TreePeople's Education Program

Fruit Tree Pruning

TREEPEOPLE

TreePeople's Education Program

Fruit Tree Pruning

My TreePeople contact is:

Phone:

E-mail:

TREEPEOPLE

12601 Mulholland Dr.
Beverly Hills, CA
www.treepeople.org

Who We Are

TreePeople

TreePeople is an environmental nonprofit that unites the power of trees, people and technology to grow a sustainable future for Los Angeles. Simply put, our work is about helping nature heal our cities.

Our Mission

TreePeople's mission is to inspire, engage and support people to take personal responsibility for the urban environment, making it safe, healthy, fun and sustainable and to share the process as a model for the world.

Functioning Community Forest

TreePeople has a long-range vision: to green Los Angeles by establishing a Functioning Community Forest in every neighborhood of the city.

A functioning Community Forest is an urban community where local residents and businesspeople have joined together to transform their neighborhood into a sustainable ecosystem that functions like a healthy, natural forest.

Creating a Functioning Community Forest involves people engaging with each other to plant and care for trees, and to incorporate "forest-mimicking" technologies into their urban landscape.

Fruit Tree Program

TreePeople has always connected communities with trees. In 1984, distributing fruit trees to low-income communities in Los Angeles became an important part of this mission. Since then, we've distributed thousands of fruit trees to be planted in backyards, on school campuses and in community gardens throughout L.A. County.

Table of Contents

Why Prune Fruit Trees?

2 Prune Out The 4 D's

3 Prune For Disease Prevention

4 Prune To Train Young Trees

4 Prune For Fruit Production

4 Prune Or Thin Fruit

Tree Biology

5 Photosynthesis And Respiration

6 Buds And Branches

Pruning Cuts

8 Three Cut Process

8 Removal Cut

9 Reduction Cut

10 Heading Cut

Fruit Tree Pruning

11 Fruit Tree Pruning Chart

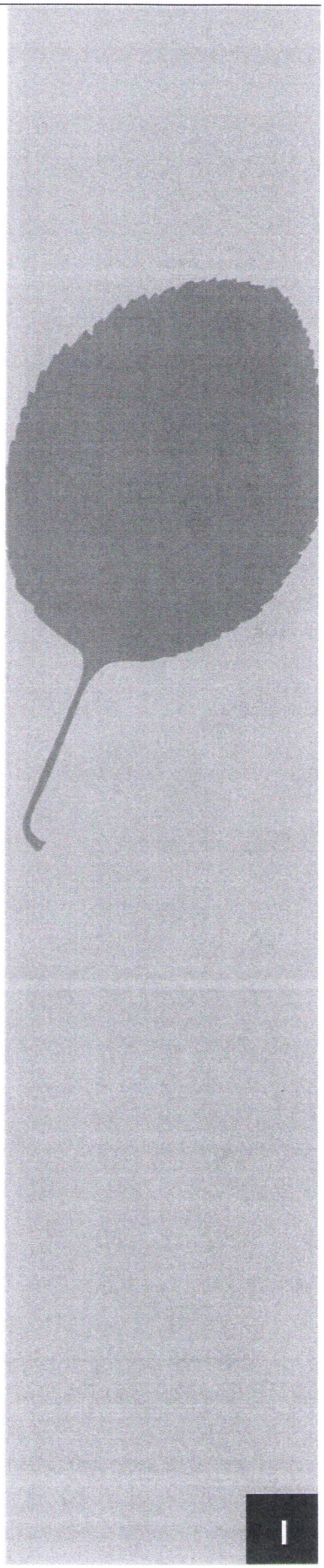
12 Spur And Renewal Pruning

Resources

15 Books

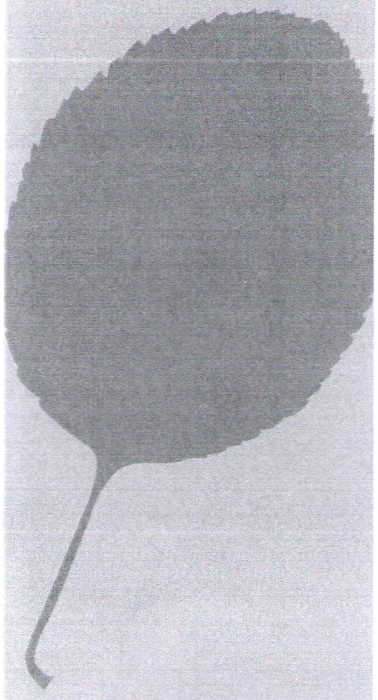
15 On-line Resources

15 On-line Tools



Why Prune Fruit Trees?

Five reasons to prune your tree



Fruit trees are amazing living machines. They give us shade, beauty and food! Some can live for hundreds of years. Fruit trees have been around for thousands of years, coming to us from all over the world. Apricots emerged out of Armenia, peaches from China, nectarines from central and eastern Asia, apples and figs from western Asia, Japanese plums (the plums that do well in southern California) from China, Asian persimmons from China, American persimmons from the eastern and mid-western U.S., pears from northwestern China and citrus from southeast Asia. They've come a long way to become an everyday food for us in the United States. With a little bit of knowledge, care and pruning, these trees can produce an abundance of sweet fruit.

Understanding basic pruning principles and proper pruning cuts is helpful in pruning any tree - ornamental or fruit. However, if fruit is the main interest, this workshop teaches these basics with fruit production in mind.

Prune Out The 4 D's

Anything that is dead, diseased, damaged or deranged should be pruned out as the bare minimum to keep the tree healthy.

Diseased

Remove diseased branches or leaves to avoid infecting other tree parts or trees nearby.

- They should be removed as soon as they are discovered.
- Cut 6"-12" below the infection to remove disease that has started to spread.

Dead

Remove dead branches – they are of no use to the tree.

- They can attract insects and disease.

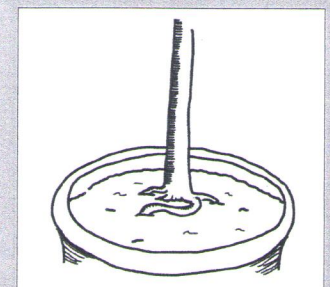
Damaged

Remove damaged branches and roots.

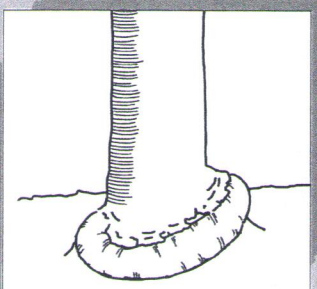
- Or, prune with a clean cut. Ragged cuts or rips prevent the tree from sealing over the wound.

Deranged

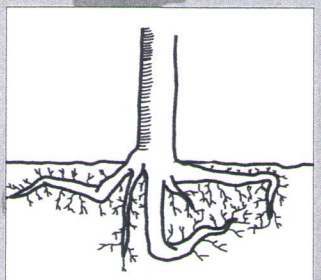
- Branches
  - — Remove branches that grow towards the center of the tree, or are crossing and rubbing against another branch, the trunk or a structure.
  - —If a branch is rubbing, it will create a wound. Wounds are an entry point for disease and can attract insect pests.
- Roots
  - — Deranged roots are either circling/girdling or kinked roots. Circling roots are those that circle around the trunk instead of growing out, like the spokes of a wheel.
  - — If a circling root is left in place, it constricts the growth of the trunk and cuts into it, causing instability.
  - — If the circling root is flexible, dig it out, unwind it and pull it so that it is coming straight out from the trunk. Bury it in its new position. If unable to reorient it, cut it out as close to the trunk as you can.
  - — Kinked roots block the energy or flow of water and nutrients through the root.
  - — If most of the roots are kinked, that also means the tree is less stable.
  - — Cut the kinked roots, either to where they connect to the trunk, or at the point where they make their sharp turn.



Circling roots on young tree



Circling roots on older tree



Kinked roots

Prune For Disease Prevention

Many fruit trees tend to be more susceptible to fungal and bacterial diseases.

- Good air circulation through the tree lessens the ability for diseases to take hold. As wind blows through the branches, it dries up surface moisture in small crevices and on leaf surfaces.
- A general rule is to prune so that a small bird can fly through the tree.
- Old, shriveled fruits on the trees are often filled with fungal spores. Called mummies, they should be removed, as well as any fruit or diseased leaves that have fallen to the ground.

Whitewashing

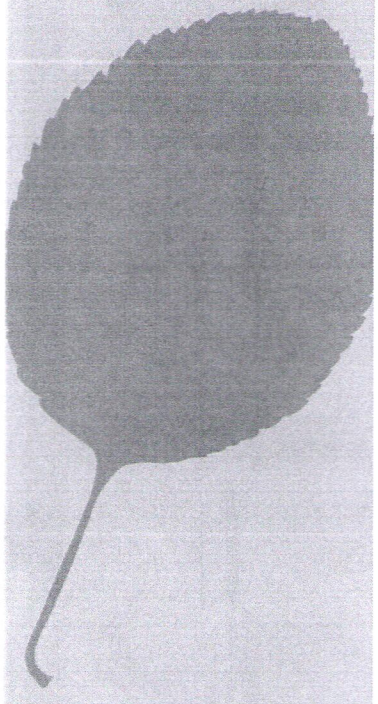
To prevent sunscald or sunburn, paint the bark exposed to the direct sun with a 50:50 solution of water and white or light-colored latex paint.

Paint the upward facing side of the upper-most branches and the south, west and east sides of branches and trunk that are exposed.

Prune To Train Young Trees

Fruit trees have the extra burden of heavy fruit on their branches for months at a time. These trees should be trained to have strong scaffold branches to hold up the other branches.

- Be sure to prune out any suckers (shoots growing from the rootstock), especially on grafted fruit trees.



Prune For Fruit Production

Fruit trees can be pruned to improve production or to keep the fruit within reach.

Prune or Thin Fruit

Thinning fruit allows the remaining fruit to grow larger and ripen faster, and prevents branches from breaking.

- When the fruit is about the size of a quarter, remove some.
- Fruit should be thinned so they are about 4" to 8" apart.
- Apples and pears should be thinned to one fruit per cluster.

Tree Biology

How trees grow and their reaction to pruning

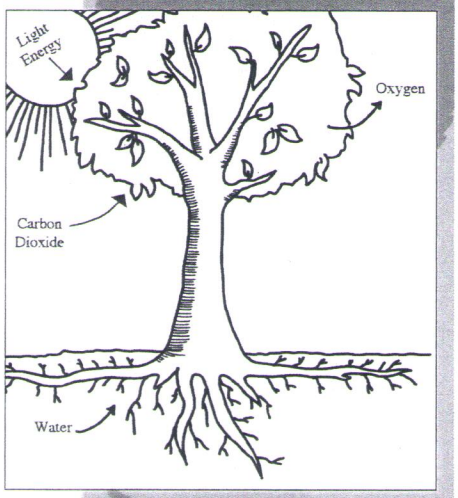
Learning some basics in tree biology, from photosynthesis to how branches grow, will help in understanding the reactions and implications for pruning.

Photosynthesis & Respiration

Photosynthesis

As part of the cycle of air, trees give off oxygen and take in carbon dioxide. This is a part of the process known as photosynthesis.

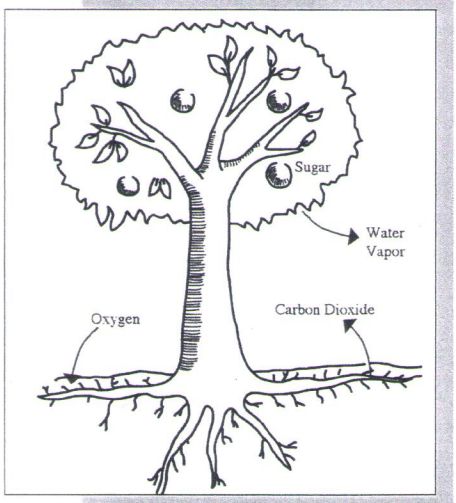
Through small holes on the undersides of leaves (stomata), a tree absorbs carbon dioxide. Through the roots, a tree absorbs water. In the presence of sunlight, carbon dioxide and water combine to produce oxygen (released through the stomata) and sugar (fruit).



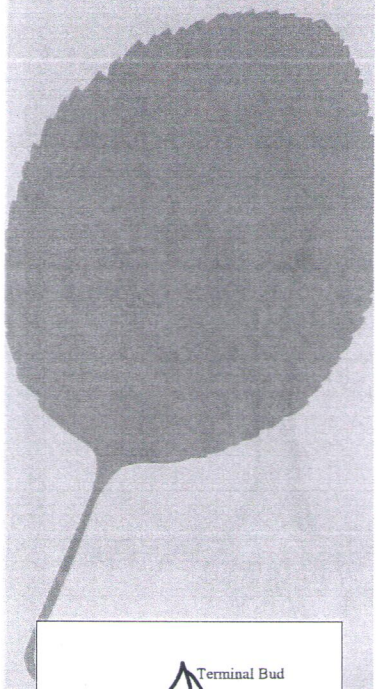
$$\underset{\text{carbon dioxide}}{6\,CO_2} + \underset{\text{water}}{6\,H_2O} \xrightarrow{\text{sunlight}} \underset{\text{sugar}}{C_6H_{12}O_6} + \underset{\text{oxygen}}{6\,O_2}$$

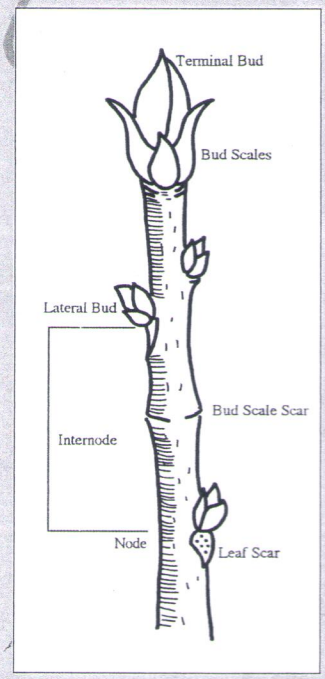
Respiration

In the roots below the ground, a reverse reaction happens called respiration. Roots take in oxygen and release carbon dioxide. The sugar molecule is split apart and releases energy. Water vapor is released through the leaves.



$$\underset{\text{sugar}}{C_6H_{12}O_6} + \underset{\text{oxygen}}{6\,O_2} \longrightarrow \underset{\text{carbon dioxide}}{6\,CO_2} + \underset{\text{water}}{6\,H_2O} + \text{Energy}$$





Implications for pruning

- A tree stores the sugar it makes and uses it when necessary. During winter the sugar is mostly stored in the roots. During spring, the sugar starts rising as sap, and the tree begins to produce leaves, flowers and eventually fruit.
- A tree needs a certain amount of leaves to photosynthesize in order to make sugar and then energy.
- When pruning, removing too many of the branches (that produce the leaves necessary for photosynthesis) will affect the health of the tree.
- Winter pruning: The tree in winter is sitting on stored energy, waiting for spring. Pruning branches in the winter causes the tree to use the stored sugar to produce a big flush of growth in the spring.
  — Winter pruning encourages new growth.
- Summer pruning: The tree in summer hasn't stored a large quantity of sugar yet. Pruning during this time of year removes leaves and reduces the tree's ability to store sugar. There is no flush of growth, which makes it easier to thin out a tree, reduce its height or remove suckers from the rootstock.
  —Summer pruning doesn't encourage new growth.

Buds and Branches

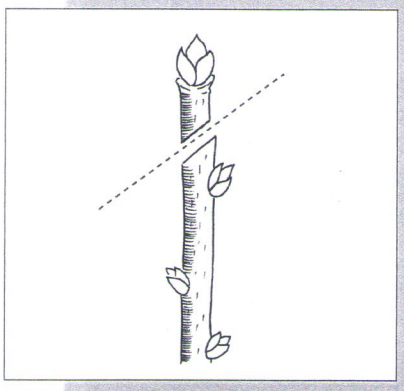
To increase in length, a plant grows from the ends of branches and at the buds.

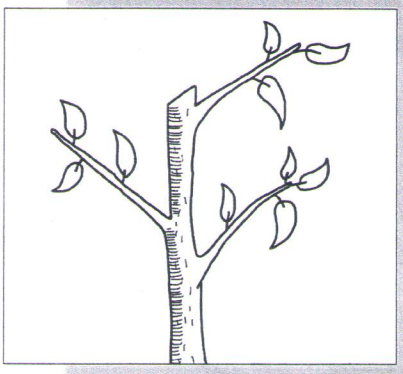
Buds

- Along a young branch are small lateral buds.
  — Scales surround and protect the buds and will fall away in spring allowing the buds to open (called breaking bud). New growth emerges in the form of flowers, fruit, leaves and possibly branches.
- At the end of the branch is the terminal or apical bud.
  — The bud scales are attached all around it in a circle. When the scales fall off, they leave a scar where they were attached at the base.
  — The scars make a circular mark around the branch. This mark shows the age of a branch. Each circular scar is equal to one year's growth.
- The locations of the buds are called nodes.
- The areas in between the nodes are called internodes.

Implications for pruning

- The apical/terminal bud produces a hormone that flows down by gravity, inhibiting the growth of lateral buds.
  - —Cutting off the apical bud, (or bending the branch so the bud is headed downward) will cause the lateral buds to sprout branches (since the hormone can't flow up).
  - — Usually two to four buds below the cut will sprout branches.
  - — This "heading cut" is often done on a one-year-old, branchless fruit tree (called a whip) to encourage branching.
- All over the tree, under the bark, are hidden buds called adventitious buds.
  - — These become activated and sprout when a branch is cut in the internode area (rather than 1/4" above a node or lateral bud).
  - — These vertical, weakly attached branches are called water sprouts.
  - — A tree will also produce water sprouts if too much of the tree is pruned.

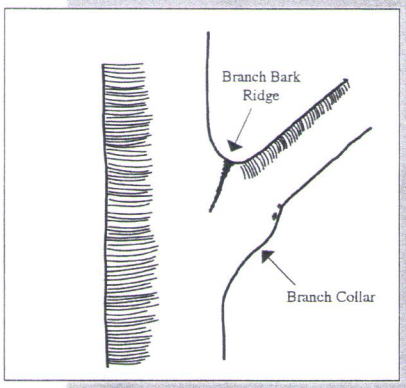




Branches

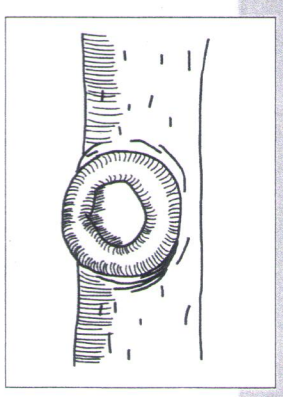
Branches arise from the center of the tree.

- The bulge at the base of branches is called the branch collar.
- The branch wood compressing against the trunk wood causes a slight ridge of bark to form on the trunk around the top of the branch and down each side. This ridge is called the branch ridge bark.

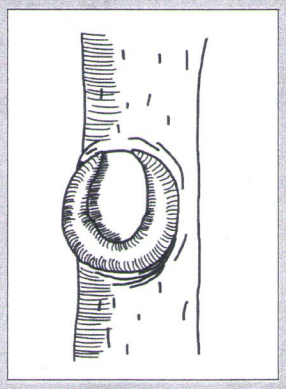


Implications for pruning

- A proper removal cut outside the branch collar and branch bark ridge will allow the tree to seal over the wound with callus wood.
  - —The callus wood looks like a donut, curling over and slowly growing over the cut.
  - — A good cut will be round.
  - — A bad cut (cutting into the branch collar) will be oval shaped or not formed on one side of the cut.
- Inside the tree, barriers or walls are produced that act like a natural defense zone that protects it from disease.
  - —When a poor cut is made, the natural defense zone is broken and disease can penetrate.



Good cut



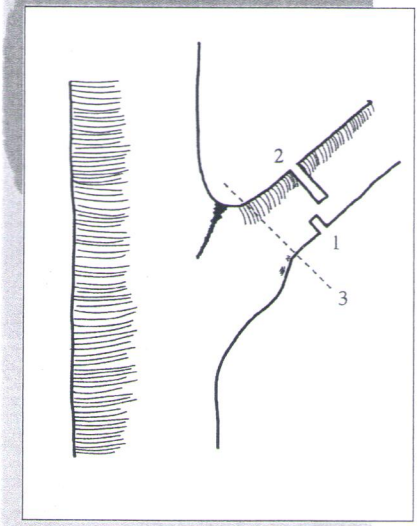
Bad cut

Pruning Cuts

Basic cuts for removing branches

A pruning cut is a wound. The smaller the branch, the smaller the wound will be. Try to remove branches that are less than 3" in diameter.

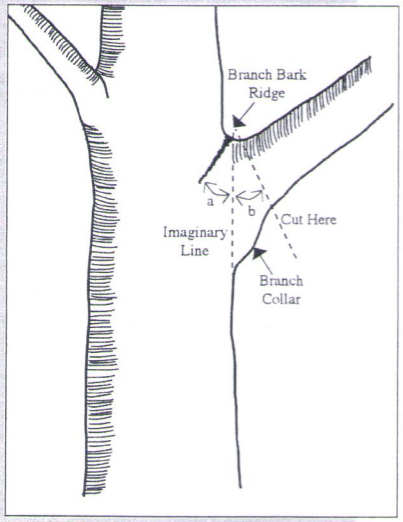
Three Cut Process



If the branch is heavy, use a three cut process.

- The first cut is made on the underside of the branch a few inches from the trunk. Do not cut all the way through.
  - —This prevents the bark from ripping down the trunk when the rest of the branch is removed.
- The second cut is made beyond the first cut - away from the trunk. Cut all the way through.
  - — This removes the majority of the weight of the branch.
  - — The bark may rip, but will be stopped by the first cut.
- The third cut removes the rest of the branch.

Removal Cut



This is the healthest type of cut. Use a removal cut to remove a whole branch.

- The cut is made just outside the branch collar and bark branch ridge.
  - — When the branch collar cannot be detected, draw an imaginary line parallel to the trunk downward from the top of the branch bark ridge.
  - — The angle formed by the imaginary line and the branch bark ridge is equal to the angle from the imaginary line to where the pruning cut should be made.

Reduction Cut

Use a reduction cut to shorten a branch or trunk back to a branch no smaller than 1/3 the diameter of the trunk or branch being cut.

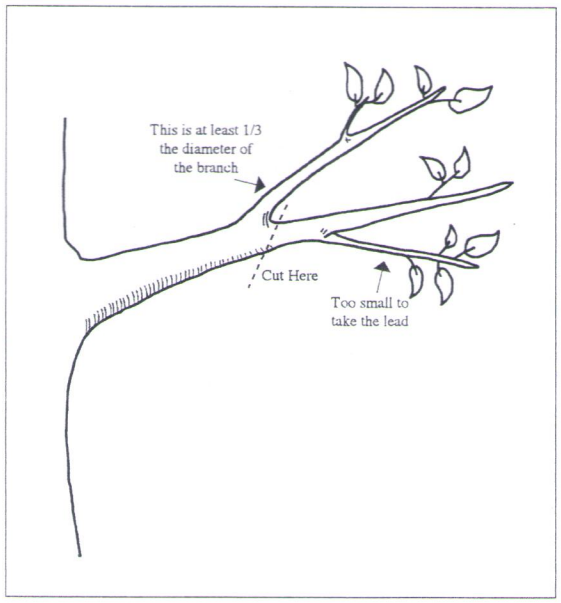
- This cut is not as healthy as a removal cut.
  - —The tree has a harder time setting up the defense zone to its interior.
  - — It is sometimes necessary and needed to reduce the height of the tree.
- Draw an imaginary line perpendicular to the trunk (or branch, if shortening a branch).
- Cut the trunk in the middle of the angle created by the imaginary line and the branch bark ridge.
  - — If the trunk is cut back to a branch that is not at least 1/3 the diameter, it is considered a heading cut.
  - — A heading cut will result in a lot of shoots.

Wound Paint

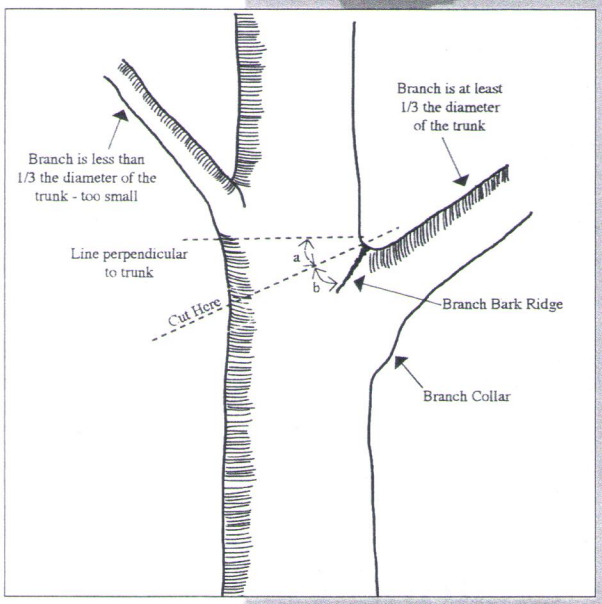
Studies have found that the use of wound paint, a dressing applyed to pruning cuts:

- Does not help a tree seal over a pruning cut or wound.
- Can hinder the natural sealing process.

Do not fill a trunk or branch cavity with anything.



Reduction cut on branch

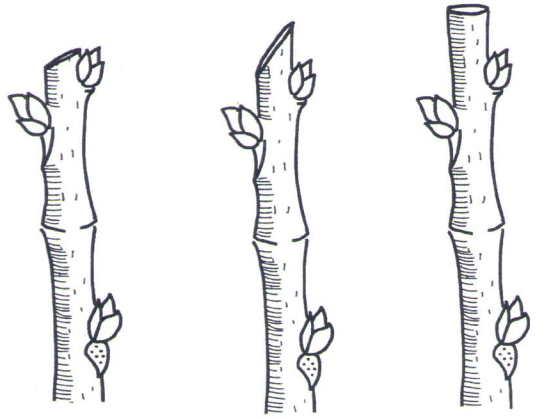


Reduction cut on trunk

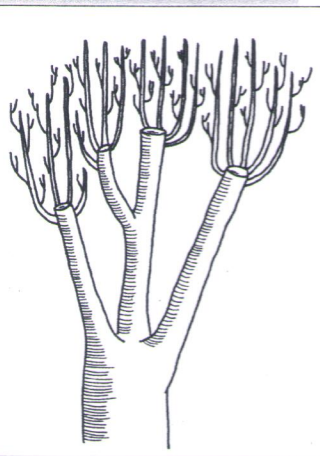
Heading Cut

Used to induce branching on a young tree or shorten long, thin branches.

- Using a heading cut on a branch will cause it to put more energy into getting thicker rather than getting longer.
  - — This allows the branch to hold fruit.
- Cut a one-year old branch back to a bud.
  - — Make the cut 1/4" above a bud.
  - — Make the cut at a slight angle.
- Two to three lateral buds will sprout branches below the cut.
  - — If the trunk is cut back to a branch that is not at least 1/3 the diameter, it is considered a heading cut.
  - — A heading cut will result in a lot of shoots.



Proper location and angle | Too low and sharp | Too high and flat



Topping

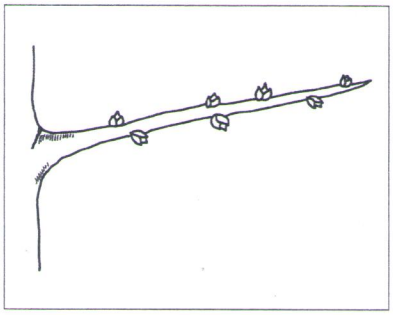
Improperly heading a large branch or trunk is called topping and is a harmful pruning practice.

- This type of heading causes adventitious buds to produce a flush of watersprouts.
  - — These weakly attached branches usually grow in a congested, unorganized way.
- It is difficult for the tree to seal over a heading cut like this, making it unable to hold back disease.

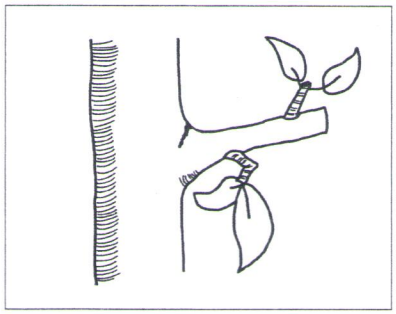
Fruit Tree Pruning

Appropriate pruning for different fruit trees

Different fruit trees produce fruit on different parts of the tree, different aged wood's growth, or on small branches called spurs.



One year old wood



Spurs

Fruit Tree Pruning Chart

A simple rule is to prune after harvesting the fruit. Use the chart for more specific pruning suggestions.

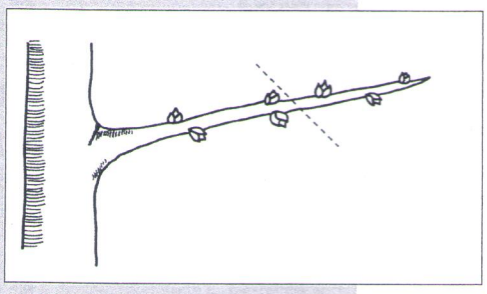
FRUIT	TREE TRAINING STYLE	AGE AND PLACE OF FRUITING WOOD	HOW MUCH TO PRUNE
Almond	Open center	Fruits on 2-year and older wood. Spur (mostly) and lateral bud bearer. Spurs live for 5 years.	Light pruning.
Apple	Any	Fruits on 2-year and older wood. Spur and tip bearer. Spurs live for 6-10 yrs.	Moderate pruning, spur renewal
Apricot	Open center, fruit bush, espalier	Fruits on 2-year and older wood. Spur bearer. Spurs live for 3-4 years.	Prune to generate new wood, but not as heavy as peach. Can prune when flowering.
Avocado	Central leader	Fruits on current wood tips.	Bark is sensitive to sunburn. Go light on summer pruning. Reduction cut to shorten.
Cherry	Open center, fruit bush	Fruits on 2-year and older wood. Spur bearer. Spurs live for 10-12 years.	Very little pruning. Make sure pruning is done in dry weather. Cherries are very susceptible to fungal diseases.
Citrus	Style-training not needed. Espalier lemon only.	All wood above the graft union fruits.	Minimal pruning. Prune between March and August, but be careful of sunburn if summer pruning. Prune before bloom. Lemons require more thinning and reduction cuts to keep in bounds.

FRUIT	TRAINING STYLE	AGE AND PLACE OF FRUITING WOOD	HOW MUCH TO PRUNE
Fig	Central leader	Fruits on lateral buds from last year and the current year.	Don't winter prune. Prune after harvest. For late ripening cultivars, prune in summer
Kiwi	Vine, espalier	Fruits on current season's wood. Only first 3-6 buds fruit.	Heavy pruning winter. moderate pruning spring and summer.
Pear	Any	Fruits on 2-year and older wood. Spurs bear for 6- 10 years (Asian); 8-10 years (European)	Moderate pruning, spur renewal
Asian Pear	Central leader	Fruits on 2-year and older wood. Spur bearer. Spurs live for 10-15 years.	Moderate pruning, spur renewal
Peach & Nectarine	Open center	Fruits on last year's wood only. Bears on lateral fruit buds.	Heavy pruning. After fruiting, remove 20-33% of wood that fruited.
Pecan	Central leader	Fruits on tips of new shoots.	Light pruning.
Persimmon	Open center, modified, central leader	Fruits on new shoots near tips of 1-year old wood.	Light pruning.
Pomegranate	Modified central leader, fruit bush	Fruits on 2 or 3-year old wood. Spur bearer. Spurs appear on outer edge of canopy.	Light pruning to encourage fruiting spurs and remove crossing branches.
Japanese Plum	Open center	Fruits on 2-year old wood or older. Spur and lateral bud- bearer. Spurs bear for 6-8 years	Heavy pruning to keep short.
Walnut	Modified central leader	Fruits on tips of new wood.	Light to moderate pruning.

Spur and Renewal Pruning For Apple and Pear

Spurs are the short twigs that bear fruit and leaves.

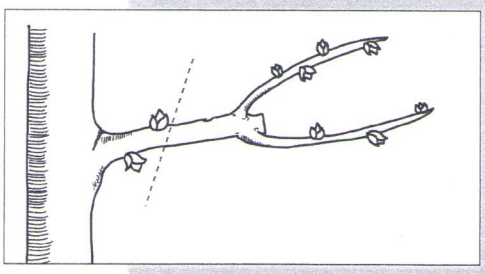
- Spurs tend to have a long life, but eventually they stop producing and need to be replaced.
- Use pruning to induce your tree to produce fruiting spurs and renew fruiting wood.
- Use a mix of these when needed.



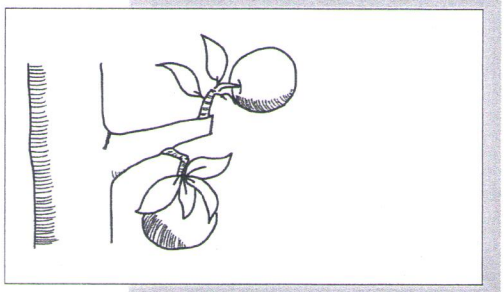
Creating spurs

- First winter: head back young lateral branches to 4 buds.

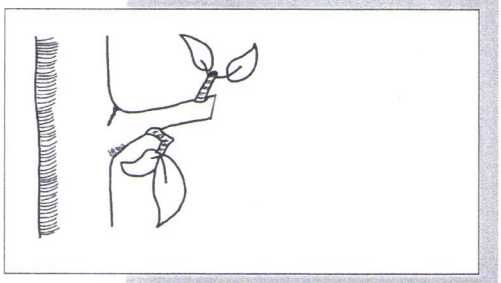
- Second winter: head back lateral branches to a flower bud.



- Following spring to fall: Fruit forms on flower buds left.

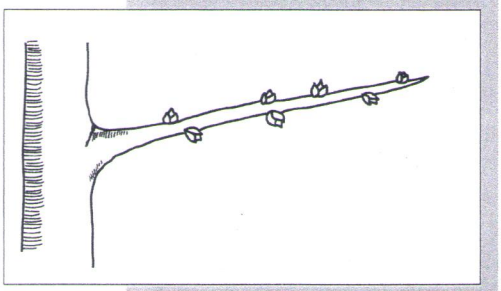


- Fourth winter: A spur system has formed.

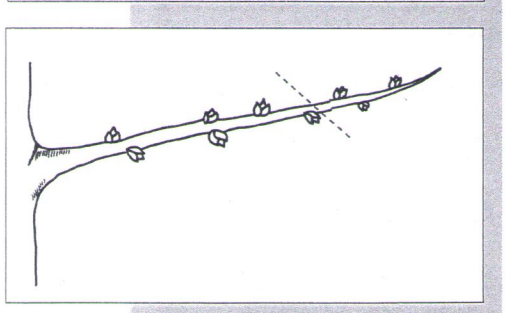


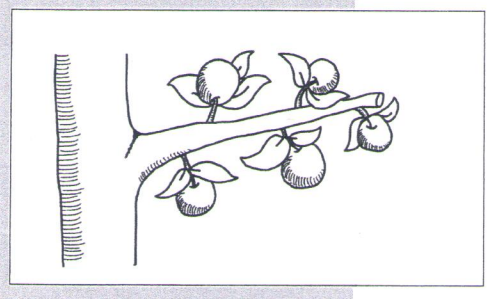
Renewal pruning

- First winter: no pruning on lateral branch.

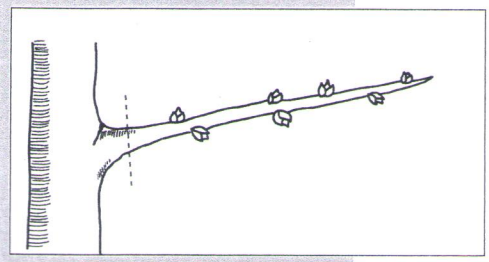


- Second winter: cut off last year's growth leaving wood from the first winter

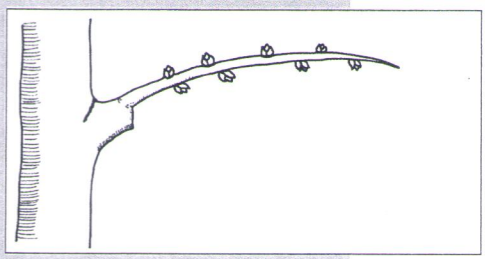




- Following spring to fall: Fruit forms on flower buds left.



- Third winter: head back leaving 1" stub.



- Fourth winter: a new lateral branch has formed. Repeat the cycle.

Resources

Books

Best Management Practices: Tree Pruning. 2002. Gilman, Edward F.; Lilly, Sharon. International Society of Arboriculture. Champaign, IL. For more information: www.isa-arbor.com).

California Master Gardener Handbook. 2002. Pittenger, Dennis. Regents of the University of California. Oakland, CA.

The Home Orchard: Growing Your Own Deciduous Fruit and Nut Trees. 2007. Ingels, Chuck A.; Geisel, Pamela M.; Norton, Maxwell V. Regents of the University of California.

How to Prune Fruit Trees. 2006. Martin, R. Sanford. Martin Bio-Products. Burbank, CA.

An Illustrated Guide to Pruning, Second Edition. 2002. Gilman, Edward F. Delmar Publishing. Albany, NY.

Mejores Prácticas de Manejo: Poda De Árboles (Revisado 2008). 2008. Gilman, Edward F.; Lilly, Sharon. International Society of Arboriculture. Champaign, IL. Purchase this booklet on the ISA website (http://www.isa-arbor.com).

The Pruning Book. 1999. Reich, Lee. Taunton Press. Newton, CT.

On-line Resources

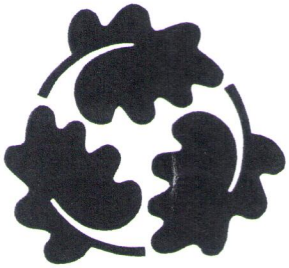
California Rare Fruit Growers – Fruit Facts
www.crfg.org/pubs/frtfacts.html

University of California: California Backyard Orchard
http://homeorchard.ucdavis.edu

University of California: Fruit and Nut Research and Information Center
http://fruitsandnuts.ucdavis.edu/datastore

University of California, Davis: IPM Online
www.ipm.ucdavis.edu

Trees Are Good
www.treesaregood.com



TREEPEOPLE
12601 Mulholland Dr.
Beverly Hills, CA 90210
(818) 753-4600
www.treepeople.org
info@treepeople.org