. Different surfaces vary as to heat and light reflected, absorbed or stored.



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



LIGHT

Properties of Light:

Duration

How long is it light. Varies with latitude and time of year.

Intensity

How bright is it. Varies with latitude, time of year, exposure and distance from light source.

Quality

Wavelength or color. Plants use wavelengths primarily in the blue and red spectrum. Varies with latitude, time of day or time of year, and light source.

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 in a pH range of approximately 5.5 to 7.8. A slightly acid pH of 6.5 to 6.8 up to a slightly alkaline pH of 7.2 is the ideal pH for most plants.

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

SOIL - Amendments and Mulches

Soil amendments and Mulches can be Inorganic or Organic. The same products can be used as either a soil amendment OR a mulch. The difference is not so much what the product is, but HOW it is used.

Mulches are laid on top of the soil. Anything that covers the surface of the soil can be considered a mulch. This can be inorganic, such as rock, concrete, asphalt, carpet or sand, etc. or it can be organic such as compost, bark, planter mix, ground wood and bark, green waste or cover crops, etc.

Mulches have Many benefits. Some of these are: They reduce evaporation from the soil, they keep the soil cooler during hot weather, they can help to suppress weeds, and organic products can provide nutrients to the soil, can supply food for soil organisms and can produce humic acid.

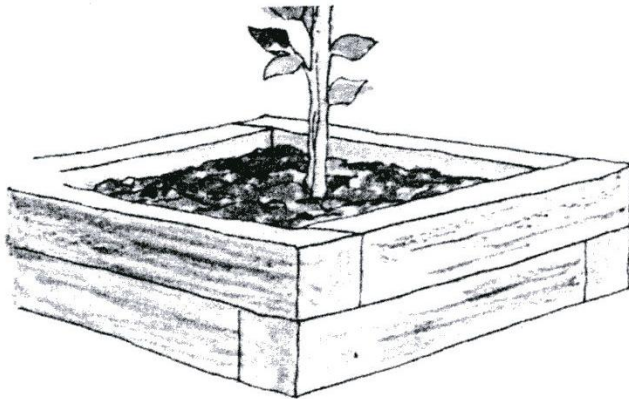
Amendments are mixed into the soil. The practice of amending the soil for trees , shrubs, vines or drought tolerant plants IS NOT RECOMMENDED! At Best, these products do no good. Frequently they reduce the plants ability to develop roots into the native soil, they can decompose and cause the plant to settle or can cause drainage and root rot.

SOIL

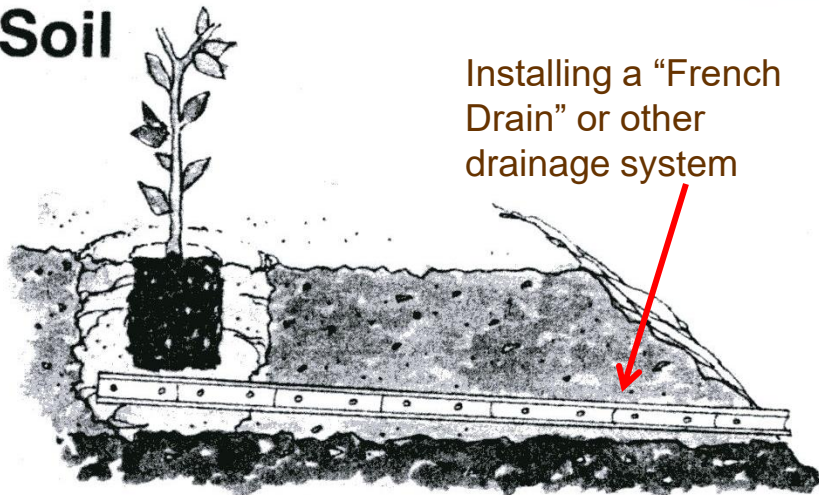
Percolation / Drainage:

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

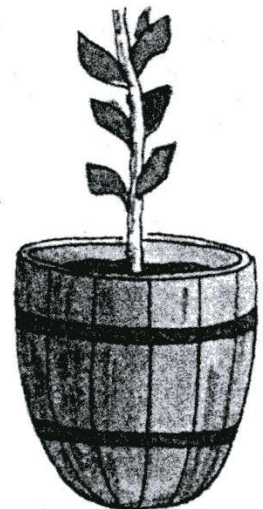
Alternatives to Poor Soil



Raised bed



Mound planting



Container

■ 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

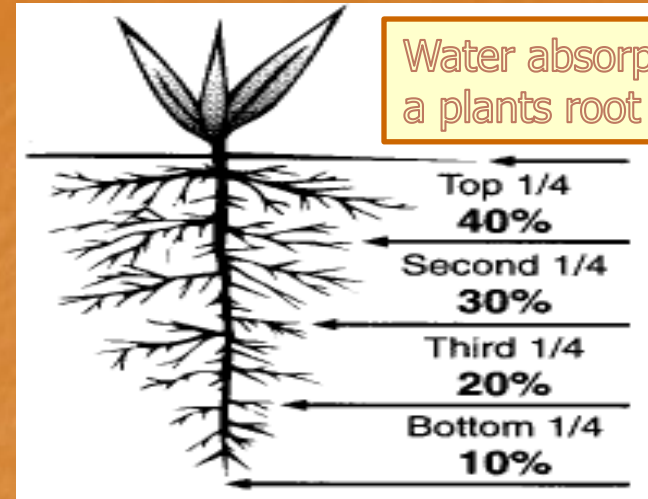
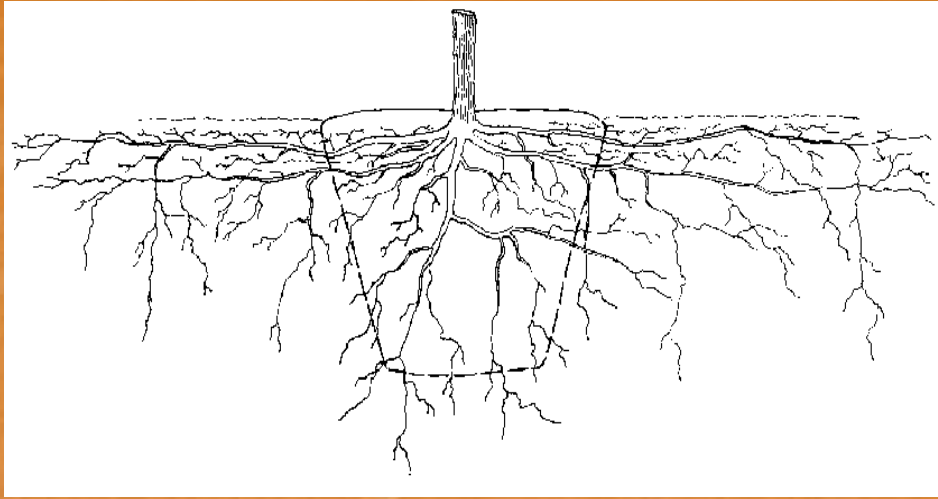
Plants & plant parts – alive & dead/decomposing

Animals – vertebrates & invertebrates – alive & dead/decomposing

Fungi & bacteria – alive & dead/decomposing

Tilling the soil disrupts this ecosystem and damages plant roots!

KEYS TO PROPER WATERING



- The root systems on plants have 3 functions. 1 is to anchor the plant so that it stays upright in the soil or growing medium. A 2nd is to store food and carbohydrates to sustain the plant (Especially on deciduous plants during the period when there are no leaves on the plant.)

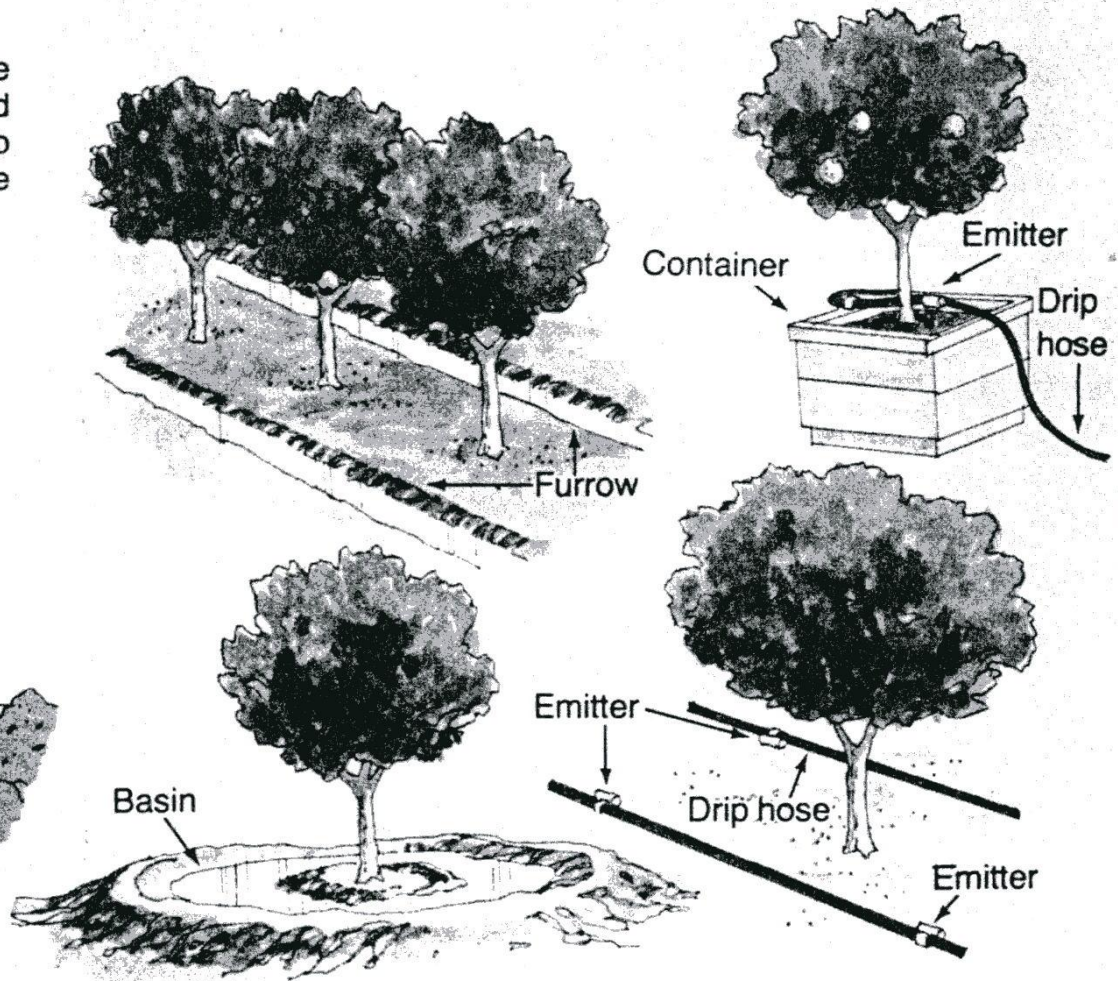
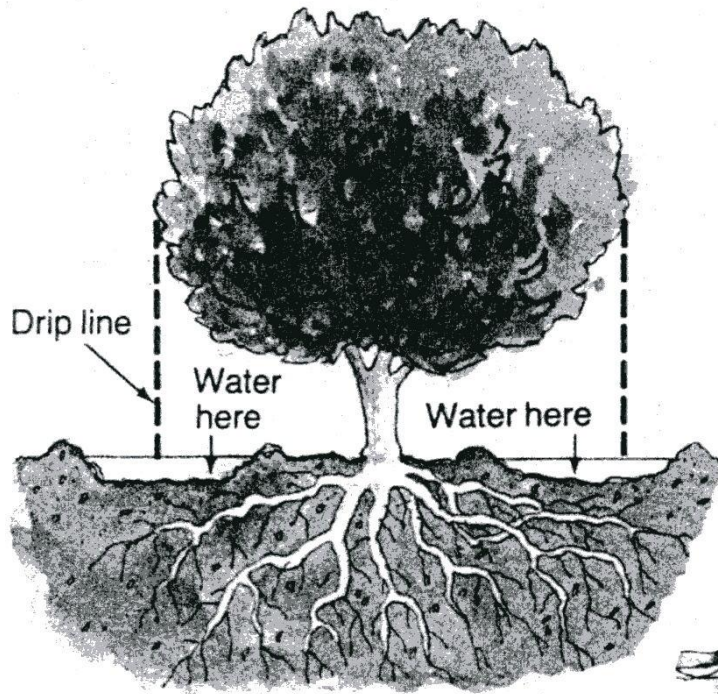
The 3rd is to absorb water and nutrients.

- The roots that absorb water and nutrients are called feeder roots or hair roots and are very fine, delicate roots that are constantly being generated and are dying off due to soil conditions and other factors. **In most soils, 70% of the feeder roots occur in the top 1 foot of soil! 90% of the feeder roots occur in the top 3 feet of soil in most soils, due to water and air availability.**

KEYS TO PROPER WATERING

Watering

There are many ways to water trees. The method you choose will depend on where and how your trees are growing. It is important to note that citrus feeder roots extend beyond the drip line.



- There is no one way to correctly water trees. Any method used to water (a bucket, a hose, flood irrigation, sprinklers, a drip system, microspray) or any other watering method can be used to properly water.

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

KEYS TO PROPER WATERING

Water the proper area – the Feeder Root Zone!

Water near the trunk on newly planted trees so that you wet the original root ball.

Water slightly within the drip line and well beyond the drip line on trees which are established in the ground for one year or more.

Water further away from the trunk each year as the tree grows larger in diameter.

KEYS TO PROPER WATERING

Apply water to a sufficient area of the Feeder Root Zone to support the canopy of the plant.

Irrigate as much of the area around all sides of the plant as possible, not just one side or in one area.

Water will spread out to an average of 1-2 feet at a depth of 2-3 feet when applied from a source such as a drip emitter or soaker hose.

If irrigating with a drip system or with soaker hoses, provide enough drip emitters or concentric rings of soaker hose to wet a significant area of the Feeder Root Zone – NOT a few spots or a single line. Space drip emitters 12-18 inches apart in concentric rings 2-3 feet apart around the tree, both within and outside of the tree's canopy

Adjust and expand the region irrigated as the plant grows to promote the expansion of the root system in order to support the healthy development of the plant's canopy.

KEYS TO PROPER WATERING

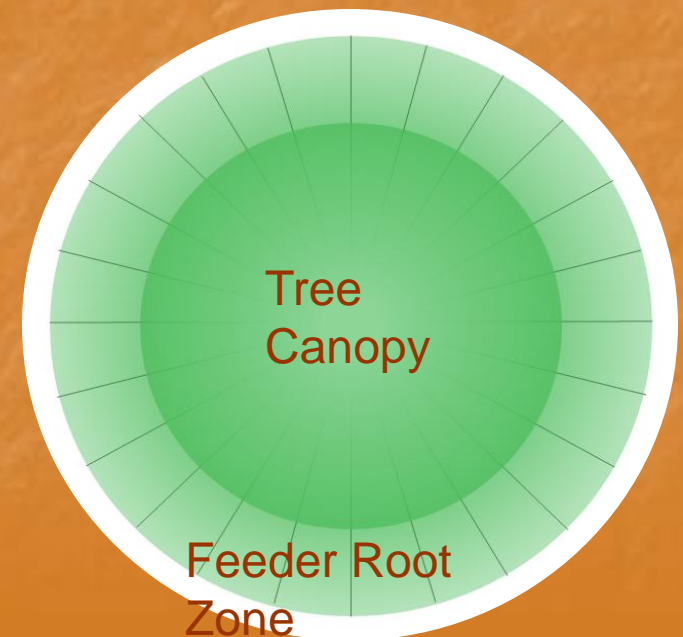
Water a sufficient amount of the Feeder Root Zone to support the existing canopy of the tree.

Use a soaker hose or "Netafilm" in concentric rings 2-3 feet apart around the tree, both within and outside of the tree's canopy.

Move a sprinkler or hose to several locations around the feeder root zone.

Flood irrigate around the feeder root zone.

Do not use pipes or tubes to "deep water" trees!



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

Water to a depth of 3' at each watering for trees that have been established in the ground.

For trees 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 trees, soil, weather conditions and many other variables.

On average:

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

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

Water trees in containers 1-3 times per week.

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!

PRUNING:

Proper Pruning – Proper Cuts

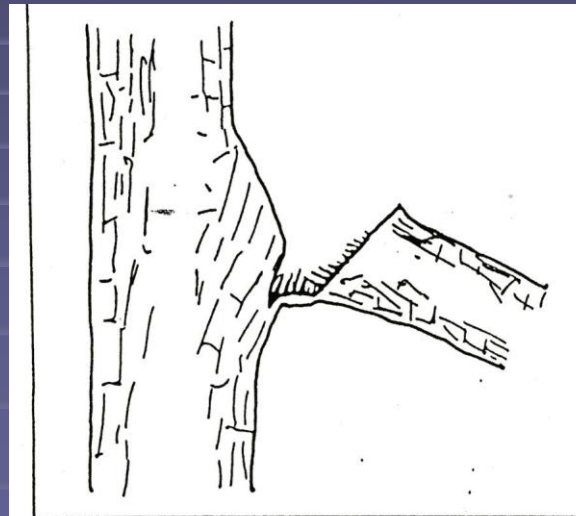
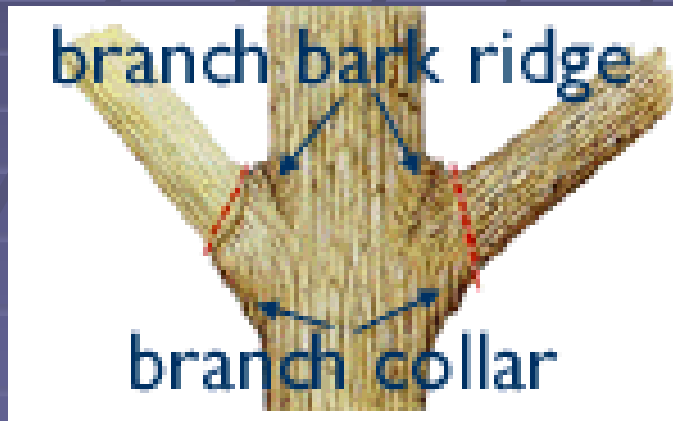


Fig. 8.3 Improper pruning cut. If a heavy limb is not undercut, it may "peel" back, tearing bark and vascular tissues of the parent limb.

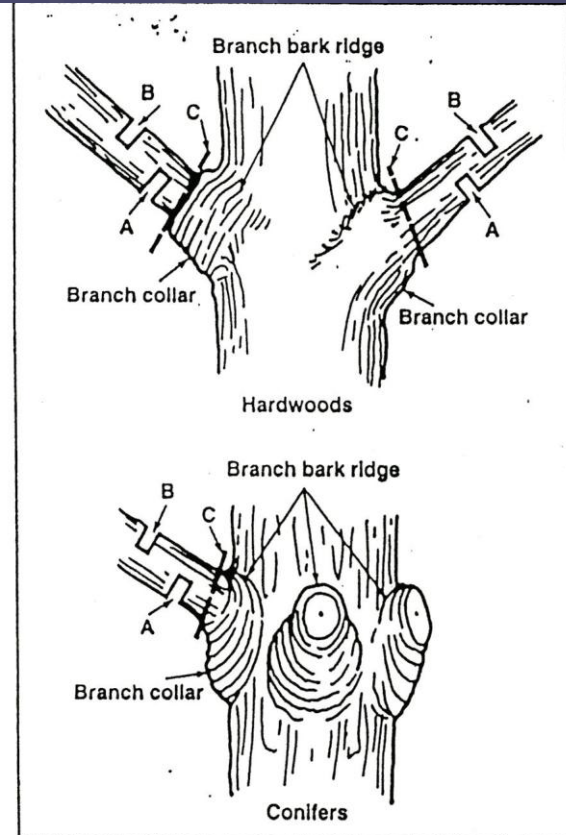


Fig. 8.2 Pruning principles. The first cut (A) undercuts the limb. The second cut (B) removes the limb. The final cut (C) should be just outside the branch collar to remove the resultant stub.

PRUNING:

Reasons for Pruning: Structural Strength

Crotch angles < 30
degrees

Bottom Branches

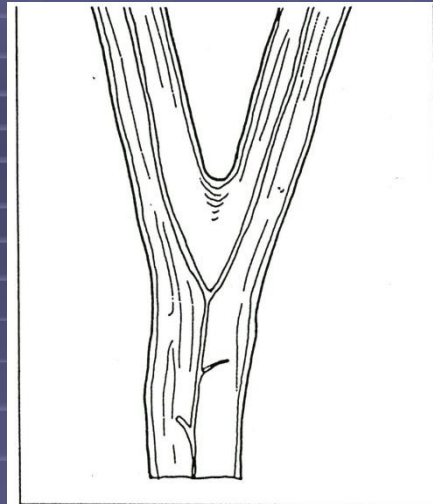


Fig. 8.4 Codominant stems. The nearly equal diameter of the two stems can make them more prone to failure.

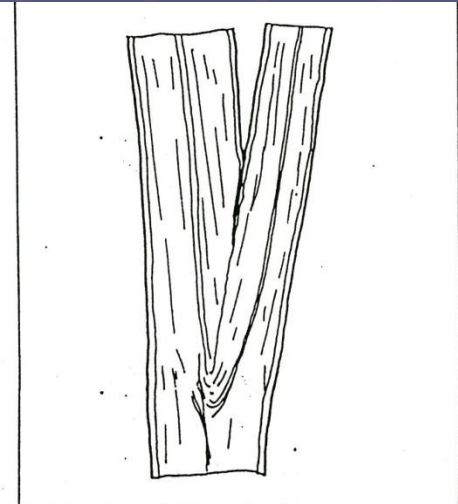
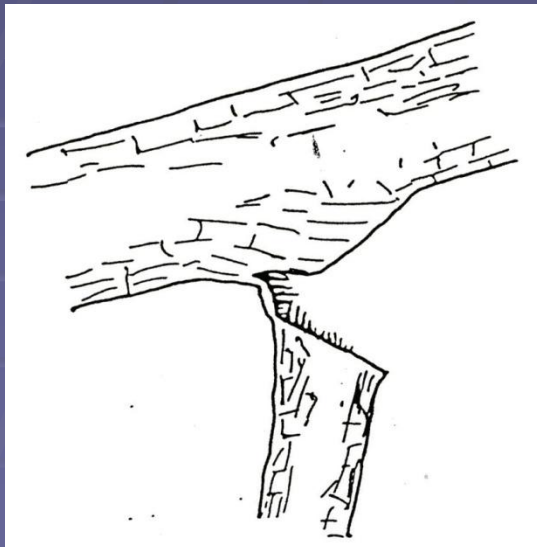


Fig. 8.5 Included bark can be a problem in tight crotches. This weakens branch attachment.



Health

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!

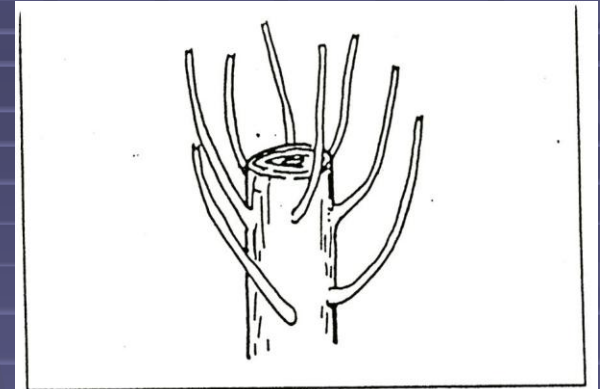


Fig. 8.11 Watersprouts develop profusely following a heading cut.

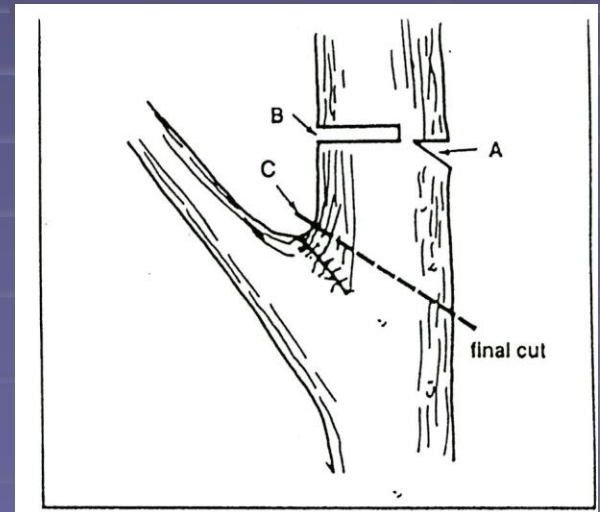


Fig. 8.10 Drop crotch pruning cuts a limb back to a major lateral.

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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Tom Del Hotal
(619) 454-2628
email: fantasiagardens@gmail.com

ISA Certified Arborist
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