Xtremehorticulture
CONSULTING

Training and Pruning of Fruit Trees

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Preparing your equipment for pruning
Pruners should be bypass type. Hand shears, loppers and pruning saw are needed.

- *Sharpen*. Sharpen only one side of the blade. Pull the stone or file at a consistent angle along the beveled edge three or four times.
- *Adjust and Lubricate*. Tighten or loosen the adjustment nut that holds the pruners together. If the pruner is not tight enough, the shears or loppers will rip or tear the branch. If the pruner is too tight it creates early fatigue of the hands and arms.
- *Sanitize*. Wash the blades free of dirt and grease. Alcohol is sprayed or wiped on the cutting blades. Alternatively, a butane cigarette lighter can be used to sterilize the cutting edges.

Pruning Cuts. There are two types of pruning cuts; *thinning cuts* and *heading cuts*. Thinning cuts are made where two branches come together.

Thinning cuts totally remove one branch without leaving a stub. Thinning cuts allow more light into the canopy. 95% of all pruning cuts made are thinning cuts.

Heading cuts are made anywhere along a branch NOT where two branches come together. Heading cuts remove part of a single branch. Heading cuts cause less light to enter into the canopy.

Most productive branches that produce fruit are at 45 degree angles to the ground. Branches growing at 45 degree angles should be preserved or created whenever possible. Branches are less productive if they grow vertically (upright or downward).

Thinning cut

When to use thinning cuts. Thinning cuts remove growth on a limb so that competing growth is improved. Growth which is removed may be crossing other limbs, broken, blocking sunlight, growing too close to other branches or at an inferior angle.

- Use a thinning cut to maintain trees small. Tallest limbs are identified and lowered to the proper height.
- Use a thinning cut to remove limbs at the bottom of the tree so fruit does not rest on the ground.
- Use a thinning cut to remove limbs from orchard aisles to allow for machinery and equipment to pass.

- Use a thinning cut to remove limbs from the perimeter of the tree so people can work without knocking fruit off of the branches.
- Use a thinning cut to remove limbs from the center of the tree for improved light penetration and easier picking.

When to use heading cuts. Heading cuts force new growth immediately below the cut. Normally 3 to 4 new stems grow below one heading cut. Heading cuts increase the density of a tree and reduces sunlight inside the tree. Heading cuts should be used with caution.

Heading cut

- Use heading cuts when stems are long and weak. Heading cuts strengthen week stems. If last year's growth is more than 60 cm long, cut it back to about 45 cm with a heading cut.
- Use heading cuts to force fruiting spurs to grow along a stem. Spurs are forced to grow starting about 30 cm below a heading cut.
- Use heading cuts if a thinning cut cannot be done.

When to Prune. The major concern with pruning during summer months is damage to limbs and fruit by intense sunlight (sunburn or sunscald). Commercially there are two acknowledged times for pruning; during the winter months after leaf drop (dormant pruning) and immediately after spring growth (summer pruning). The following pruning can be done anytime.

- Prune any time of the year with a hand shears.
- Remove young new growth any time of the year.

Remove growth that interferes with machinery or equipment any time of the year.

18-year-old Gold Kist apricot

- Reduce growth that causes intense shading any time of the year.
- Major limb removal (primary or secondary scaffold limbs) should be delayed until winter months.

Pruning to Control Size. Some fruit trees can be kept much smaller than their mature size by using dwarfing rootstocks and aggressive pruning (apple). Many fruit trees can be kept small by aggressive pruning alone. Smaller tree size makes spraying, pruning and harvesting simpler and cost-effective.

Trees of small size allow more trees to be planted on each hectare. More trees on each hectare gives higher yield in a smaller area.

Spacing between small trees can be 3 ½ m apart in a medium high density orchard. Planting closer than this may require trees to be grown in hedgerows or trellising. The distance between rows depends on machinery and equipment movement. But in kitchen gardens this distance could be as close as 3 ½ m as well. When planting close, triangular spacing may be best.

Pruning to control size can begin before leaf drop but after growth has stopped. This is usually September or October. Tree height can be maintained between 2 ½ to 3 m.

Training the Tree's Structure. Fruit trees are typically trained either in open center or modified central leader form. The primary difference is where scaffold limbs originate on the tree. Primary scaffold limbs grow directly from the trunk. Secondary scaffold limbs grow from primary scaffold limbs. Tertiary scaffold limbs grow from secondary scaffold limbs. Whenever possible scaffold limbs should be pruned in two dimensions.

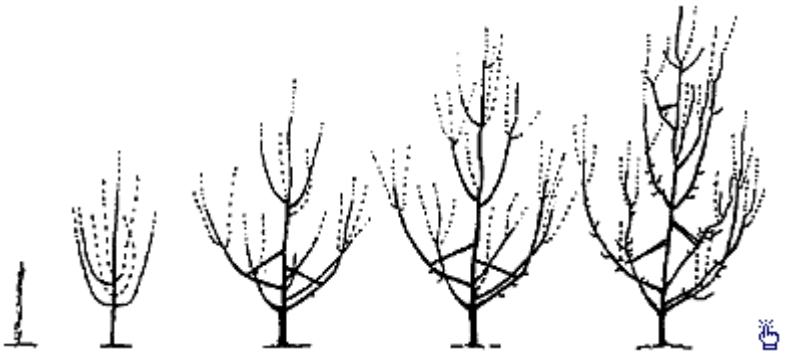
The purpose of scaffold limbs are to support and space fruit, limbs, stems and leaves. When pruned correctly, scaffold limbs support and space the fruit throughout canopy of the tree where it can be easily harvested.

Open center form

- Scaffold limbs should start as low as possible on the trunk without allowing fruit to touch the ground.
- Scaffold limbs should be grown at 45 degree angles to permit optimum sunlight penetration. Sunlight penetrating inside the canopy produces higher-quality fruit.

Open center form:

Normally no more than 5 or 6 primary scaffold limbs should grow from the trunk. Primary scaffold limbs should grow from the trunk in different directions like spokes on a wheel.



Modified central leader form

- Lowest scaffold limbs are grown at 60 cm.
- Highest scaffold limbs should be no more than about 80 cm above the soil.

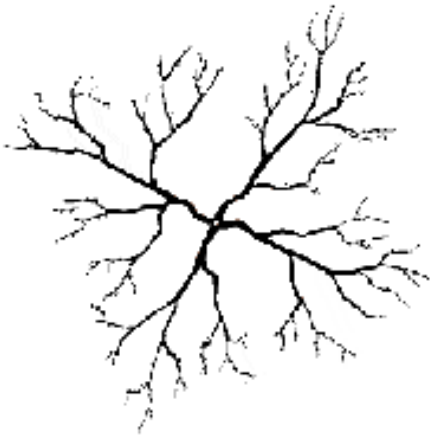
- Prune branches far enough apart so fruit can hang in the tree without getting bruised or scarred by other branches and sunlight can penetrate inside the tree.

Modified central leader form:

- Lowest scaffold limbs are grown at 60 cm.
- Scaffold limbs are normally 45 cm apart vertically.
- Prune branches far enough apart so fruit can hang in the tree without getting bruised or scarred by other branches and sunlight can penetrate inside the tree.

General Pruning for All Fruit Trees

Prune any time of the year:



- Remove branches or stems from the aisles
- Prune so you can work around a tree
- Remove dead, broken or a crossed branches.
- Remove new growth
- Prune to reduce shading

Pruning late summer, early fall or winter

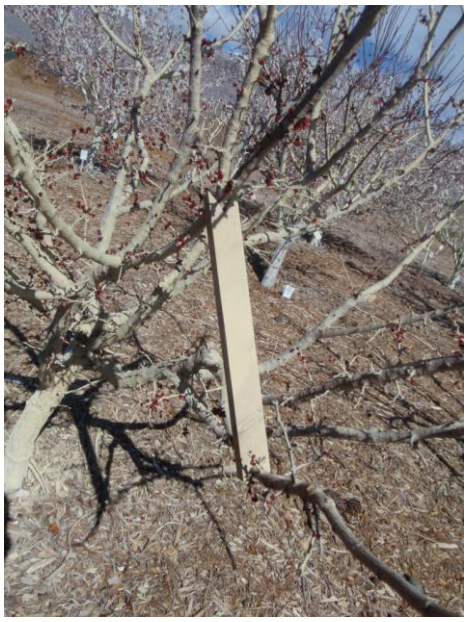
- Prune to reduce height and size
- Remove strong vertical growth

Winter pruning

- Remove unnecessary scaffold limbs
- Cut back young growth more than 60 cm long to 45 cm

Training the Tree: establishing its architecture

- Begin pruning at the bottom of the tree work upwards.
- Primary scaffold limbs should radiate from the trunk. Growth from scaffold limbs should fill the canopy of the tree 360°.
- Secondary scaffolds limbs should grow at 45° from horizontal.
- Remove strong vertical growth coming from the secondary scaffold. Secondary scaffold limbs should grow in two dimensions from primary scaffold limbs.
- Prune secondary scaffolds limbs far enough apart to space stems, leaves, and fruit and allow sunlight to penetrate. Trees growing large fruit (example: apples) need more space between secondary scaffold limbs than trees growing small fruit (example: apricot).



Limb spreader

Spacing Limbs for Better Light Penetration

Fruit trees grow toward light. The best angle that balances limb growth with fruit production is 45°. The upper limbs of most fruit trees will grow at angles of 60° or more. Limbs that grow at 60° from horizontal grow more rapidly and produce less fruit than limbs growing at 45° from horizontal.

Two fruit trees which have an abundance of limbs which grow at about 60° are plums and pears. By correcting this problem we improve light penetration inside the canopy which results in increased production and improved fruit quality.

Limbs lower in the canopy grow at angles less than 60° because of shading. Limbs lowest in the canopy grow at angles less than 45°. These limbs grow more slowly than limbs at 45° or 60°. Limbs growing at angles less than horizontal (0 degrees) are normally removed through thinning cuts because of their low yields.

Through pruning and management we can encourage limbs to grow at the best angles for fruit production. The two methods we use to accomplish this are pruning and applying limbs spreaders.

Limb spreader

Limbs spreaders. Limbs spreaders are inexpensive devices which can be placed between limbs that can decrease the angle of growth. Limbs spreaders are used to encourage scaffold limbs to grow at 45° angles. This is done to primary scaffolds in the tree during the first 2 to 4 years of its life.

Limbs spreaders can be used on secondary scaffolds as the tree matures. If wood is older than three years, limbs spreaders may cause limbs to break. Limbs spreaders are best used in the spring of the year when new growth is just beginning. Limbs spreaders can be removed and reused after one season of growth.

Pruning. Pruning can also encourage limbs to grow at 45° angles. By pruning vertical growth through thinning cuts we can encourage greater limb angles. A second method is using a heading cut on young growth, cutting to an outside bud and removing inside buds with your fingers.

Pruning of Peach and Nectarine

Pruning of peach and nectarine is different from other fruit trees for one important reason. Much more wood must be removed every year from peach and nectarine than other fruit trees. The primary reason for this is where fruit is produced compared to other fruit trees.

15-year-old peach in bloom

Many fruit trees produce their fruit on short stems that are modified for fruit production called spurs. These fruit bearing spurs can last for many years and so they must be protected from damage. Peach trees produce fruit from flower buds growing on last year's wood. Each year peach must produce new wood for a new crop of peaches. Healthy peach trees produce more new

wood than is necessary each year. New wood must be reduced by 50% each pruning season.

New wood in peach is reduced in two ways. First is by removal of new growth by using thinning cuts. The second way is to reduce the length of new wood. After removing wood by thinning, the remaining wood may need to be shortened by using heading cuts. If new wood is longer than 60 cm, it should be headed back to 45 cm.

Peach trees are very susceptible to sunburn and the insects and diseases which follow. Removal of wood that shades scaffold limbs should be done in the dormant season.

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)