

Fruit Trees: Training and Pruning Deciduous Trees

by

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Pruning Times

- ***Winter pruning*** is best for the tree's structure. You can easily see all the branches, but it tends to result in strong growth in the spring, so do this sparingly.
- ***Summer pruning*** is recommended for controlling tree size. Cut new growth by half in mid-spring and again in summer.

Reasons for Training Fruit Trees

- Improve structural strength
- Reduce maintenance
- Increase tree longevity
- Create better light penetration
- Support crop load
- Create easier access for tree work and harvest.

Terminology

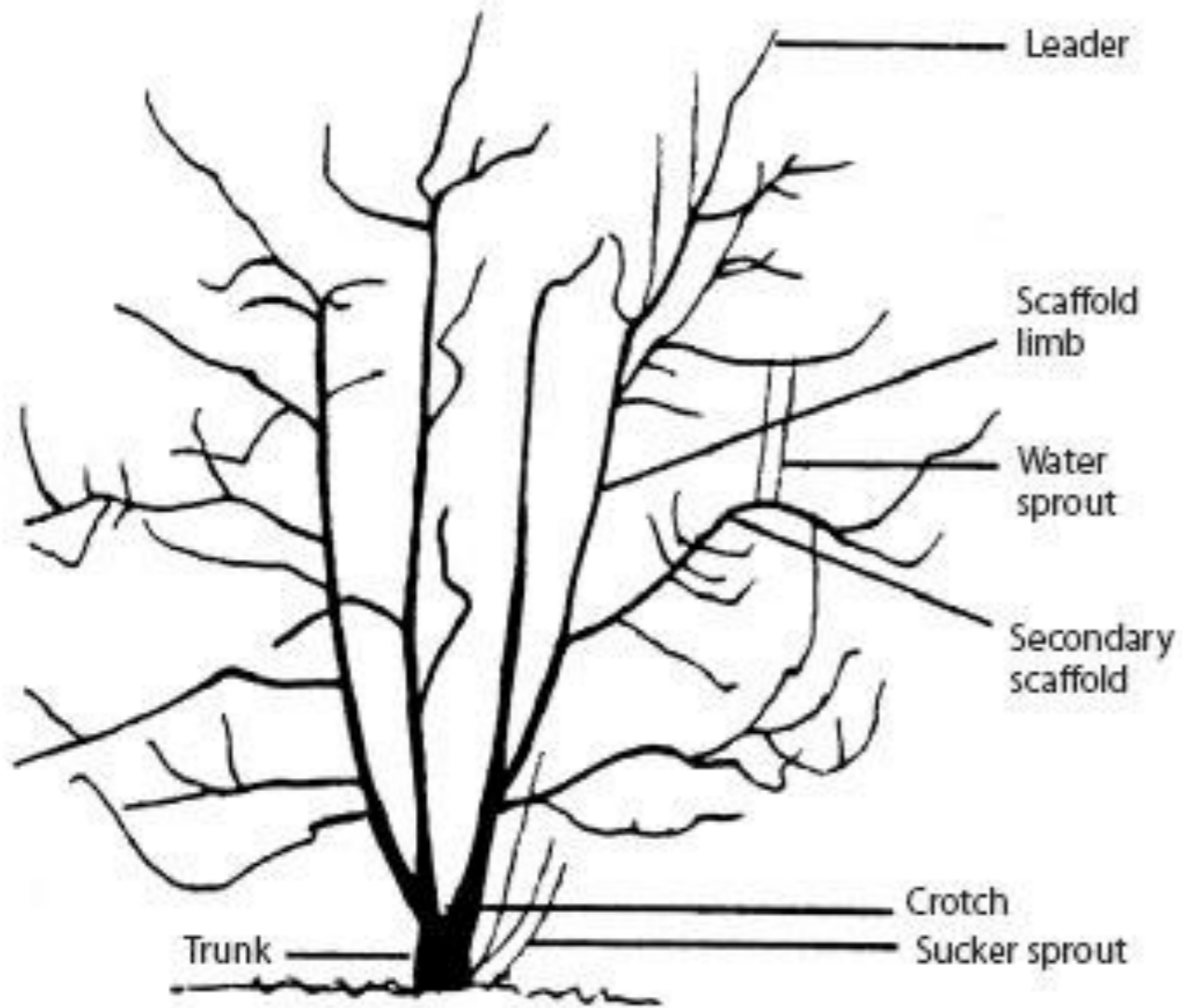


Figure 1. Common terms used in pruning and training fruit trees.

- Branch collar-The raised tissue at the base of every branch.
- Crotch angle- The angle formed between the trunk and a limb.
- Heading cut- A pruning cut that removes only part of a branch.
- Scaffold limb-A large limb that forms a tree's framework
- Shoot- The length on branch growth in one season
- Spur- A short shoot that fruits.
- Thinning cut- A pruning cut to remove an entire branch or shoot back to the branch collar, or to another branch at least 1/3 the thickness of the branch being removed
- Watersprout-Vigorous upright shoot that arises from a latent or adventitious bud on older wood

Branch Growths



● Branch bark ridge

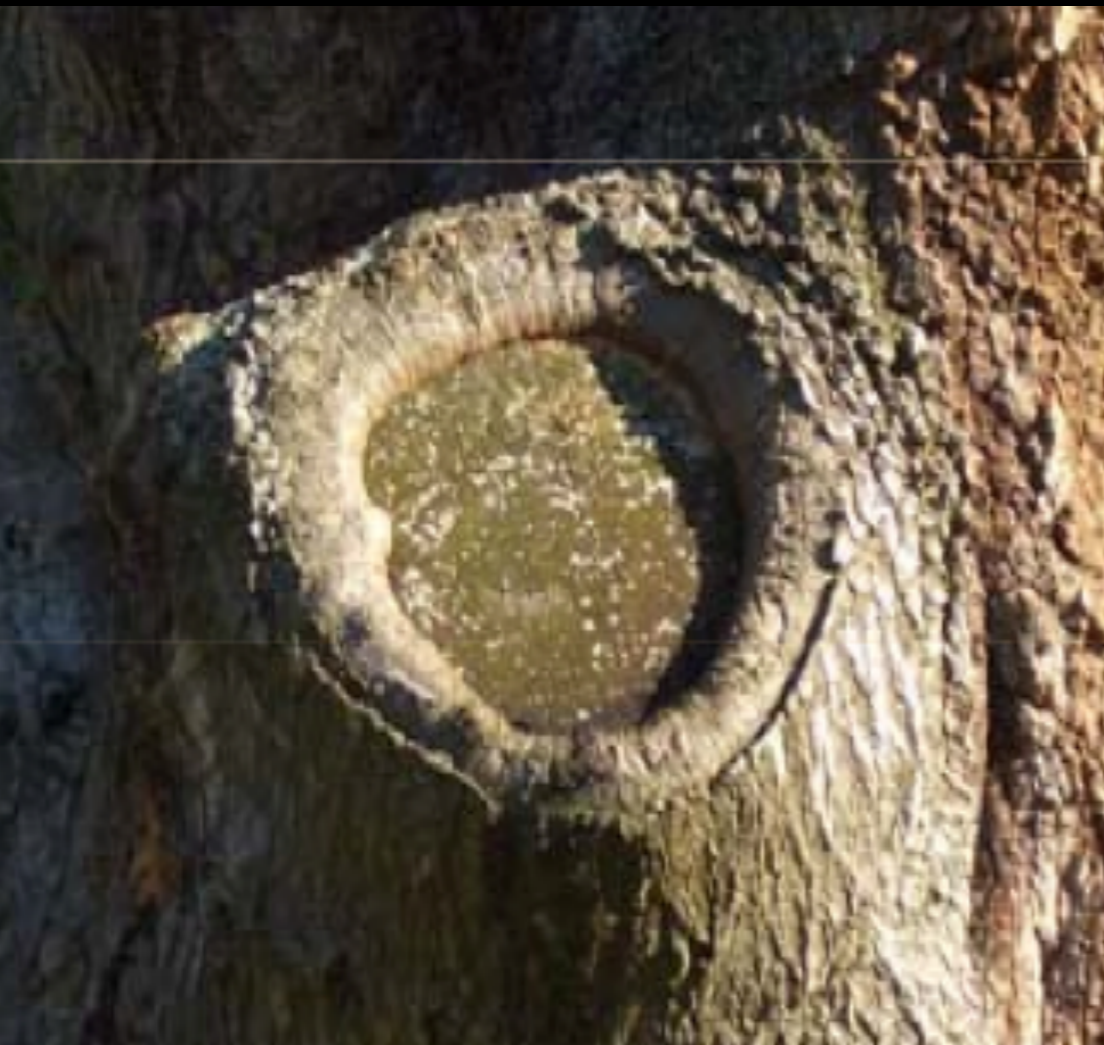


Branch collar

Proper Cuts

- Every cut you make wounds the tree
- Makes the smallest cut/wound possible
- Large cuts/wounds are more difficult for the tree to heal.
- Large cuts/wounds increase the potential for decay, disease and insect damage
- Cut just outside the branch collar
- Do not flush cut or leave a stub.

Proper cuts heal



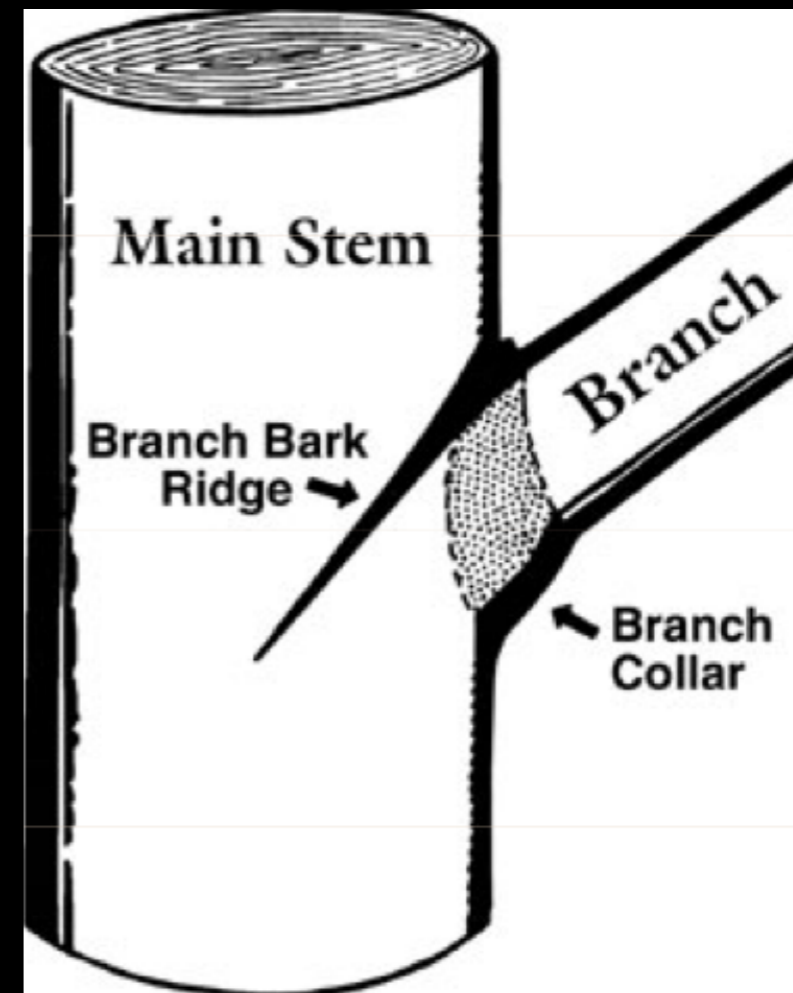
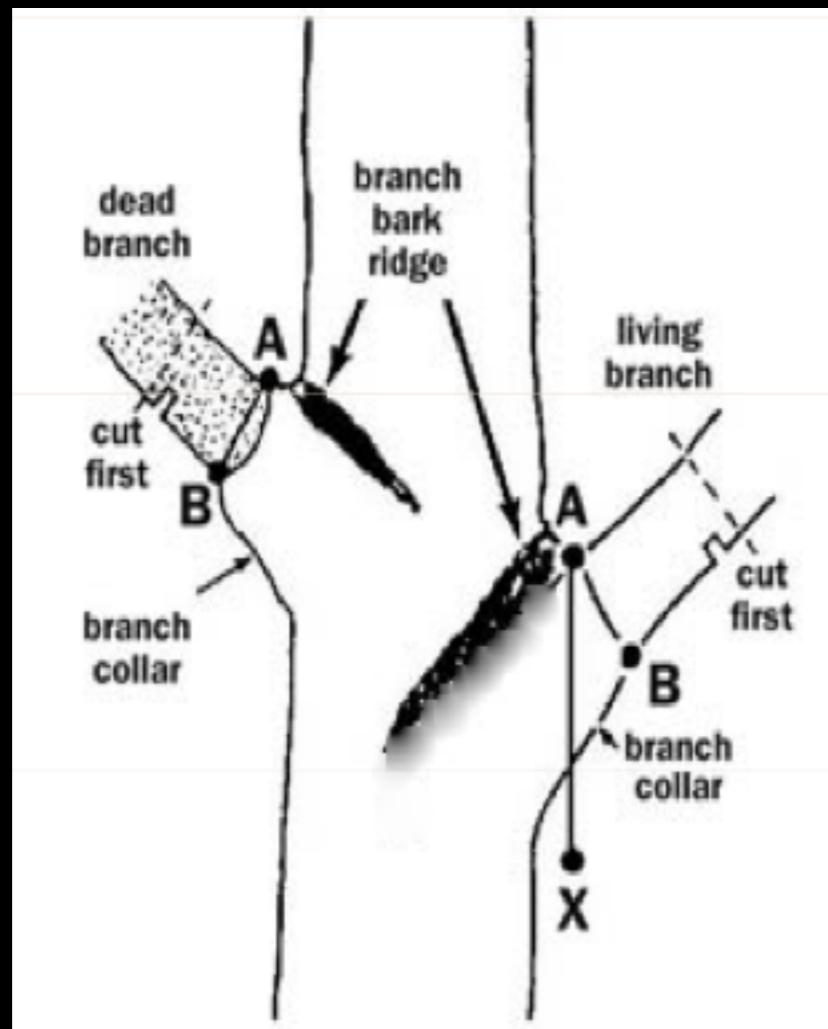
Improper Cuts

- Flush cuts are pruning cuts that originate inside the branch bark ridge causing injury to stem tissue and will never heal
- Stub cuts are pruning cuts that are made too far outside the branch bark ridge leaving tissue that can not heal and will eventually decay.

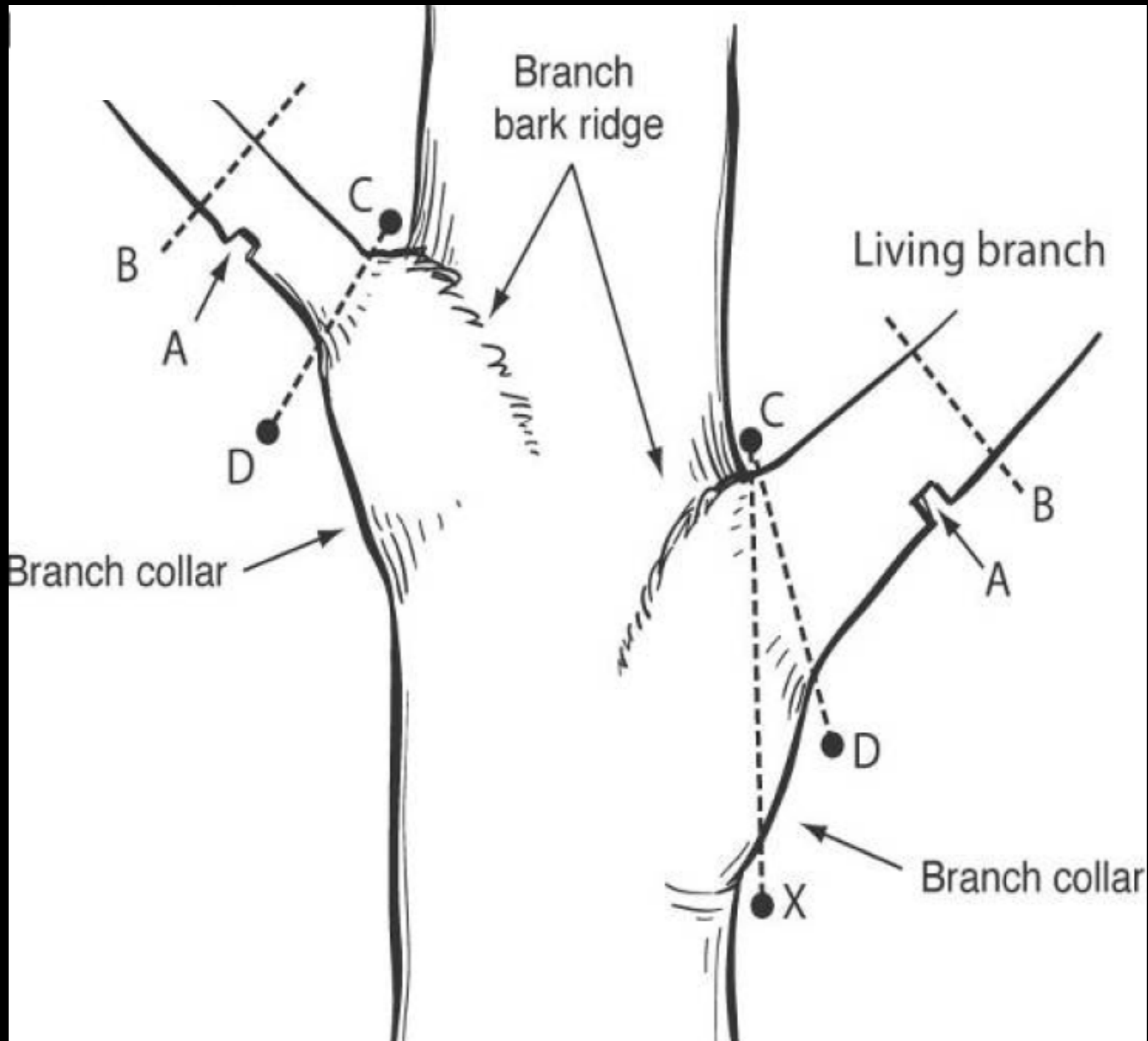


Where to Cut

- Cut so the branch bark ridge and branch collar are intact without leaving a stub.
- The branch collar should never be injured, cut into or compromised in any way.



Making Large Cuts

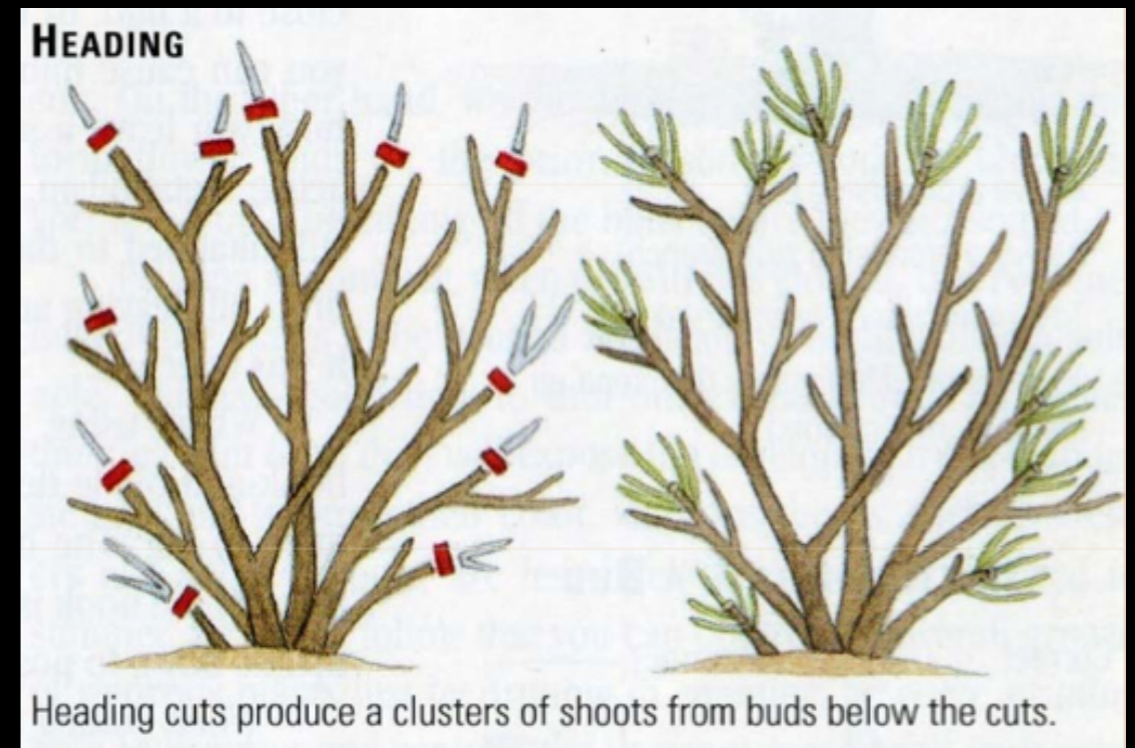


Types of Cuts

- Heading Cuts
- Thinning Cuts
- Reduction Cuts

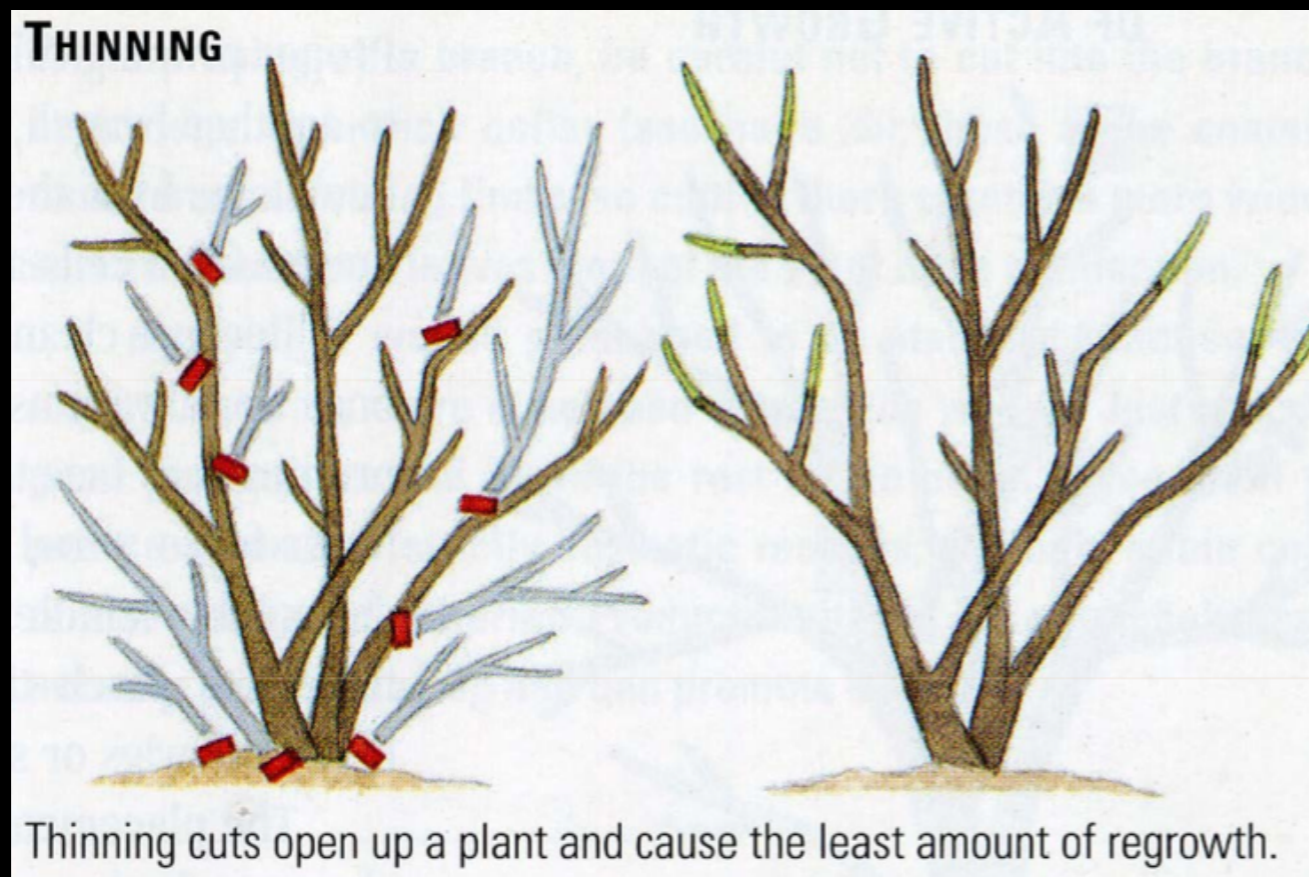
Heading Cuts

- Removal of part of branch
- Used to promote branch development
- Stimulates growth just below cut
- Can reduce sunlight penetration



Thinning Cuts

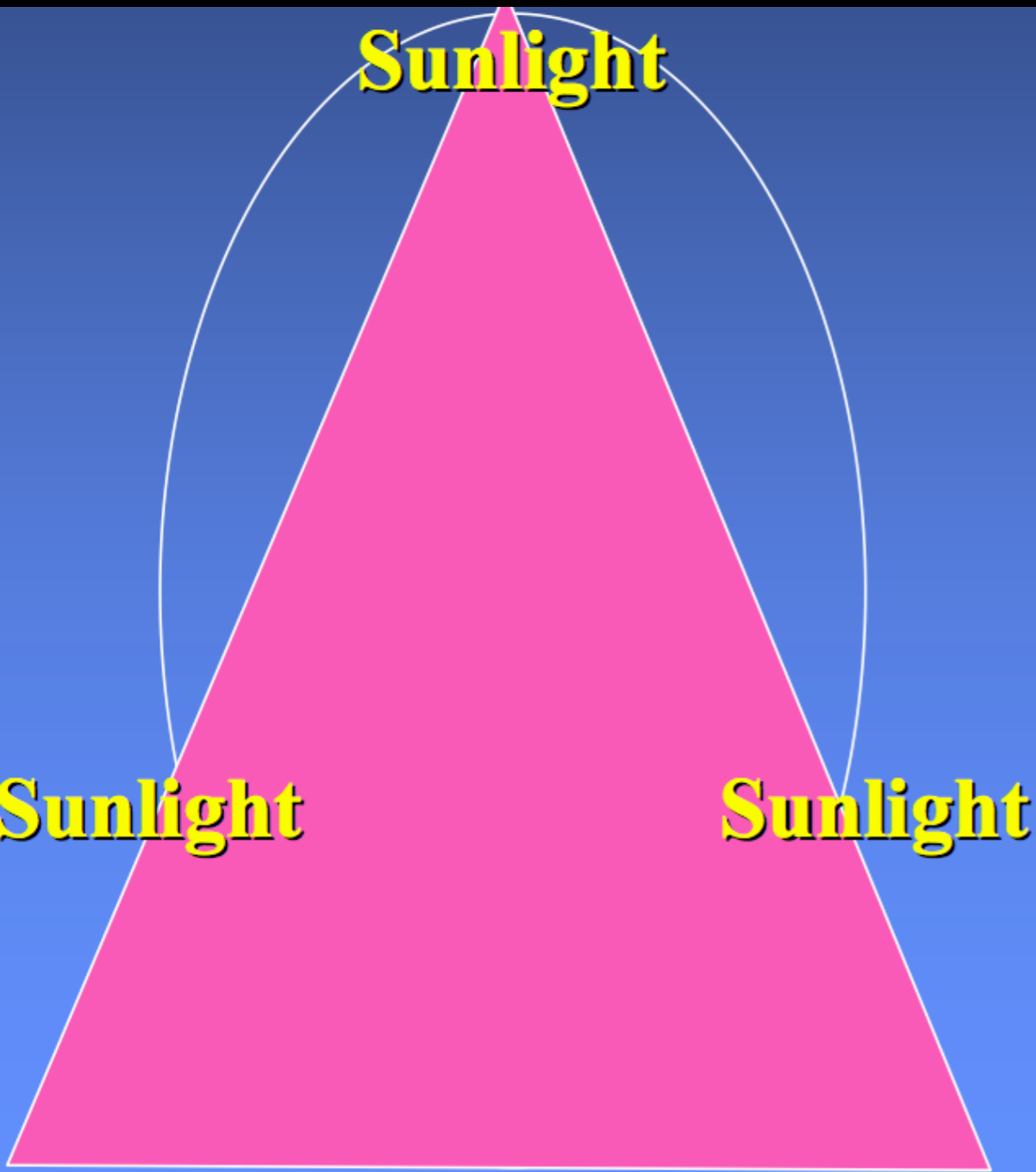
- Removal of entire branch or shoot
- Used to prevent crowding and improve sunlight penetration



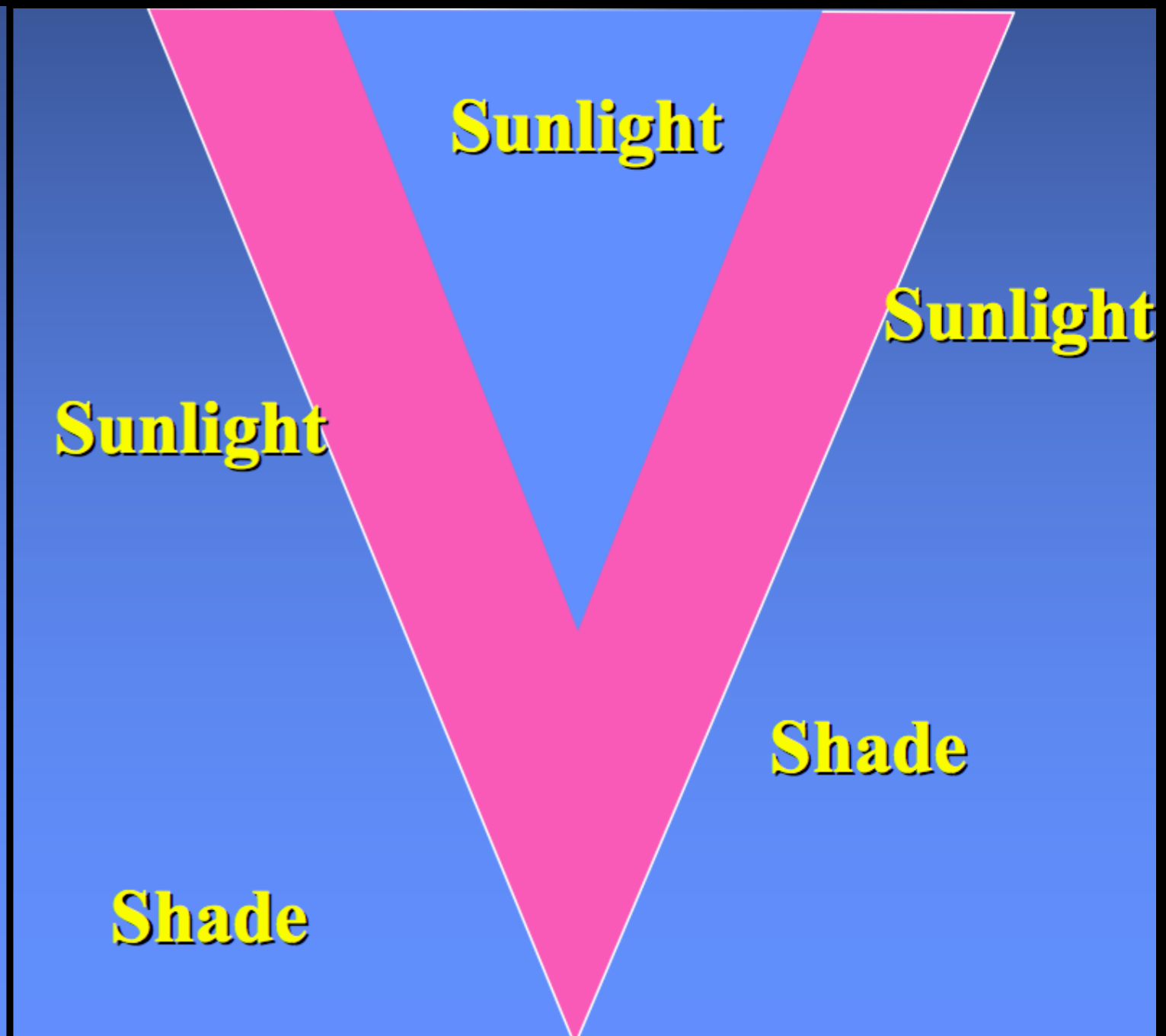
Fruit and Nut Tree Training Methods

- Open center
- Central leader
- Modified central leader
- Fruit bush
- Espalier

Training Method will Determine Light Interception



Central leader



Open center

Open Center

Almond, apricot, cherry, fig, nectarine, peach and plums. Can also be used for pear and apple. Better fruit production, better fruit color, strong buds, strong flowers and larger fruit than central leader.

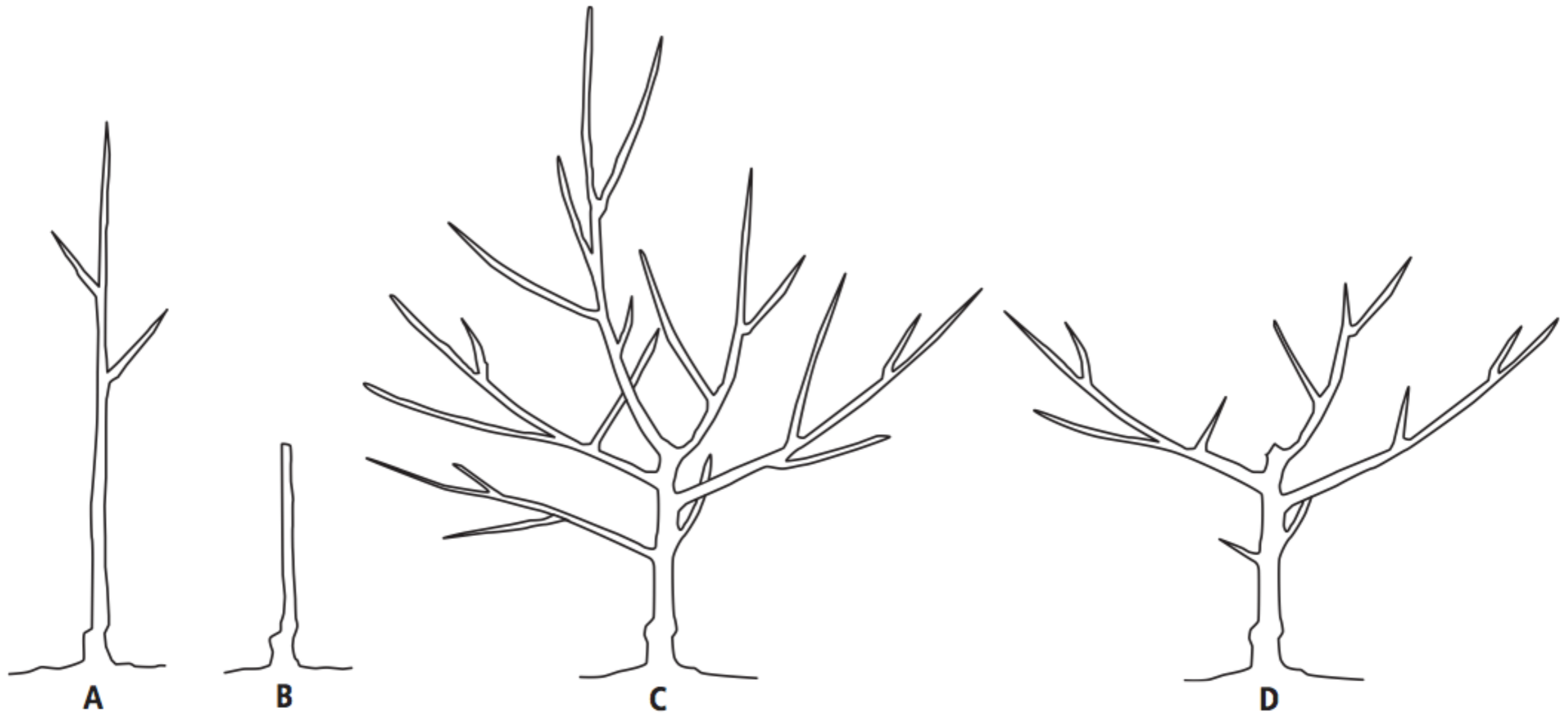
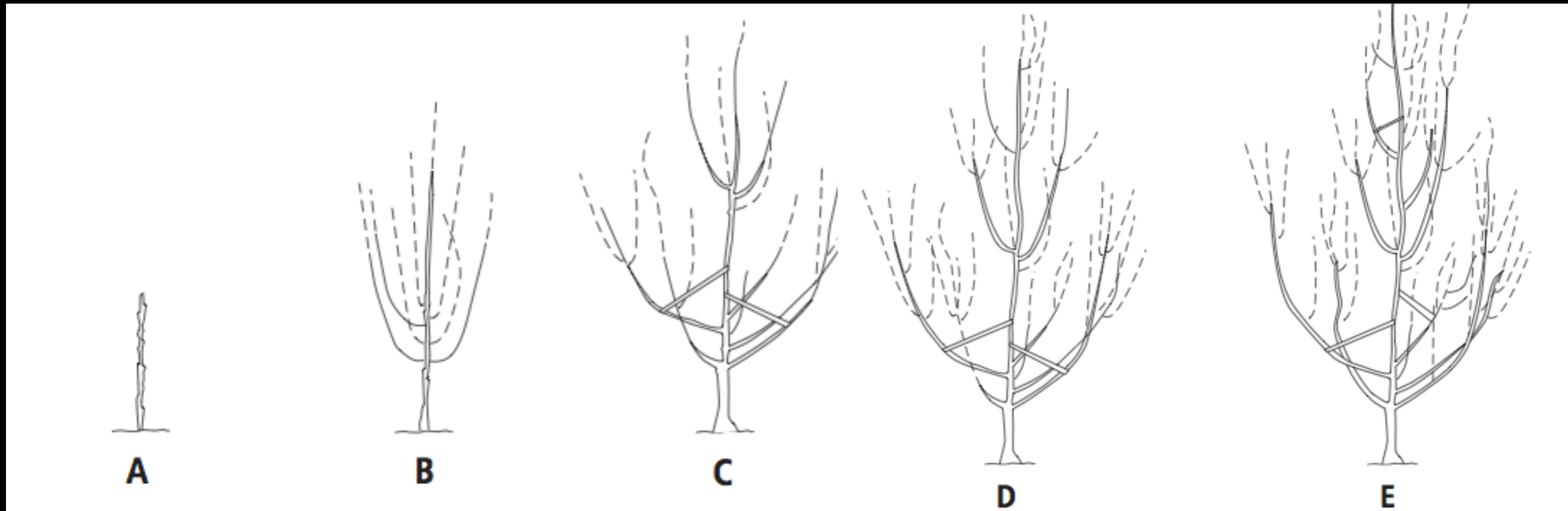


Figure 1. Open center pruning method. (A) Bare root tree at planting time. (B) Tree headed after planting. (C) Growth after one season. (D) Tree pruned after one growing season.

Central Leader

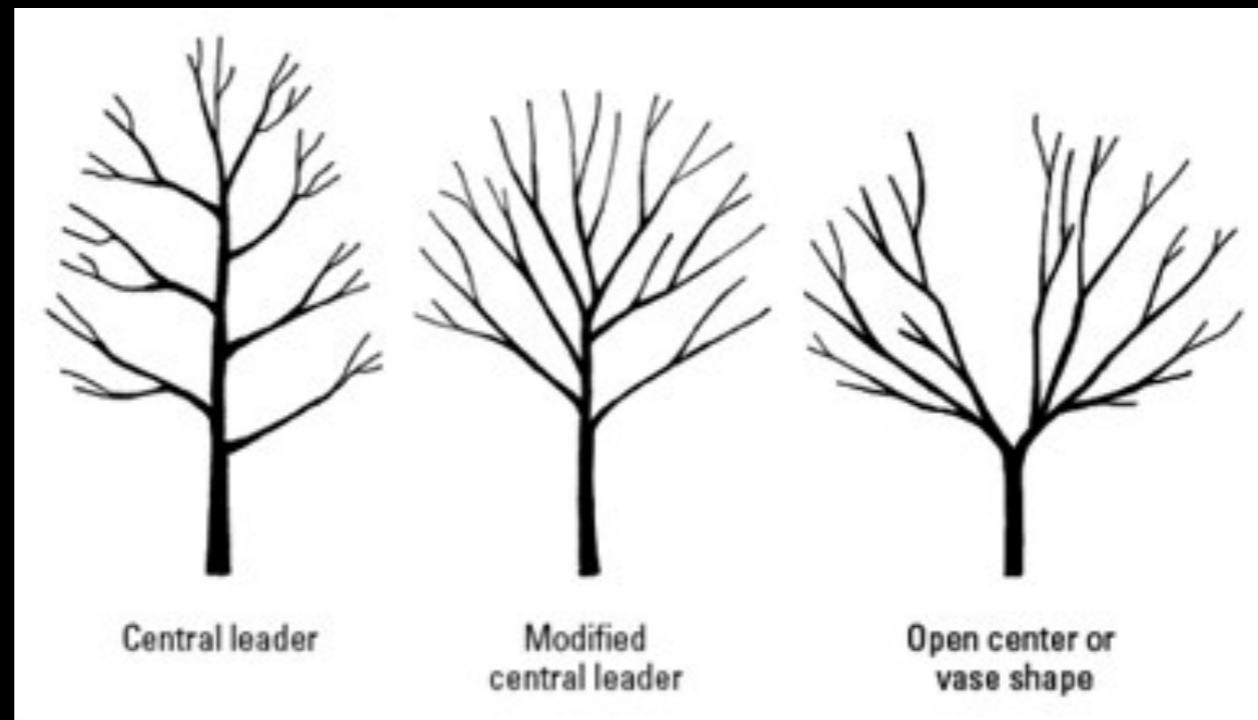
Often used for apples and pears, Asian pears, pecans and quince. Makes a nice shade tree and more traditional looking landscape tree.



A) Bare root at planting. B) First tier of scaffold branches. C) First tier staked into desired position and second tier is established. D) Next year E) Following year. Note the 45 degree angle of branches formed by using spreading bars.

Modified Central Leader

Can be used for apples and pears if fireblight is known to be a problem



Trees are trained to a single, upright trunk with evenly spaced limbs until they reach a desired height, usually 6 to 10 feet. At that point, you prune out the leader and maintain the tree at that height. All fruit trees can be trained to this form. Especially useful for areas with fireblight, one of the main branches can be pruned out if it becomes infected.

Fruit Bush

This method can work for nearly all fruit species. The beauty of this system is its simplicity and ease of management.

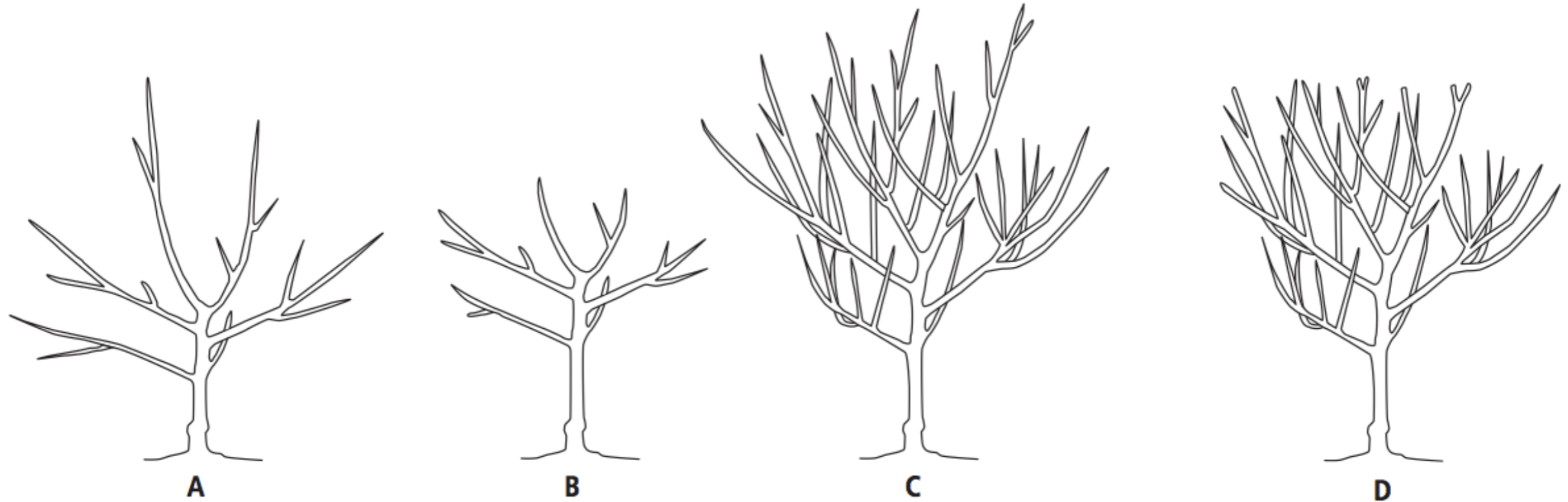


Figure 3. Fruit bush pruning method (leaves removed to show structure). (A) New growth early in the first growing season (late April to early May). (B) Initial heading of new growth. (C) Subsequent new growth following heading (June). (D) Additional growth headed back. Vigorous trees may require pruning one or two more times during the first growing season. Continue heading back each year until the tree reaches the desired height.

Espalier

Espalier is a technique of growing trees into a two dimensional flat plane by grafting, pruning and training.

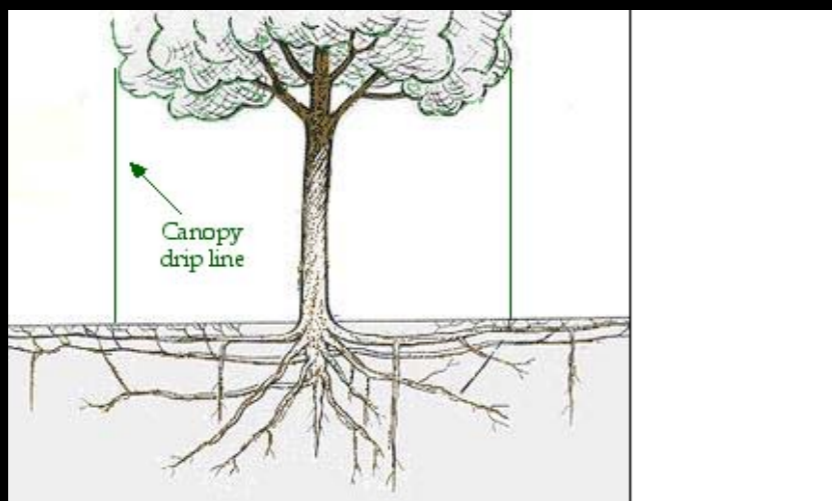
All fruit trees can be espaliered. Labor intensive (**winter prune** for structure, **spring prune** for size control, **summer prune** for fruit load), excellent yields, works well in small areas, allows sunlight to access all of tree.



Citrus

- Young citrus will not require extensive pruning. They will, however, often produce very vigorous shoots that give the tree a wild appearance. These shoots may be pruned back a bit to give a more refined appearance. Be sure to prune off any suckers that arise below the graft or bud union.
- Fruit thinning is not usually required.
- For a large fruiting area, citrus should be trained to be a full skirted tree with the foliage canopy extending almost to the soil line. Citrus can also be grown as a sheared hedge or informal espalier. Pruning is not required to keep citrus productive or attractive. You can, however, prune the branches up higher to make it easier to get under the tree. Try to keep the center somewhat open by removing crossing branches.
- If you do prune, the ideal time is late spring to early summer. Minor pruning can be done at any time, but avoid late-season pruning, which can stimulate excessive tender growth that is likely to be injured by frost. Protect any exposed branches after pruning from sunburn by painting with a 50:50 white interior latex paint and water mixture.

During the summer, citrus will require about 4 to 6 inches of water per month. However, depending upon your soil type, this amount may be divided up into several applications. Ideally, in hot summer climate zones, you may want to irrigate about every 7 to 10 days during the middle of the summer. You may irrigate your trees using a drip system with either two to four emitters per tree or using small microspray emitters. The root zone of citrus is shallow and drippers need to be placed at the base of the trunk of newly planted trees to keep the root ball moist until roots grow into the native soil. Apply water further from the tree trunk as trees become established.



Apply water further from the trunk as trees become established

Fruiting Patterns

Type of tree	Location of fruiting buds				Spur life (years)	Type of training system	Amount of pruning for mature trees
	On long shoots		On short shoot or spurs				
	Laterally	Terminally	Laterally	Terminally			
almond	minor	—	major	—	5	open center	light (thinning)
apple	minor	very minor	—	major	8–10+	central leader, open center, or modified central leader	medium
apricot	minor	—	major	—	3	open center	heavy
cherry, sweet	minor	—	major	—	10–12	open center	light
fig	major	—	—	—	bears on 1-yr and new shoots	open center or modified central leader	various
nectarine	major	—	minor	—	1–2	open center	heavy
peach	major	—	minor	—	1–2	open center	heavy
pear, Asian	minor	very minor	—	major	6–8	central leader or open center	medium to heavy
pear, European	minor	very minor	—	major	8–10	central leader or multiple leader	medium
persimmon	major	minor	—	—	bears on new shoots	modified central leader	light (mainly thinning)
plum, European	very minor	—	major	—	6–8+	open center	medium
plum, Japanese	minor	—	major	—	6–8	open center	heavy
quince	major	minor	—	—	bears on new shoots	central leader or open center	light (mainly thinning)
walnut	minor on young trees	major on young trees	minor on mature trees	major on mature trees	8–10	modified central leader	light (thinning)

What the heck was that last slide about?

- Fruits on spurs

Apples

Apricots

Cherry

Pears

Plums

Walnuts



Fruits on new wood

Citrus

Fig- 2nd crop

Mulberry

Persimmon

Quince

Walnut



Citrus

Fruits on last years wood

Fig- 1st crop

Nectarine

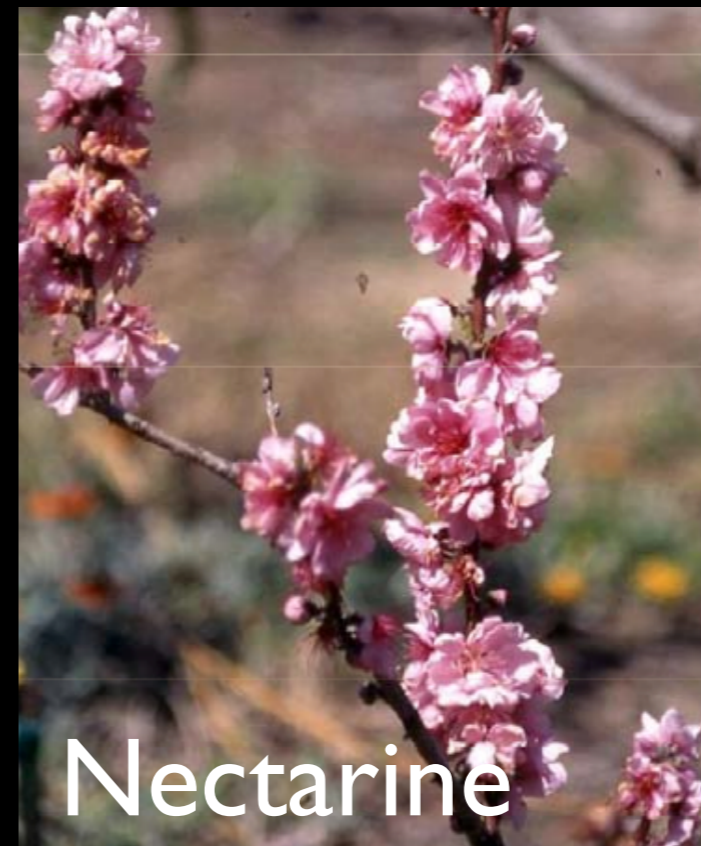
Peach

Pomegranate

Quince



Peach



Nectarine

Apples and Pears

Open center, modified open center or central leader

APPLES, keep spurs six to 10 years.

PEARS, keep spurs three to 10 years.

Prune for structure and fruit spur development annually. Thin out older spurs and fruiting branches to improve light penetration and air circulation.

Prune new shoots back at least two-thirds to an outside-facing bud.

Watch end weight and thin heavily every five years.

Pears produce vigorous upright growth. Thin shoots where crowded.



Common Pome Fruit Insects



- **Codling moth**- *Cydia (Laspeyresia) pomonella*
- Thin fruit so it doesn't touch, that's where the adults lay their eggs
- see Pest Notes: Codling Moth UC ANR Publication 7412

Woolly apple aphid—*Eriosoma lanigerum*

The parasite *Aphelinus mali*, with the help of other natural enemies, can completely control aerial colonies.

Sprays of insecticidal soaps or horticultural oils may control light populations on limbs.

Root-infesting populations cannot be controlled with pesticides.

Where woolly apple aphid is a serious problem, consider resistant rootstocks, such as M111 or M106.



Fireblight

Fire blight, caused by the bacterium *Erwinia amylovora*, is a common and frequently destructive disease of pome fruit trees and related plants.

Removing Diseased Wood

Successful removal of fire blight infections is done in summer or winter when the bacteria no longer are spreading through the tree. Rapidly advancing infections on very susceptible trees (pear, Asian pear, and some apple varieties) should be removed as soon as they appear in spring. In these cases, sanitizing pruners between cuts might be wise. To locate the correct cutting site, find the lower edge of the visible infection in the branch, trace that infected branch back to its point of attachment, and ***cut at the next branch juncture down without harming the branch collar***. This will remove the infected branch and the branch to which it is attached. Sterilize tools between cuts.



Fire Blight Resistance of Apples and Pears

<i>Resistance</i>	<i>Varieties</i>
Apples	
Highly Resistant	Jonafree, Melrose, Northwestern Greening, Nova EasyGro, Prima, Priscilla, Quinte, RedFree, Sir Prize, Winesap
Resistant	Dutchess, Empire, Red Delicious, Goldrush, Haralson, Honeycrisp, Jonagold, Jonamac, Libery, McIntosh, Northern Spy, Novamac, Spartan
Susceptible	Beacon, Cortland, Fuji, Gala, Golden Delicious, Granny Smith, Honeygold, Idared, Jonathan, Lodi, Monroe, Mutsu (Crispin), Paulared, Rome Beauty, Wayne, Wealthy, Yellow Transparent, Zesta!
Pears	
Highly Resistant	Honeysweet, Kieffer, LaConte, Magness, Moonglow, Old Home
Resistant	Seckel, Maxine
Susceptible	D'Anjou, Aurora, Bartlett, Bosc, Comice, Clapp's Favorite, Dutchess

Apricots & Plums



Apricots: Keep fruit buds and spurs for two to three years. Prune for structure annually and prune new shoots back two-thirds. Thin all new shoots at least one third.

Plums and prunes: Keeps fruit spurs five to 10 years. Japanese plums need more pruning than French or Italian varieties. Thin lightly for structure and light. Watch end weight and remove water sprouts and suckers at base as they come up. Avoid over-pruning because much growth and little fruit can be the result.



Silver Leaf-*Chondrostereum purpureum*

Silver leaf is caused by a fungus that infects wood and the water-conducting xylem through fresh wounds. A toxin produced by the pathogen is carried through the xylem to leaves, causing them to turn a silvery gray. As the disease progresses over a few years, leaves curl upward at the edges and turn brown. Eventually limbs, scaffolds, and the whole tree will die.

The pathogen attacks a wide range of woody plants, including many indigenous to riparian habitats such as willow, poplar, birch, and oak. Silver leaf is most commonly found in plums and occasionally in other stone fruit species such as peach

Certain cultural practices help reduce the spread of silver leaf. Avoid excessive and improper pruning, including pruning of large branches that may require long periods for wound healing. Prune young trees in late spring and bearing trees immediately after harvest to reduce the likelihood of infection during rainy weather.



Prune Apricots in August to Avoid Eutypa Dieback



Eutypa lata

Eutypa dieback, also known as *Cytosporina*, gummosis, and limb dieback, causes limbs or twigs to wilt and die suddenly in late spring or summer with the leaves still attached. Rough dark cankers may develop at pruning wounds. The bark has a dark discoloration with amber-colored gumming.

Solutions

Eutypa dieback occurs when fungus spores are spread by rain and infect trees through pruning wounds. Remove infected limbs at least 1 foot below any sign of the disease. Prune during July and August after harvest. Ideally, pruning should be completed at least 6 weeks before the first fall rains. Wound treatments with fungicides, paints, or sealants have not been satisfactory. Cauterizing freshly pruned branches with a hand-held propane burner may prevent infection.

Cherries

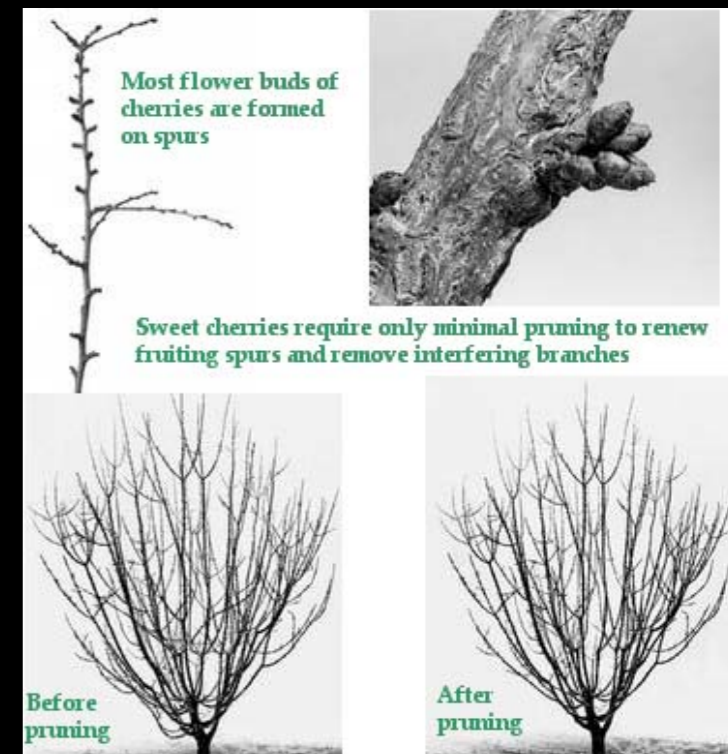
Open Center

Cherries bear fruit on long-lived spurs that are productive for 10 to 12 years.

Pruning consists mainly of thinning out interfering branches, removing dead and diseased branches, and thinning out new shoots lightly each year.

If it is necessary to keep the tree to a smaller size, occasionally thin back to strong growing side branches. Once fully established, mature cherries will require very little annual pruning. Most major pruning is done during the dormant season. Pruning in summer will have a greater dwarfing effect on the tree.

Proper pruning can help prevent diseases such as powdery mildew and bacterial canker. Do not overprune as this may lead to sunburn, which may make trees susceptible to borers.



Peaches & Nectarines

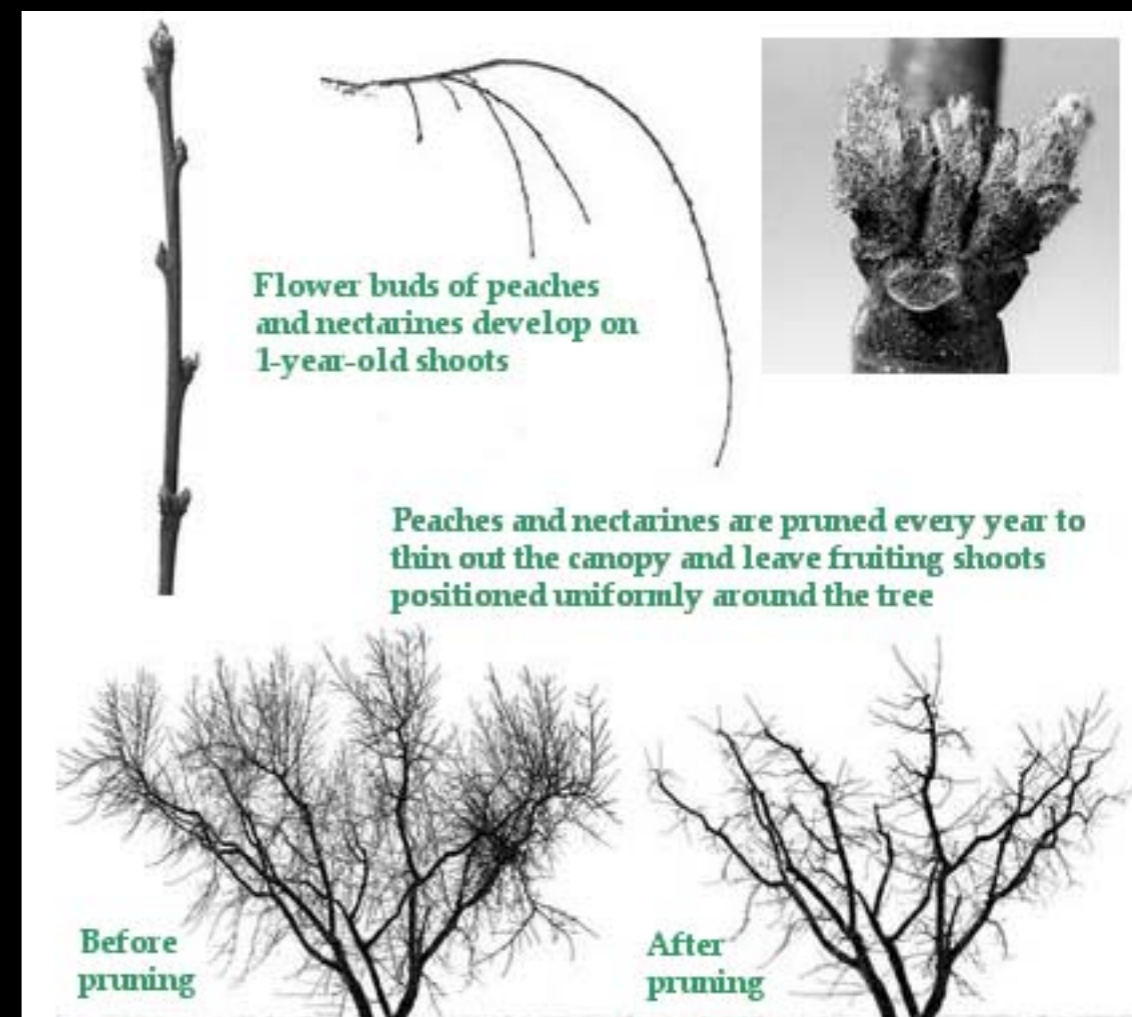
Open center

Fruit will bear on last year's wood and on small spurlike growths.

Prune back new growth by two-thirds.

Thin to encourage good structure, and don't allow lateral branches to get too long; otherwise they will crack or break under a heavy fruit load.

Thin the young tree and place braces as crop ripens.



Peach Leaf Curl - fungus *Taphrina deformans*

To prevent peach leaf curl, use resistant peach and nectarine varieties where possible. For nonresistant varieties, treat trees with a fungicide every year after leaves have fallen. Generally a single early treatment when the tree is dormant is effective, although in areas of high rainfall or during a particularly wet winter, it might be advisable to apply a second spray late in the dormant season, preferably as flower buds begin to swell but before green leaf tips are first visible.

Resistant Varieties

A few peach varieties are available that are resistant or partially resistant to leaf curl. Currently available resistant varieties include Frost, Indian Free, Muir, and Q-1-8.

The peach cultivar Frost is reportedly very tolerant but must receive fungicide applications the first 2 to 3 years. Redhaven peach and most cultivars derived from it are tolerant to peach leaf curl, whereas Redskin peach and cultivars derived from it range from susceptible to highly susceptible to the disease. There are fewer resistant nectarines, although Kriebich is one such variety.

