

Traditional orchards: formative pruning of young trees

This note provides guidance on why young fruit trees require formative pruning and on how to prune them. The main part of the guidance applies mainly to apples and pears, in particular dessert varieties. The final section explains the main differences when pruning other fruit trees. Other notes provide guidance on site and tree selection, planting and establishing fruit trees, an introduction to pruning, maintenance pruning, the restoration and management of mature and neglected orchards, fruit tree health, and orchards and wildlife. For an explanation of terms used in this leaflet see the information note *Orchard glossary*.

Key points

- All young fruit trees require formative pruning to develop a balanced shape. The amount of work will vary according to the type of fruit tree.
- This work involves pruning young growth back to encourage the tree to grow in the right direction and develop thick branches.
- The eventual aim is to develop an evenly spaced, open network of branches above the height of grazing livestock and/or machinery.
- Stone fruits do not respond to pruning as well as apple and pear trees so their formative pruning should be kept to a minimum.
- The style of pruning and final tree shape varies across the country. Trees should be pruned to the shape and style of those found locally.

Background

Formative pruning, or training, is the initial pruning of a young tree to develop a balanced shape. During this time the aim is to create a strong branch framework forming a healthy tree that will crop well in the future. This is the most important period of pruning during the tree's life. If carried out incorrectly the tree will require lots of corrective work in later years. Young trees that are not pruned may develop thin, vertical, overcrowded, crossing and badly placed branches. These may be unable to support the weight of the fruit produced and bend or break. The ideal is to create strong, well spaced laterals

(horizontal branches which will bear the leaves and fruit) to support the weight of the fruit and ensure it gets as much sun as possible to ripen.

How to formatively prune

When planting trees on vigorous rootstocks in existing orchards, whether they are standards or half-standards, the first aim is to begin developing a framework branch structure that will eventually support the laterals at a height above the reach of livestock. To prevent browsing damage, branches in horse or cattle-grazed orchards must be formed at a higher height than those grazed only with sheep. This needs careful consideration even if livestock are initially not used to graze the orchard, as they may do at some point in the future. The need to allow access for machinery also need to be taken into consideration.

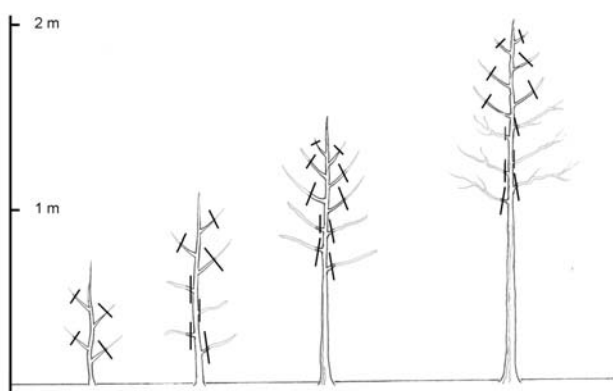
The height of the central leader (trunk) does not increase from the base as the tree grows: only the girth increases. Therefore the height at which each branch forms remains the same throughout the tree's life. This means the only way to raise the height of the laterals is by removing them in favour of higher growth. As doing this may compromise the shape and balance of the tree it is important to begin forming the branches so that they attain the right height while the tree is still young.

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With standard trees, this height is reached by the formation of a trunk. To create half-standard trees, the trunk is stopped lower down and the resulting two or more branches (secondary leaders) developed as long tall arches to create a multi-stemmed tree.

Until the desired stem height has been reached and the first branches are developed, the aim is to establish a leader by removing competing stems. Initially, therefore, the central leader is left unpruned. If the stem or bud becomes damaged, the central leader may grow weakly: in this case it can be cut back to a healthy, well-placed side shoot which will develop into a new leader. The same can be done if it grows too vigorously, to help build up a thick, strong trunk. If necessary the new leader can be staked for the first year to encourage it to grow upright.

In the first winter any side shoots (feathers) are cut back to leave snags 50-75 mm long (with 2-3 buds, Diagram 1). In second and subsequent winters, new feathers are cut back to 50-75 mm and previously pruned snags cut back to the trunk (Diagram 2). Feathers are progressively shortened and removed from ground level upwards each year to give a clear stem to the desired height (Diagrams 3 and 4).



Diagrams 1 – 4

This process encourages the stem to thicken and builds a strong trunk to support the head of the tree. Removing the feathers earlier, without 'snagging', produces a thinner, weaker stem. The feathers need to be removed eventually, or

they may grow up and compete with the main branches or grow around and through the tree guard. If browsed by stock they may be torn off to the trunk which could then weaken the tree.

Any growth from the rootstock should be removed as it will direct the trees energies away from the grafted variety.

Forming the first branches

The branches of each tier will all join the trunk at slightly different points, having developed from alternating buds. In practice it is best to leave at least 20 cm of trunk between each branch (bearing in mind their eventual thickness). If the branches all start from the same height, it puts an increased strain on the trunk at that point as they grow. The height at which the first tier of branches should be developed depends on the type of rootstock and form required: on standards the first tier should be developed at 1.5-2.1 m (Diagram 5).

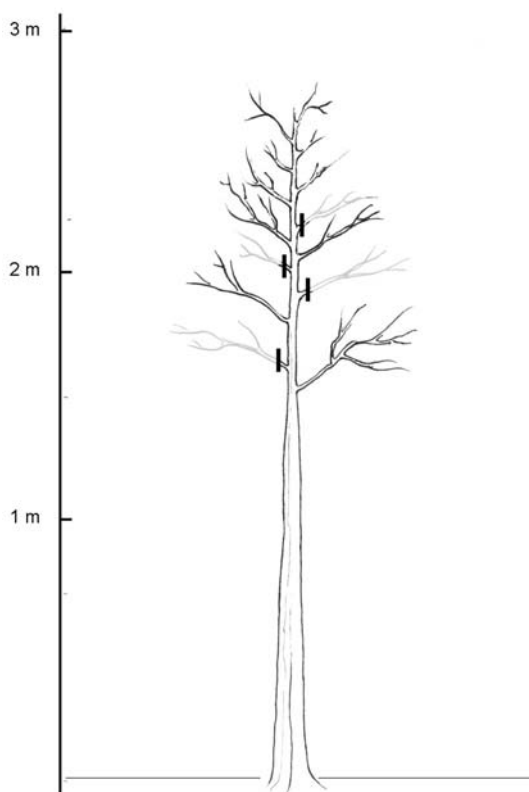


Diagram 5

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On half-standards this can be at any height below this almost down to ground level (Diagram 10). Approximately three to six evenly spaced secondary leaders that have formed wide angles with the trunk (which will ensure a stronger growing joint) should be pruned back by half (two thirds for weak shoots), to an outward-facing bud. These will form the first tier of branches. The remaining secondary leaders can be removed (Diagram 6).

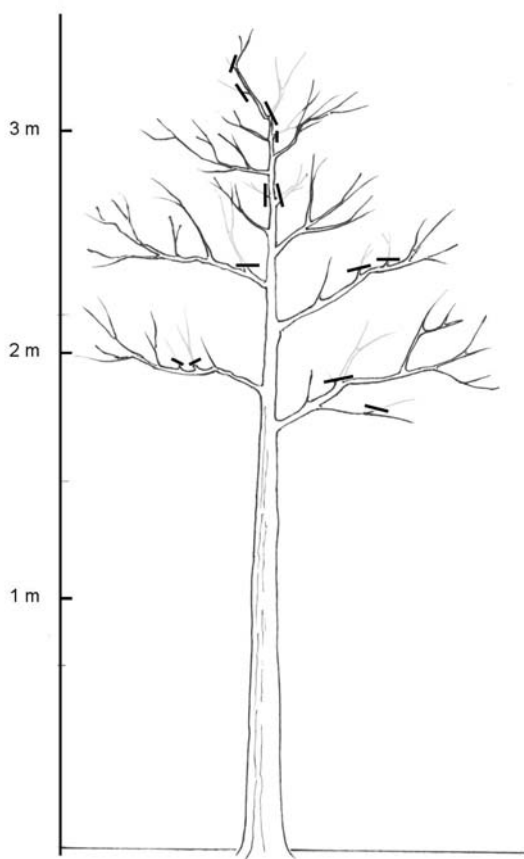


Diagram 6

Forming subsequent branches

From now on the aim is to develop a balanced branch system with an open habit. This will allow light in and air to circulate. The eventual aim is to have 4-8 evenly spaced main branches radiating from the trunk like the spokes on a wheel if viewed from above (Diagram 7). These will form the framework from which the fruit-producing side branches and spurs will develop.

During the first few years the pruning will be relatively severe in relation to the amount of wood present on the tree. Generally speaking, the leader of each branch should be reduced each year by between a third and a half of the season's growth. Thin shoots should be pruned to short spurs of one or two buds only. This will stimulate new vegetative shoot growth.

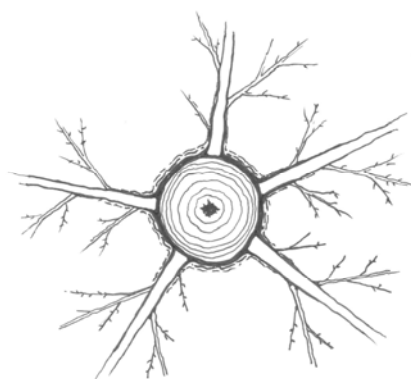


Diagram 7

The style of pruning and final tree shape varies across the country. When creating an open centred (goblet-shaped) tree, the central leader is removed once it has developed beyond the height of the first tier and several strong branches have begun to form below it (see Diagram 8).

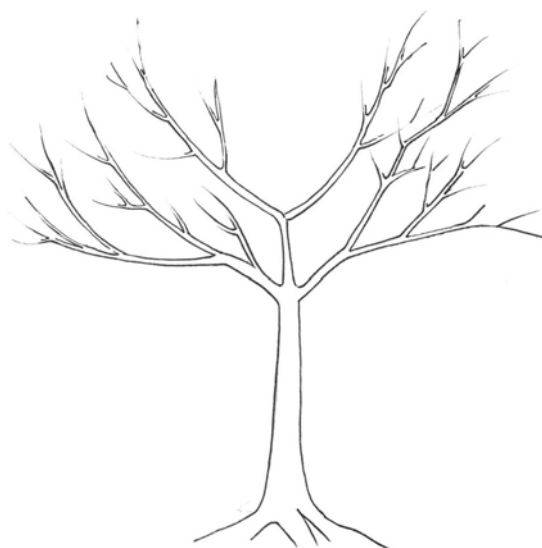


Diagram 8

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This encourages the tree to put its energies into these branches which will now form the main framework branches (secondary leaders).

When creating a delayed open-centred tree, the central leader is left to grow on and the process of branch selection repeated, to form further tiers of branches higher up the trunk.

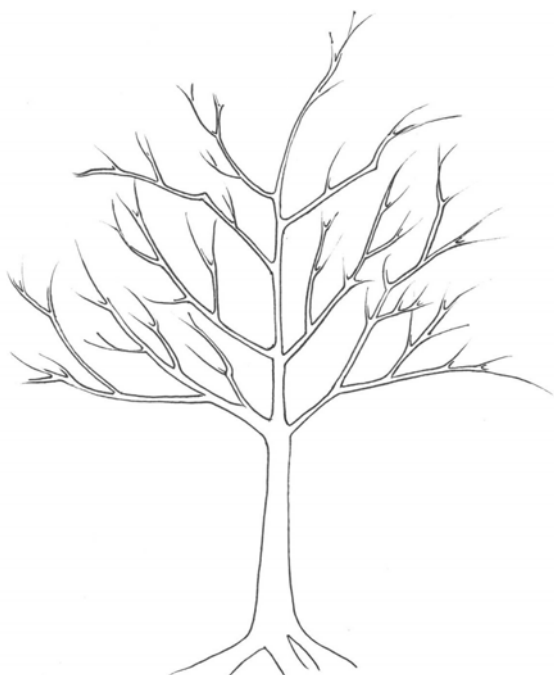


Diagram 9

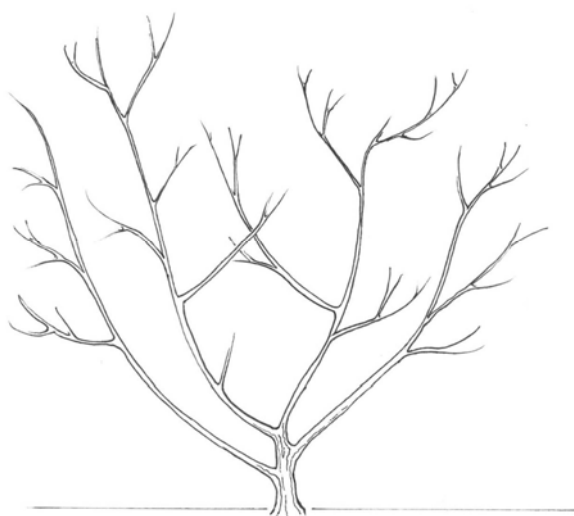


Diagram 10

Each tier will therefore have fewer branches, with the consequence that the main branches will be spaced further apart, and higher up, the trunk (Diagram 9).

Because the first branches are formed lower down on the trunk when creating a half-standard tree, they are developed at a more upright angle than the secondary leaders on a standard tree. This raises the laterals and leafy growth to the desired height, effectively forming 'mini-trunks' growing out at different angles. The required number of 'spokes' may then be formed from these branches if necessary. (Diagram 10).

Forming the crown of the mature tree

The basic shape of the tree takes about 8 to 10 years to form. After this the main emphasis of pruning moves towards the development of fruit bearing growth (for information on this see *Traditional orchards: maintenance pruning*).

Pruning is confined to removing diseased wood and selectively thinning, shortening or removing shoots and branches that are weak, crossing or growing back towards the centre of the crown to maintain its shape.

Pruning to different shapes

Formative pruning is not a regimented process and can be varied according to the growth of the individual tree. Different varieties have different growth habits, which should be allowed for when developing their shape. Some have a bushier habit than others, losing their dominant leader. Pears have a more upright growth than apples. The important objective is forming an open, balanced network of strong, unshaded branches above the height of grazing livestock and machinery: the method is of secondary importance. Selection of species and varieties and the form and shape of tree developed should be guided by orchards in the local area.

Formative pruning of stone fruit trees

The above guidance applies mainly to dessert apples and pears. Stone fruit trees do not respond as well as pears and apples to continuous pruning, so it is best to try and keep this to a minimum. However, all young fruit trees still have to develop a clear trunk and a

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balanced shape. They benefit from allowing light and air in, and removing branches which are crossing, weak or diseased.

To prevent excessive growth it is advisable to cut the end off the leader shoot when the tree is about 2 m tall and to shorten the ends of spreading branches to keep the tree within manageable dimensions. This should be done in the summer months to prevent Silver Leaf infection.

Formative pruning of cobnut trees

The traditional practise for cobnuts is to grow open-centred trees about 2 m high. Six to eight wide-angled framework branches are developed on a central stem (or sometimes a multi-stemmed bush) about 60 cm high. Shoots and wands below this height are removed. The central leader should be shortened once it has reached 1.1 m. As the tree grows, some of the central branches can be cut away and others shortened to reduce their dominance in favour of more desirable, outward-facing buds or branches.

After about six years the tree should have developed its goblet shape. After this point the aim is to maintain the framework branches, removing crowded and upright growth and producing an ongoing supply of new cropping wood - the shorter, weaker branches which can be removed rotationally over the years.

Further information

This information note is aimed at managers of traditional orchards and agri-environment scheme land management advisers. Other Natural England Technical Information Notes include:

- *Traditional orchards: a summary*
- *Traditional orchards: site and tree selection*
- *Traditional orchards: planting and establishing fruit trees*
- *Traditional orchards: an introduction to pruning*
- *Traditional orchards: maintenance pruning*
- *Traditional orchards: restoration and management of mature and neglected orchards*
- *Traditional orchards: fruit tree health*
- *Traditional orchards: orchards and wildlife*
- *Traditional orchards: glossary*

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