

Traditional orchards: an introduction to pruning

Pruning is the practice of cutting out unwanted woody material from a tree. It is essential to develop a balanced tree in its formative years. Thereafter most trees need on-going pruning to produce quality fruit and to maintain structure and balance. This information note provides guidance on the reasons for, and the basic principles behind, the pruning of fruit trees. Other information notes in the series provide further guidance on pruning and on other aspects of orchard management. For an explanation of terms used in this leaflet see TIN021 *Orchard glossary*.

Key points

- Pruning fruit trees is an important part of maintaining their health and keeping a balance between vegetative growth and fruit production.
- Pruning cuts should be clean without torn or damaged edges and placed to avoid leaving stubs which will die back.
- Branches forming strong, wide angles should be favoured. Branches with narrow angles and included bark should be removed.
- Pruning should never remove the branch collar, as this helps the wound to heal.
- Tools should be kept clean and sharp.
- The right tool should always be used for the right task: eg loppers or secateurs should not be used where a saw is required.

Reasons for pruning

Fruit trees, as with any other tree, will grow quite happily and produce fruit without any pruning. However, there are a number of good reasons for pruning fruit trees:

Preserving old trees

Old trees have significant wildlife and cultural value and should be maintained wherever possible. Pruning can rejuvenate them, restoring vigour and prolonging their life.

Shaping young trees

Formative pruning is necessary to develop a strong framework of branches capable of bearing the weight of future crops.

Managing the size and shape of the tree

Unpruned trees can develop large overcrowded crowns of criss-crossing branches and twigs. These trees are susceptible to damage and to being blown over in winter storms. Large crowns can also lead to the tree being rocked, which damages its roots.

Pruning can restrict the height and/or spread of the tree within its allotted space and balance its shape. It can also make the fruit easier to pick.

Removing branches that are damaged, crossing and badly placed

The wind can cause close or touching branches to rub against each other, so damaging the bark and exposing the cambium layer leaving it vulnerable to disease. Touching branches may even graft together. Removing crossing branches and damaged wood reduces the risk of disease and encourages the development of stronger, better positioned branches.

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Letting in air

Increasing air-flow through the branches encourages healthy leaf growth and minimises the effect of fungal infections and air-borne diseases.

Letting in light

Removing overcrowded branches allows sunlight to penetrate more easily into the tree. This encourages the development of large, healthy leaves and fruit buds throughout the tree, thereby increasing the yield and quality of the fruit by allowing it to colour and ripen fully.

Balancing vegetative growth and fruit production

Unpruned trees tend to produce large crops of small, poor quality fruit at the expense of new growth. Pruning helps maintain a balance between vegetative growth and fruit production. Cutting back to old wood causes dormant buds to break and grow out as shoots, encouraging new growth where it is required.

Generally fruit grows best from lateral (horizontal) branches on wood that is 2-5 years old. Pruning to control the age and position of cropping wood improves fruit yield and quality. Thinning growth with fruit buds and spurs to regulate their number and position will also concentrate growth in fewer but larger and healthier fruits.

Pest and disease control

Many diseases and fungal infections such as silver leaf, canker, scab and mildew can be cut out to prevent their spread. This also reduces the need for sprays which may also kill off wildlife.

There is a difference between decaying wood and diseased wood, however (see TIN019 *Restoration and management of neglected orchards*). Dead or decaying wood is not necessarily a sign of poor health or disease and so there should not be a presumption to automatically remove such material, particularly as it forms valuable wildlife habitat (see TIN020 *Orchards and wildlife*).

Grafting material

Prunings can be used to provide material for new trees helping to perpetuate old, local or rare varieties.

Tools

Five tools are useful for pruning fruit trees:

Pruning knife

These knives (generally penknives with a large, curved blade) are suitable for cutting young shoots no thicker than 10 mm. They are also useful for tidying around the edges of larger cuts.

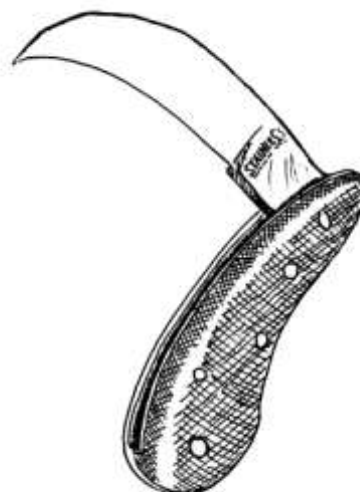


Figure 1 pruning knife

Secateurs

These are the best tool for shoots up to 20 mm in diameter. Bypass (two-bladed) secateurs work like scissors, with one blade slicing past the other; these should be used in preference to anvil secateurs, where a single blade cuts against a flat surface, as these can bruise the stem.

When using secateurs the cut should be made as deep into the jaws as possible and always with the narrow blade towards the trunk to avoid leaving a stub behind. If necessary, the secateurs should be turned upside down or used from the opposite direction to achieve this.

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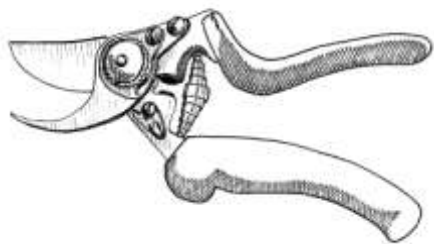


Figure 2 secateurs

Loppers

These are effectively large secateurs and are useful for stems up to 30 mm thick. Long or telescopic-handled loppers are particularly useful when reaching high branches and can be used to tackle slightly thicker branches.

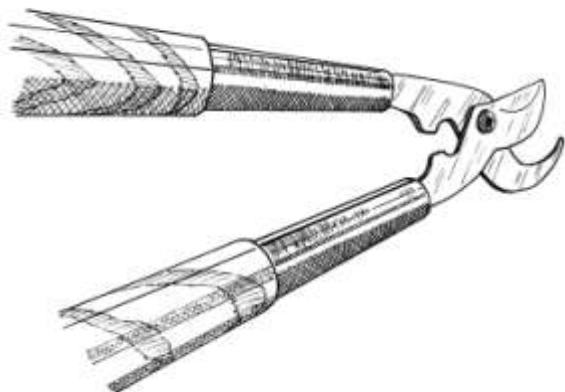


Figure 3 loppers



Figure 4 telescopic-handled loppers

When using loppers or secateurs, cuts should always be made with single, swift action. Hacking at overlarge stems and branches or twisting the loppers should be avoided as this will leave a ragged cut and crush and damage the stem (and also damage the tool).

Pruning saw

Modern pruning saws have folding, disposable blades that lock open or shut. They are razor-sharp, leave a cleaner cut than bow-saws and should be used on bigger branches up to 80 mm in diameter. Pruning saws with extra-long handles are available for higher branches.



Figure 5 pruning saw



Figure 6 long handled pruning saw

Bow saw

Branches from 80-150 mm in diameter are best tackled with a bow saw. Anything larger than this should be left to an expert with a chainsaw.

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Figure 7 bow saw

Using tools

With all tools it is important to keep the blades sharp and clean. Blunt blades will make the job physically harder and leave messy wounds. Cuts should be clean and straight to minimise the area of exposure and hence the risk of infection. Gloves are essential when using saws to protect hands from cuts. Goggles and a hard hat may be worn as protection from falling branches.

When using a ladder, one with extra supporting legs are preferable, and ideally another person should be present to steady it. If large branches or tall trees are to be pruned it may be better to call in a tree surgeon.

Disinfecting tools

Pruning tools should be carefully cleaned to avoid the spread of plant diseases. When moving from tree to tree the blade should be sterilised between each cut, particularly if any trees are diseased. The disinfectant can be one part of household bleach to ten parts of water or straight rubbing alcohol. The blade should be dried off before re-use. To prevent corrosion, tools should be rinsed in water and dried at the end of the day's work.

How to prune

Minor pruning: the basics

A pruned stem will not grow back in exactly the same direction it was growing in before. Instead, it will grow in the direction that the bud immediately below the new cut faces. As most fruit trees produce buds growing in a whorl up the stem, the direction of the new growth can be manipulated by pruning back to a bud that is

pointing in the desired direction. As the normal aim is to encourage horizontal growth away from the tree's centre, this will usually be to an outward-pointing bud.

How to make small pruning cuts using secateurs or loppers

Pruning should always be to just above a bud. This is the growing point and any material left above it will die back leaving a potential source for disease and infection to enter the tree.

Cutting back above a bud encourages the bud to grow. Plant hormones force the top bud to be a sink for nutrients and so it is from this bud that most of the next season's growth will occur. The lower buds will only produce limited growth or remain dormant. Similarly, removing a dominant shoot will cause the shoot below it to take over in its place.

All cuts should be clean and must not bruise the stem or leave ragged or torn edges, as these will increase the chances of disease or infection entering the wound. Cuts should be made close to a bud, but not so close as to damage the bud or create a weak point when it grows. If the stem or bud is damaged when cutting, it should be cut back to a lower bud.

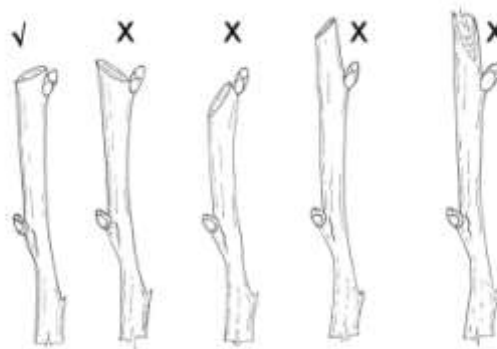


Figure 8 minor pruning correct and incorrect cuts

A stub should not be left above the bud as this will die back and increase the chance of disease or infection entering. Cuts should be made at 30° to the stem and sloping away from the bud. This reduces the risk of rot by minimising the surface area of the wound and encouraging water to run off the wound away from the bud.

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Diseased growth should be removed completely. Cutting back to clean material is necessary to remove the disease or infection, otherwise it will continue to spread.

Major pruning: the basics

The angle the branch union forms with the trunk or other branches is vitally important. It affects the strength of the union, the likelihood of the branch snapping off at some point and therefore the priorities for pruning.

Where the branch union (or crotch) forms a wide angle a branch collar and a branch bark ridge will form after a few years of growth. These features are both part of the trunk wood rather than the branch tissue. They are very important as the structural strength of the branch union is based on their development.

Where the branch union forms a narrow angle (usually adjoining, forking, upright trunks or co-dominant limbs of similar size), a bark branch ridge and branch collar will not usually form. In these situations the narrow angle causes the expanding limbs to merge together and form included bark instead. This included bark makes a structurally weak branch union which is more likely to break in high winds or storms.

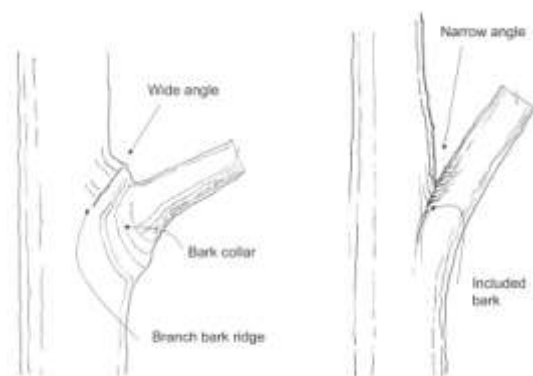


Figure 9 wide angle and narrow angle branch unions

Occasionally, usually in bush tree orchards, young upright branches may be encouraged to form a wider angle by festooning.

How to make large pruning cuts using a saw

Pruning branches creates large wounds that leave the tree open to disease and decay.

Branches should either be removed completely, or pruned back to a side branch or section long enough to take up the vigour and generate new growth. Stub cuts should be avoided as the stub is likely to die back and provide a route for diseases to enter the tree.

Pruning cuts should ensure that only branch tissue is removed and the bark ridge and collar are not damaged. Flush cuts, flat against the trunk, should only be made on small, young branches where the branch collar has not yet formed.

A short piece of wood, wider at the bottom than the top, containing the branch bark ridge and branch collar should be left behind. This should not die back, but instead callous over within a few months and seal off the wound, minimizing disease and decay. Cutting into the bark branch ridge and bark collar leaves a large wound within the trunk wood which is less likely to heal over.

The pruning cut should begin at the top, just outside the branch bark ridge and angle away from the stem of the tree following the edge of the branch collar. If large branches are cut off in one go, they may break under their own weight before they have been completely sawn through. This can split the branch collar or tear a large strip of bark from the trunk as it falls. Branches should therefore be supported with one hand while the cut is made.

Removing large branches in stages

Branches that are too large to support should be removed in stages by making three cuts, see figure 10.

The first cut

This should be made from below, approximately 30-45 cm out from the trunk. The cut should only be through a third of the branch as the cut can close under the weight of the branch and trap the saw. If this happens the branch should be lifted up and the saw eased free. Wrenching the saw from the cut can damage both the tree and the saw.

The second cut

This can then be made all the way through the branch, from above and slightly further up along

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the branch than the under-cut. This removes the main part of the limb, reducing the weight and leaving a stub.

The third cut

The stub left once the branch has been removed can then be removed back to the branch bark ridge and collar.

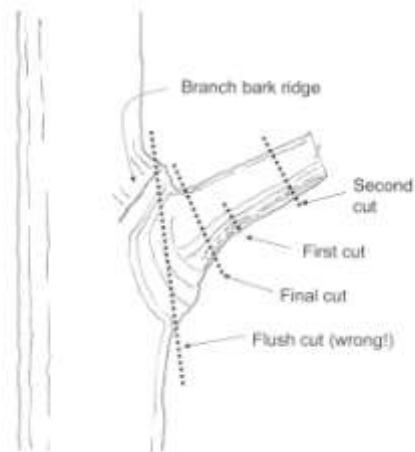


Figure 10 removing large branches in three stages

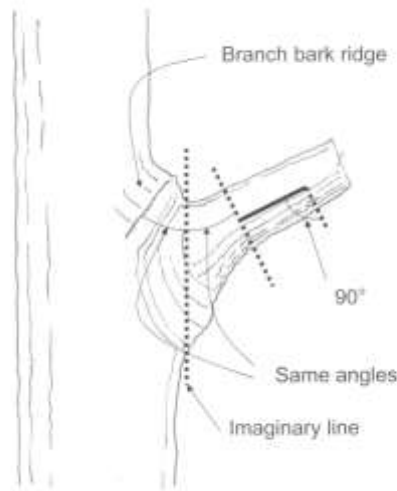


Figure 11 cut parallel to the angle of the branch

Where the branch collar is hard to distinguish, the final cut should be made downwards from the top of the branch, avoiding the bark branch ridge. It should be at an angle mirroring that of the branch bark ridge, where the branch attaches to the trunk.

This angle should be roughly parallel with the angle of the branch being removed, rather than parallel with the main branch it is being removed from (figure 11). This will keep the branch collar intact.

Co-dominant limbs or other branches with narrow, weak attachments with included bark should have one of the limbs, usually the smaller one, removed while they are young (figure 12).

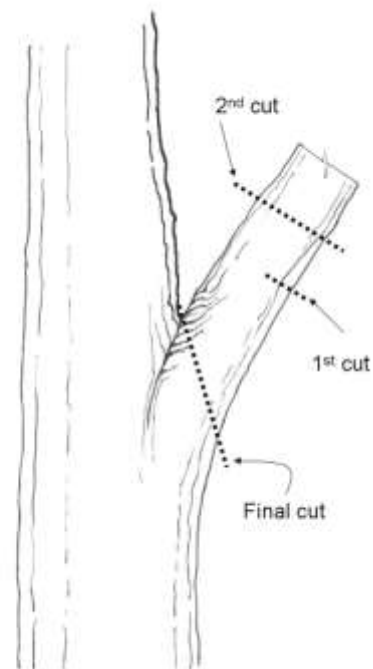


Figure 12 removing a co-dominant branch

However, removing limbs over 15 cm diameter could do more harm than good. In such situations it is best to shorten the smaller branch, reducing its weight and suppressing its growth to allow the unpruned branch to become dominant.

The edges of the wound should then be pared with a pruning knife if necessary, so that there is a smooth surface which is more likely to heal quickly. If pruned successfully, after one growing season a ring (doughnut-shaped) of callus tissue will begin to develop around and over the existing wound.

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Painting

Most wound paints and dressings are largely cosmetic. Some contain fungicides to prevent decay, but painting the wound can seal in moisture along with air-borne disease and fungal spores, creating the perfect warm, damp environment for them to thrive. Rather than 'healing', trees seal off, compartmentalise and callus over damaged wood. Wound dressings can disrupt the tree's ability to seal off wound sites.

Fresh wounds are colonised by a natural succession of fungi and bacteria which can limit and prevent infection from developing. The fungicide treatments wound dressings contain prevent the natural wound flora (fungi and bacteria) developing which facilitates the entry of spores, enabling the development of more extensive infection.

It is usually considered best to allow the tree to recover naturally. If wound dressings are applied however, they should be applied on the same day as the wound is made, allowing sufficient time for the dressing to dry before dark (when fungal spore numbers are higher). They should be applied thickly and evenly to wounds using a small paint brush, applying a second coat on large wounds.

Prunings

Pruning, particularly restorative pruning, can leave behind a lot of dead material and this can provide good habitat for wildlife.

Larger branches and trunks should either be left in situ or tightly stacked in a pile in a corner of the field to rot down, ideally near existing piles to provide continuity of habitat.

The smaller branches can be stacked in brush piles. Alternatively, wood can be used for carpentry. Apple in particular is an attractive wood for turning and larger pieces of wood can

be used for sculpture or furniture making. Diseased wood should always be removed from the site or burnt.

Further information

Natural England Technical Information Notes are available to download from the Natural England website: www.naturalengland.org.uk.

This information note is aimed at managers of traditional orchards and agri-environment scheme land management advisers. Other notes include:

- TIN012 *Traditional orchards: a summary*
- TIN013 *Traditional orchards: site and tree selection*
- TIN014 *Traditional orchards: planting and establishing fruit trees*
- TIN016 *Traditional orchards: formative pruning of young trees*
- TIN017 *Traditional orchards: maintenance pruning*
- TIN018 *Traditional orchards: restoration and management of mature and neglected orchards*
- TIN019 *Traditional orchards: fruit tree health*
- TIN020 *Traditional orchards: orchards and wildlife*
- TIN021 *Traditional orchards: glossary*

For further information contact the Natural England Enquiry Service on 0300 060 0863 or e-mail enquiries@naturalengland.org.uk.

This leaflet was written by Chris Wedge, Natural England, tel: 0300 060 1998. Illustrations by Paul Lacey.

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