



ROOTS of PEACE

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The Gardener



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Commercial Horticulture and Agriculture Marketing Program (CHAMP)

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Reason for Pruning Fruit Trees

The pruning of fruit trees is one of the most important activities in determining the yielding capacity of the tree. Its importance relies on four aspects:

- To develop a strong and sturdy framework.
- To maintain the desired shape of the tree for light interception, fruit development and easy operations.
- To manage the balance between vegetative and generative growth the tree.
- To control pests and diseases

There are three main types of pruning activities:

Shaping the fruit tree: Done to develop scaffold branches on the young tree, which can support heavy loads of fruits and facilitate accessibility for tree management.

Selective pruning: Done to balance vegetative and generative growth of the tree.

Rejuvenation: Done to keep matured trees productive and healthy.



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A monthly newsletter for the agricultural community

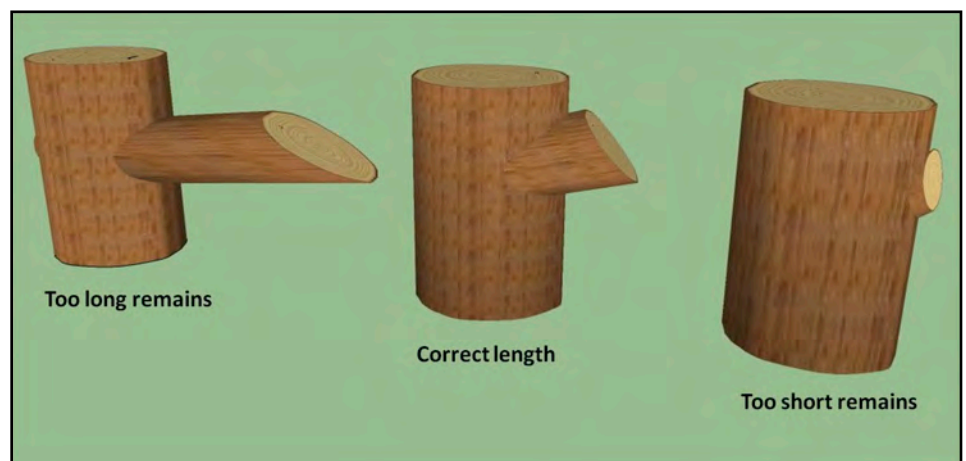
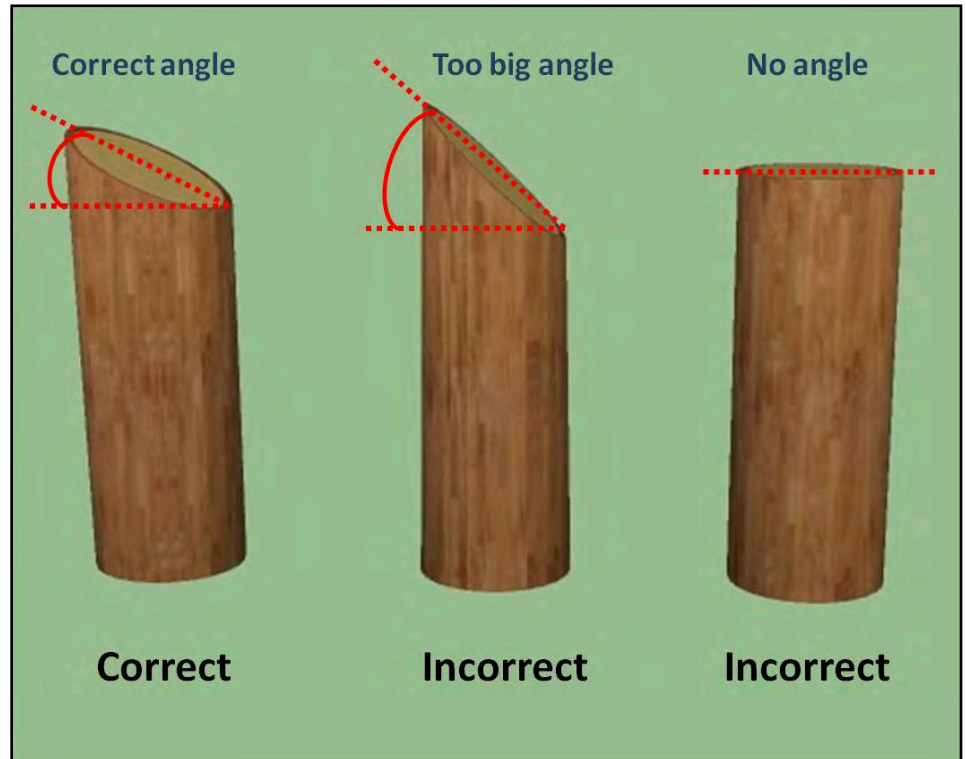
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General Rules for Pruning

There are some important rules to follow on how to properly prune fruit tree. Small branches should be cut just above a healthy bud. The bud should be pointed outward and away from the tree so the branch will not grow into the center of the tree. The preferred pruning cut is at a 45° angle across the branch. Larger branches should be cut close to the trunk. The cut should be a sloping cut, so it facilitates the run off of water. If the water does not run off, the branch may rot. If the farmer completely cuts down the branch, the bark may tear. If the cut is too far from the trunk, the branch may rot. To remove large branches the recommended procedure is to make two cuts; one cut on top of the branch, and another cut underneath the branch. Saw part way up the branch from beneath, then saw down on the branch from above until the two cuts meet. This will keep the branch from breaking off and tearing the bark.



Plant Growth and Pruning

The branch of a tree can have two types of dominance; top dominance, and basal dominance. Top dominance (Apical dominance) means that a bud on the end of the branch sprouts and grows stronger than the others. If the top bud (Apical bud) is removed, the other buds will sprout. The top bud sprouts out before the others, when the branch position is vertical or has an angle on the horizontal line greater than 30° . When the branch position is horizontal, the basal dominance overrides the top dominance. In this scenario, the branches that are closer to the base of the branch are stronger and larger, and possess a greater vigor to grow. When the position of the branch is about 30° in relation to the horizontal line, the two dominances work equally strong, therefore, the buds sprout out in a uniform manner along the branch length.

The branch can be cut back to many different lengths, with the tree reacting differently according to the length of the tree and the length of the branch. The length of branch, once cut, directly correlates with the strength of production of the shoots; if more of the branch is cut off, then more shoots will emerge. Longer branches are weakened in sprouting, and stronger if striped of buds (bald up). Longer branches also contain more productive buds than shorter ones. Cutting a branch too short reduces the number of productive buds.

Commonly used cut back methods are:

- Cut back to $2/3$ (radically increases yield capacity).
- Cut back to $1/2$ (cutting back to the middle section).
- Cut back to $1/3$ (decreases yield capacity, but stimulates vegetative growth).

The complete removal of strong branches stimulates the generative characteristics; meanwhile the partial cut back of these branches stimulates the vegetative characteristics of the tree.

An additional activity of the pruning process is to manipulate the position of the branches and shoots. There are different methods available:

Staking: Support structure which contains an approximately 1.2 m long wooden or bamboo stake.

Trellising: Commonly used for training of grape, granadilla, and other fruits.

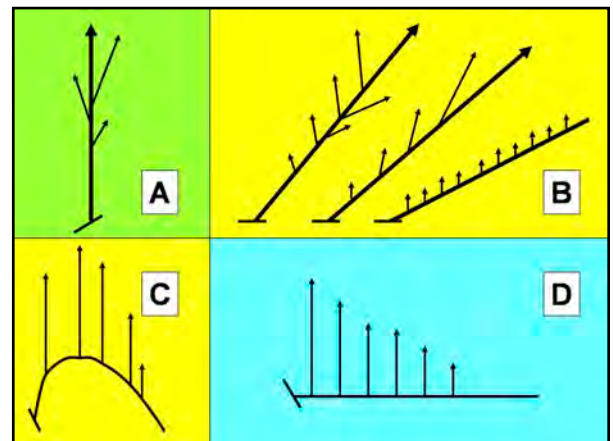
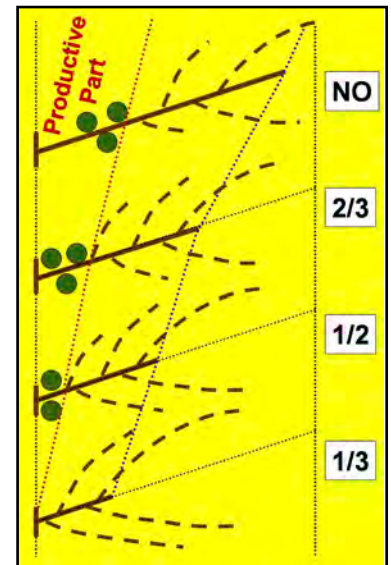
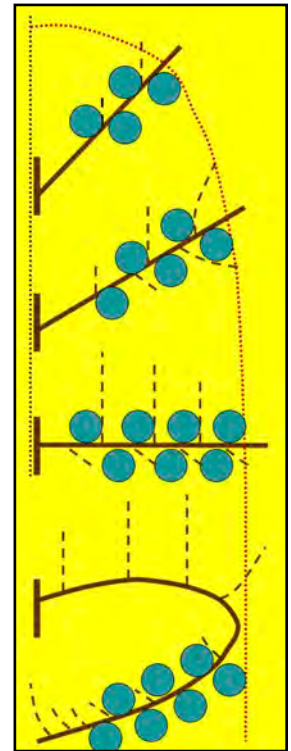
Spreading: Spreading branches with a wide and strong cloth, and angled using a cloth pin.

Propping: A stake or support structure placed beneath or against the branch to keep it from breaking or shaking.

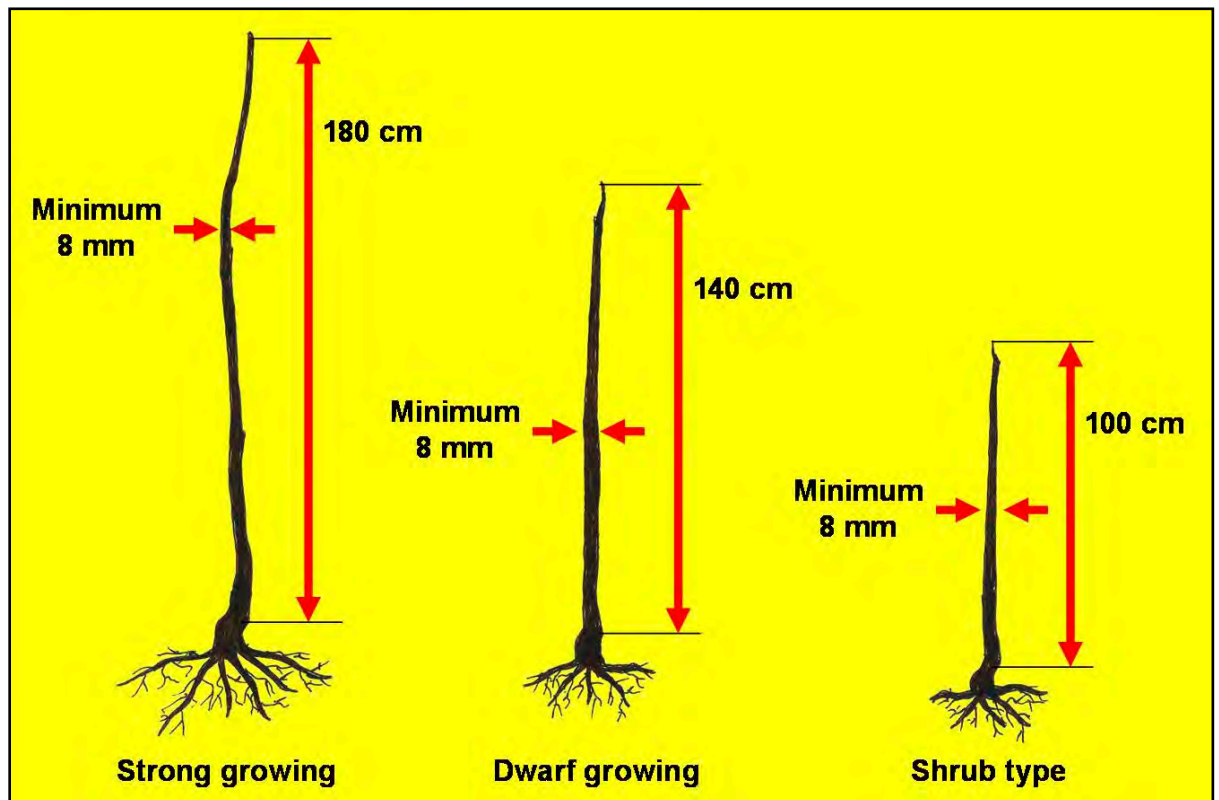
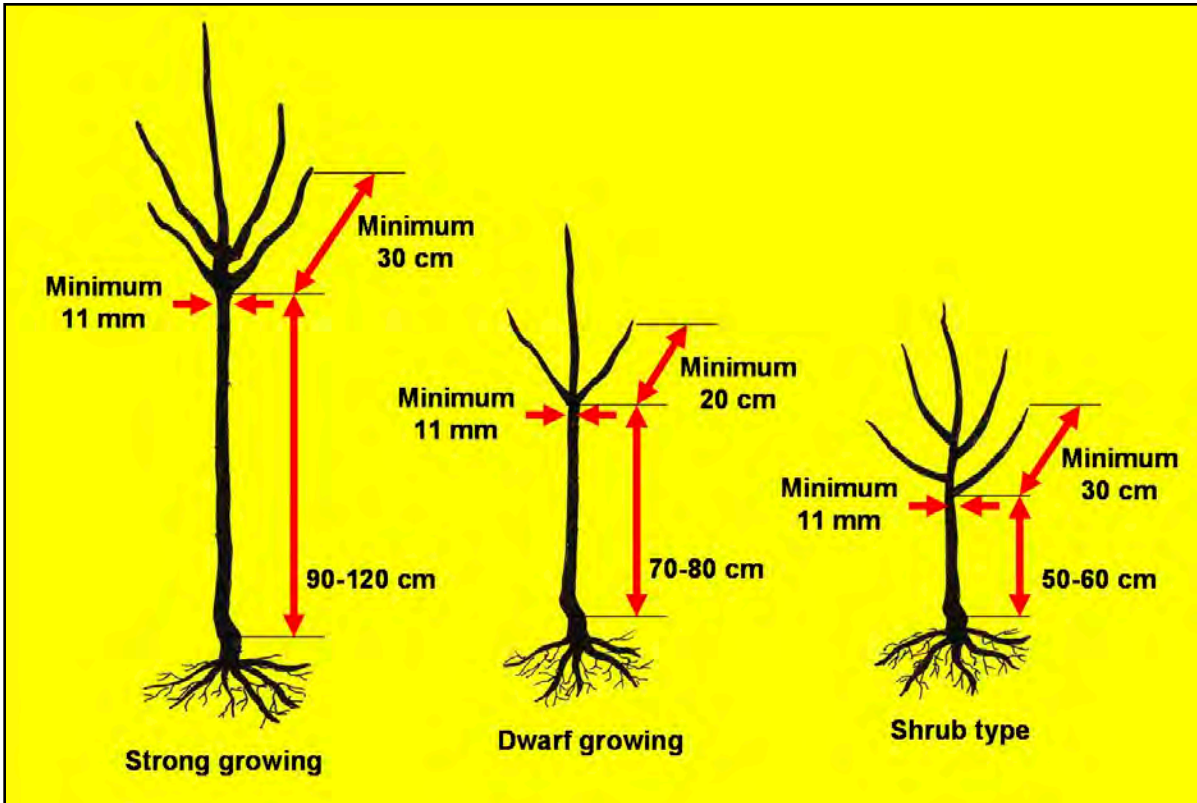
Planting in angle: The sapling is planted at an angle of 30° – 45° to the horizontal line. The budding point of the sapling is placed at a depth of 10–15 cm into the soil. In this way, the scion is also rooting into the soil and gradually takes over the role of the rootstock.

Tying down: Method which is used for the formation of hedge. It uses a support structure similar to the trellising method.

Arching: The branches are turned back forming an arch.



Sapling Standards

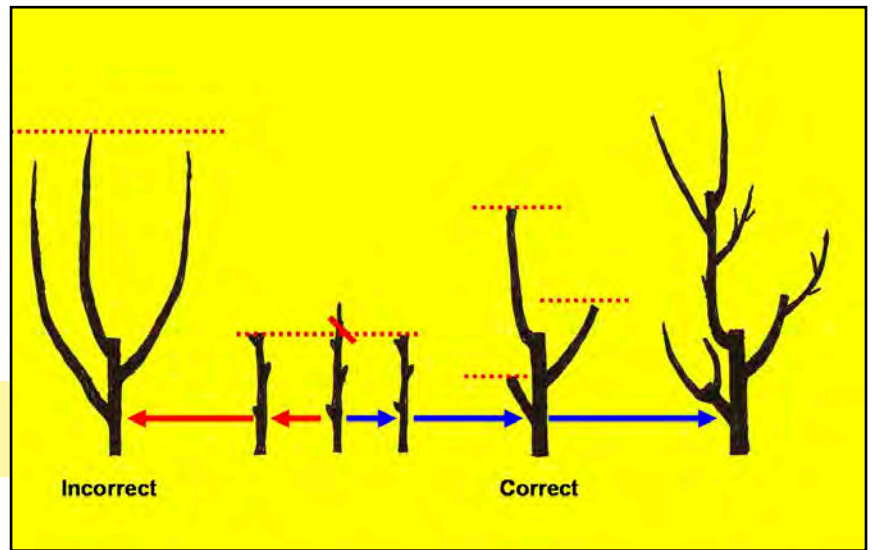


Start Pruning

Before cutting, make sure that the bottom half contains at least four buds—if not, cut above the fourth bud. The first pruning should occur immediately after planting. Make sure you know if you have a one or two year old tree. A one year old tree should be pruned immediately after planting—cut off the top half of the trunk with a sharp pair of secateurs.

The central leader system is used for apple, pear, sherry, fig, quince, and morello trees. This system keeps the trees like a Christmas tree with layers of lateral branches around the central branch.

The open canopy system is used more for peach trees, but is also frequently applied to almond, apricot, cherry, fig, nectarine, peach, plum, and prune trees.



Traditional Canopy Shapes

Natural canopy is commonly used for citrus, walnut, and chestnut. For these trees, allow them to naturally grow their branches. Pruning activities should mainly concentrate on the removal of branches that grow in the wrong direction. Sometimes thinning the branches is also necessary to lighten the inside of the canopy, and to facilitate additional ventilation. Also remove any damaged branches that are either physically damaged, or damaged by diseases.



Training Fruit Trees: Central Leader System

First year planting: For this system, start with a sapling that has 3–5 lateral branches. In the first year pruning, head back the central branch to half or a third of its length. If the tree has 4–5 lateral branches, remove the highest, strongest branch, or the lowest, weakest branch. Position the lateral branches at a 45° angle, spreading them if necessary. When cutting back the branches, make sure to consider the angle of the branch. If the angle is less than 45°, cut back for a downward positioned bud. Cut back the lateral branches when they grow up to 60–90cm length. These primary branches will form the first layer or

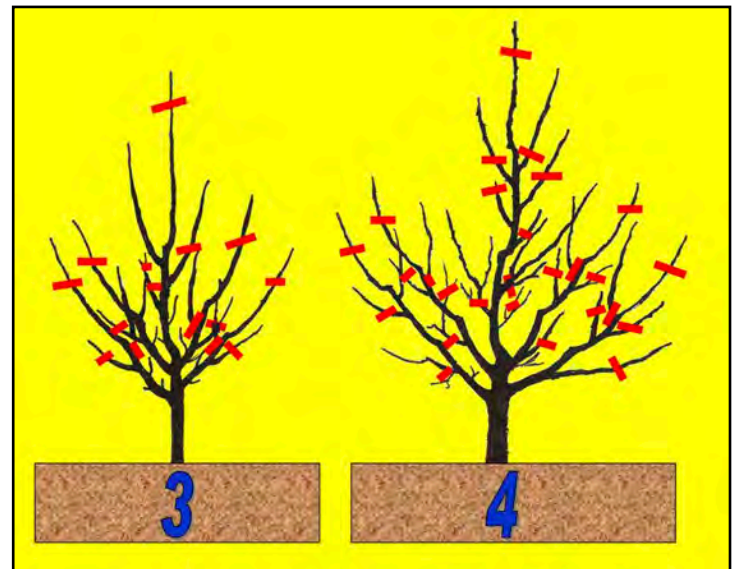
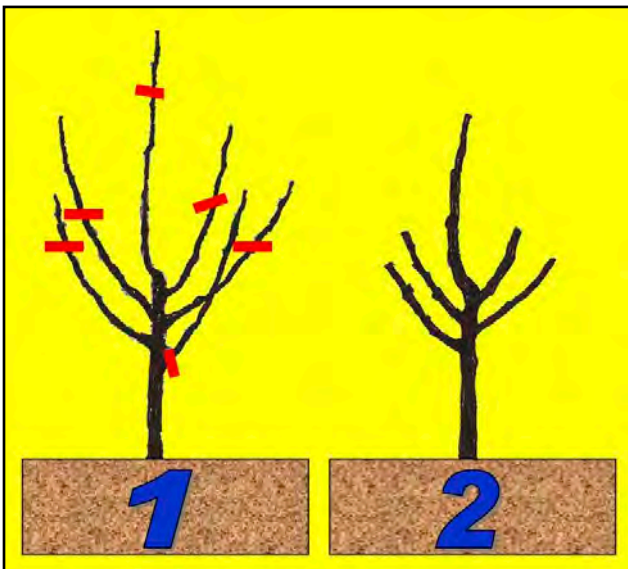
tier. From the shoots, cut back the strongest ones to 1/3. The remaining buds will be on the first 1/4 of the branch. During the selection of the shoots, keep more stronger shoots than weak ones.

Second year pruning: During the second year, the tree will replace the removed parts. Because of this, it is unlikely that there will be the chance to form the second tier. Therefore, the main activity will be to fill up the space of the first layer.

Third year pruning: This is the year to form the second tier of the tree.

The second tier's branches should be offset vertically from those of the first tier. Between the two tiers, the distance on the leader branch should be 50–100 cm. The leader branch should be cut back to 4–5 buds. Remove all branches that grow facing the inside of the canopy (or crossing).

Fourth and Fifth year pruning: The formation of the third, or sometime fourth tiers follows the same process as the previous ones. The branches of the lower tiers should always be wider than those in the upper ones. Make sure to thin the branches on a regular basis.



Training Fruit Trees: Open Canopy System

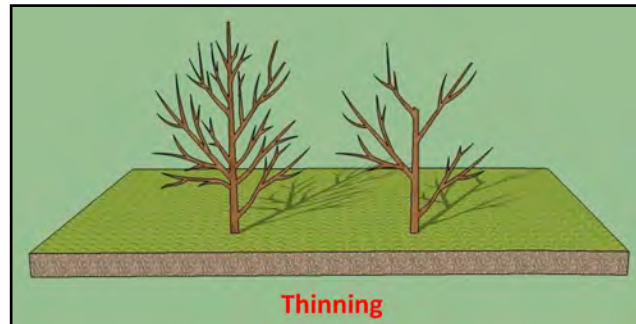
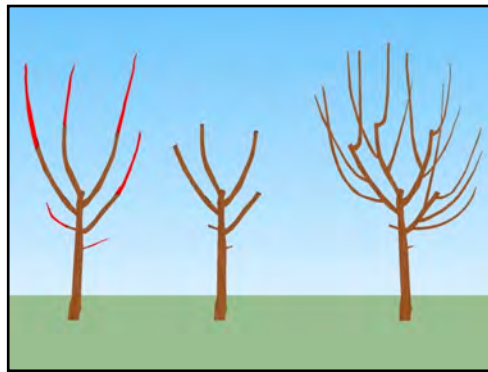
First growing season: At the beginning of the first growing season, select 3–6 shoots that will become the primary scaffold branches, and cut back all other upright shoots to 10 to 15 cm long—the leader should be removed. These scaffold branches should be spaced apart vertically, and should be distributed evenly around the trunk. The lowest branch should be about 50–60 cm above the ground.

If the scaffold branches grow vigorously, they should be cut back to 60–70 cm length during early summer time. The primary scaffold branches should grow at 30°–45° angles. Do not select scaffold limbs that grow directly above one another. Avoid upright limbs that are attached with narrow, acute angles, because they tend to be weak at the point of attachment. Flat or horizontal limbs should be avoided

as scaffold limbs, but they can be used if new shoots coming from them are directed upward and outward. If the sapling is weak, cut back the lateral shoots to one bud, and remove the leader shoot. If the sapling does not have lateral shoots, the central shoot should be cut back to the most vigorous buds.

Second and third year planting: Select 3–4 primary scaffold branches if this was not done the previous summer. During the second year, select 5–7 secondary scaffold branches that fill the space. Head back the secondary scaffold branches at 60 to 75 cm long, to develop two to three “tertiary” branches from each secondary branch. Ideally, two branches should originate from each primary. Heading back the primary scaffold branches encourages secondary scaffold branches to grow from them.

Fourth and Fifth year planting: During this period, another 10–12 tertiary scaffold branches will be selected to form the vase shape of the tree. All strongly upward growing branches and shoots should be removed.



Pruning Fruit Bearing Trees

The pruning of fruit bearing trees is related more to the productivity and care, than to forming the structure. The main reasons for pruning these trees are: to achieve and maintain a high yield; improve the quality of the fruit; balance vegetative and productive growth; facilitate better ventilation inside the canopy; facilitate proper light distribution inside the canopy; control pests and diseases.

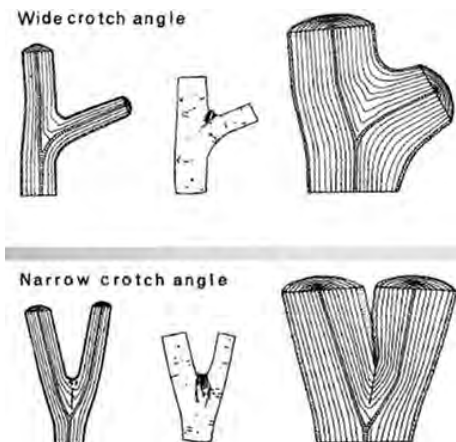
During the pruning process of fruit bearing trees, the producer should avoid strong heading cuts made in the previous years. This is because the previous year’s work carries flower buds. On the other hand, all of the following should be pruned: dead woods; suckers; water shoots; inward, rubbing or crossing shoots; low hanging, overcrowded or unproductive shoots; shoots infected with pests or diseases. For optimal and proper light distribution, the upper and outer parts of the tree should be pruned. The trees for scion production should be pruned more severely to induce vegetative growth. Here the more frequent use of a head cut is justified.

The two main types of pruning cuts are “heading” or “heading back,” and

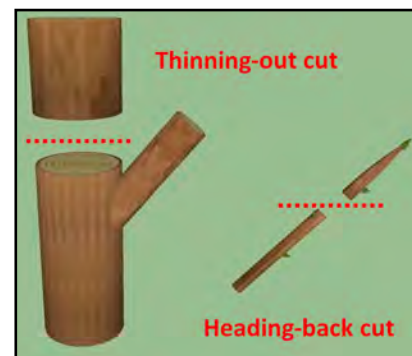
“thinning” or “thinning out.” Trees respond differently to these cuts:

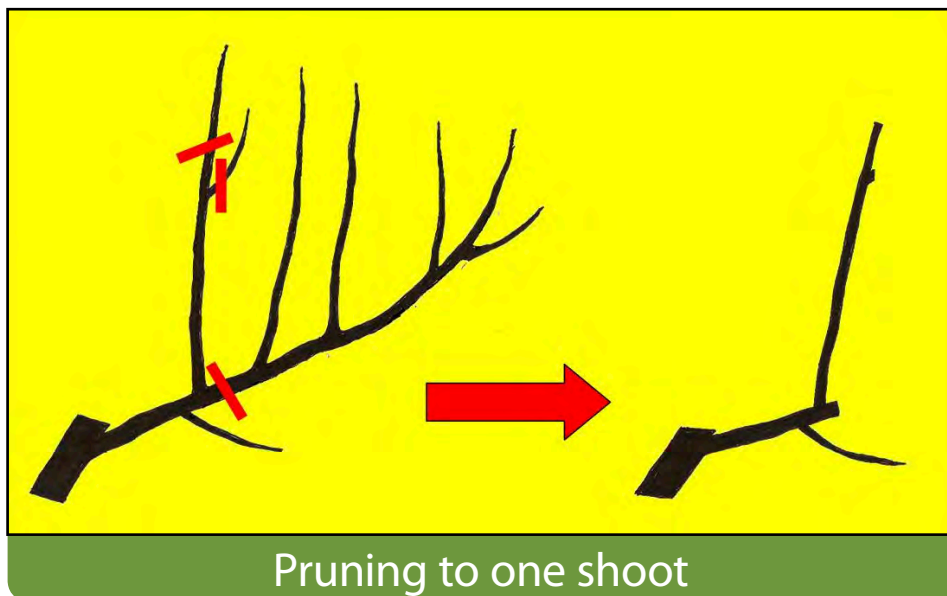
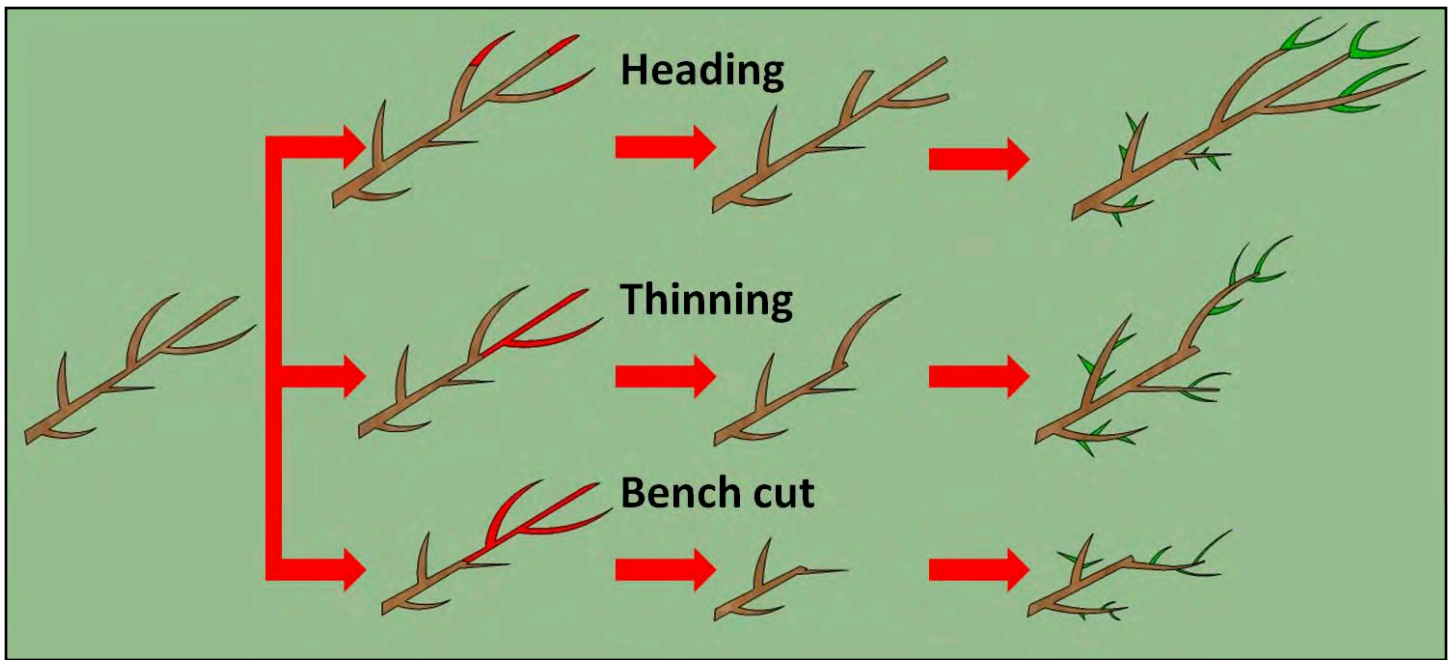
Heading cuts: Heading back is cutting the plant back to a stub, lateral bud, or small lateral branch. Depending on the severity of pruning, heading back results in flush, vigorous, upright and dense new growth from just below the cut.

Thinning cuts: Thinning is removing a lateral branch at the bottom where it attaches, or shortening a branch’s length by cutting to a lateral large enough to “take over the job” of the terminal limb. A woody plant responds to thinning by becoming more open, but retains its natural growth habit, and does not usually produce a flush of new vigorous growth from the cut. Foliage grows deeper into the tree because more light can penetrate the canopy. Except when trees are newly planted, pruning cuts should be mostly thinning cuts. Thinning removes branches completely, while a heading cut removes the end of a shoot. From the sixth winter onwards, in order to prevent the tree from becoming bare in the center, cut back two branches each year to wood that is three years old. This will cause new

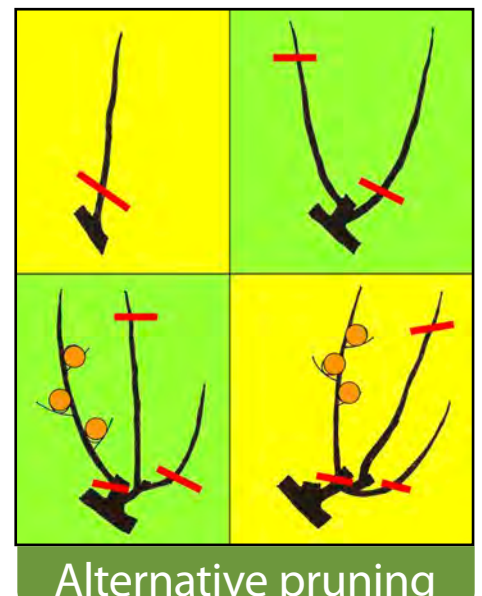


branches to grow on the inside of the tree. The selection of the fruit bearing shoots and the pruning of them is a crucial factor in yield capacity and quality. There are three main types of methods. The peach tree is a good subject to learn all three types.





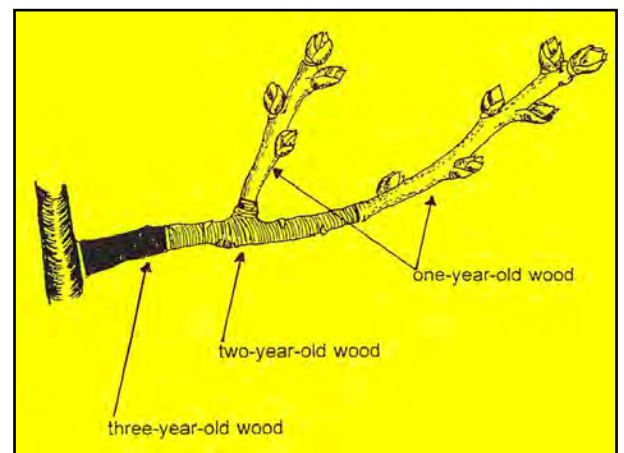
Pruning to one shoot



Alternative pruning

The main concept of alternative pruning is to develop the fruit bearing shoots close to the scaffold branches. During the dormant season pruning, leave two shoots: one bearing shoot, and another called the fallow shoot. Cut back the bearing shoot to 3, 5, or 7 buds (spurs) and the fallow shoot to 2–3 well developed buds. During the next growing season, select two shoots (green selection) from the shoots that grew from the fallow shoot, and remove all of the other shoots. These two will be the new fruit bearing shoots—the top shoot, and the new fallow shoot (under the new bearing shoot). The previous fruit bearing shoot will be removed after producing fruits. Using the method of pruning

to one shoot, means that we keep only one shoot, and we cut it back to 3–5 buds. In this way, not only the fruiting buds will produce fruit, but the bottom part of the shoot is stimulated to produce new shoots. During the next year, cut back the fruit bearing shoot in the same way. This method can only be applied to cultivars that have flower buds on the bottom part of the shoot.



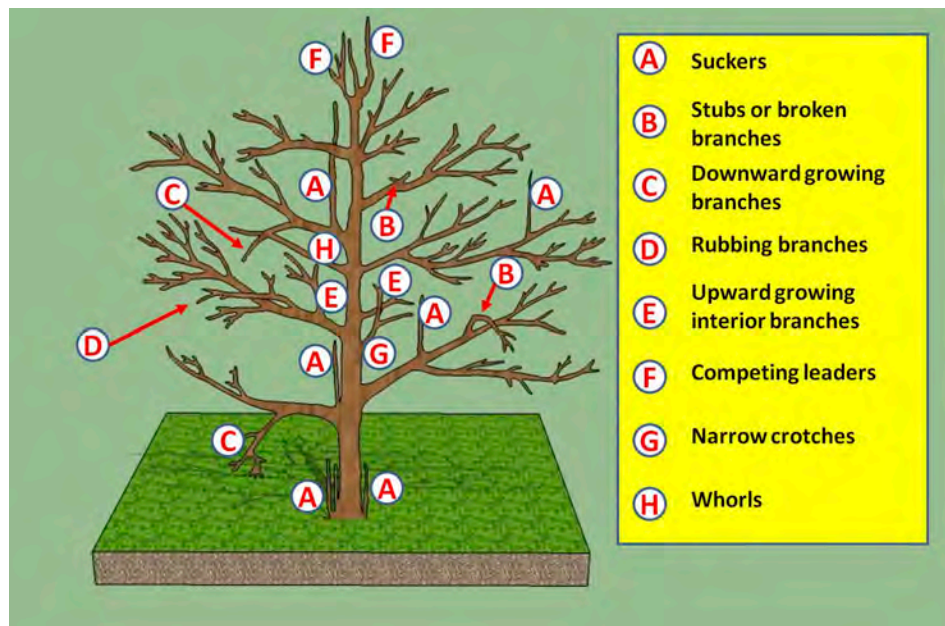
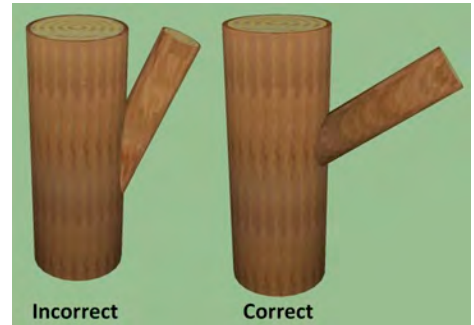
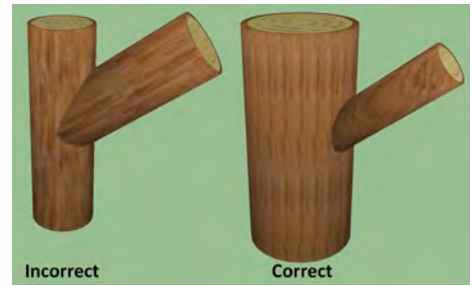
Thinning fruits is an important activity that results in higher quality fruits. Sometimes the tree is overcrowded with fruits; a situation that is not in balance with the nutrient availability and the capacity of the tree to mature them. Different types of trees vary in this respect. Peach, plum, and apple trees need more fruit thinning, while citrus and pear trees need less.

Thinning fruits should follow the following procedure:

- Fruit thinning should take place during the first 6 weeks of fruit set.
- Shaking the tree before thinning helps to dislodge unfertilized fruits.
- During the initial thinning, malformed, overcrowded, and paired fruits should be pruned.
- Short stems in apple trees should be pruned drastically.
- A maximum of 2–3 fruits are allowed to be kept per cluster.

The following list contains the main general recommendations for pruning practices:

- If pruning is taking place during the dormant season, the ideal time period is the late dormant season.
- Summer pruning is advised to remove water sprouts, suckers, and infected wood.
- Only use wound dressing for cuts that have a diameter more than 4–5 cm.
- Prune the upper layer of the canopy more heavily than the lower one.
- Prune on a horizontal plane, and remove any branches that hang downward or rise straight upward.
- To reduce length, it is preferable to use a thinning cut rather than a heading cut, which causes excessive shoot growth.
- Remove all branches with narrow crotch angles (they are always weak branches), crossing branches, or upright water sprouts.
- Remove all broken, dead, or diseased branches on a regular basis.



The suggested pruning cut locations are:

- Suckers
- Stubs
- Downward growing limbs
- Rubbing and crossing branches
- Shaded interior branches
- Competing leaders
- Narrow crotches
- Whorls