

Traditional orchards: site and tree selection

This information note provides guidance on how to select sites for new orchards and the types of tree to plant within new and existing orchards. Other information notes in the series provide guidance on other aspects of tradition orchards. For an explanation of terms used in this leaflet see TIN021 *Orchard glossary*.

Key points

- New orchards can be important in linking existing habitats and reinforcing landscape character.
- The siting of new orchards should be considered carefully to ensure that they strengthen the local landscape character and that the location is suitable for growing fruit trees.
- Orchards vary greatly across the country in terms of scale, situation and density, tree form and the type of fruit grown.
- In both new and existing orchards new planting should reflect the species, fruit varieties and traditional management practiced locally, as well as the uses of the fruit.
- In most situations trees should be grown on vigorous rootstocks and trained according to local practice (usually as standards or half standards).

Background

The term 'traditional orchard' generally refers to groups of fruit and nut trees planted on vigorous rootstocks at low densities in permanent grassland and managed in a low intensity way. There are many regional variations on this theme widely distributed across England, including apple, pear, cherry, plum and damson orchards, and cob-nut plats.

Traditional orchards contribute to the landscape mosaic of rural England and have significant

cultural, wildlife and historic interest and many have occupied the same sites for centuries. Many traditional orchards have been lost to neglect, grubbing up and development over the last 60 years.

While the management and restoration of existing orchards takes priority, creating new orchards is important in areas where they have been lost, both for wildlife and to restore the character of the landscape.

Types of orchard

Traditional orchards are widely distributed across England. At one time, virtually every farm would have had a mixed orchard close to the farmhouse to shelter livestock, grow fruit for the family and provide an alternative source of income. These would have included a wide range of species including walnuts, apricots, peaches, medlars and quince.

Some areas including Kent, East Anglia, Somerset and the three counties of Gloucestershire, Herefordshire and Worcestershire also had traditional orchards growing fruit commercially. These orchards were usually planted away from the farmhouse and often covered large areas.

They originally provided dessert or culinary fruit for local markets or for cider and (in the three counties) perry, which was sometimes given in payment to farm workers.

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The arrival of railways that could transport fresh fruit long distances to urban centres encouraged the growth of culinary and dessert orchards, particularly in the South and East. These orchards varied greatly in scale, situation and density within the landscape, the forms of tree and the types of fruit grown. They often contained just one species of fruit tree with few different varieties. Examples include damsons in Cumbria, Bramley's Seedling apples in Cambridgeshire, perry pears in the three counties, plums in the Severn Vale and cobnuts and cherries in Kent.

Most traditional orchards would have been grazed to provide an extra source of income from the land and to control the vegetation around the trees. However, some orchards would have had temporary trees, or even soft fruit, vegetables or arable crops, between rows. These provided an earlier crop, before the permanent trees matured. There are also historical examples of ungrazed orchards, sometimes planted in row systems and associated with walled gardens.

Boundaries

Orchards are most commonly surrounded by mixed, often tall, hedges, planted to shelter the fruit trees. The hedges themselves often contain fruit trees, sometimes wild species or seedlings, to act as pollinators and provide an extra crop. In some parts of the country dry stone walls were used, or single species windbreaks planted to shelter the orchard. Ditches and dykes sometimes form boundaries, often in conjunction with hedges.

Site selection and preparation

Whether planting a new orchard, or replacing trees in an existing orchard, it is important to get everything right at the start as it is difficult to rectify problems at a later date.

Landscape character and surrounding land use

Orchards can be a major component of landscape character. Any planting, either within existing orchards or creating new ones should reflect historic patterns in location, size and species. Generally, new planting should be

prioritised where orchards are widely accepted as a typical landscape feature.

Historic land use

To maintain historical continuity, new orchards are best planted on former orchard sites. These can be identified by checking old maps. It can also usually be assumed that an established orchard or historic site will be positioned correctly in terms of soil type, aspect and micro-climate.

Archaeological interest

Tree planting should be avoided on sites with known archaeology. This is most likely to be an issue when creating new orchards, but should still be considered when restoring existing orchards or replanting on former sites, particularly on sites close to existing or former settlements.

Planting on ridge and furrow grassland should generally be avoided. When restoring extant orchards originally planted on ridge and furrow, replanting should follow the historic pattern, so new trees are planted in areas that are already disturbed. Maiden trees and sheep-proof guards are preferable, to minimise ground disturbance.

Wildlife

An important reason for planting new orchards is to benefit wildlife. When planted adjacent to existing orchards they can extend habitat and link blocks of orchard on a landscape scale (see TIN020 *Traditional orchards: orchards and wildlife*). Ecologically, orchards are similar to parkland, wood pasture and woodland edge habitats and may also be planted near such sites.

Aspect and location

Sheltered, sunny, south or south-west facing sites are generally best for planting new orchards, as they provide the best micro-climate for pollination and fruit development. Although orchards are not usually planted on exposed or shaded sites or at high elevations, they can grow in most situations across the country.

Marginal sites may even be more beneficial to certain wildlife such as fungi and lichens. Tree species and varieties should be chosen carefully

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however, as some may suffer from spring frosts or require plenty of sun to fully ripen.

Wind

Trees on sites exposed to gales or cold north and east winds can suffer storm damage, stunted growth and reduced yields. Artificial windbreaks can be made from coir netting or wooden slats but hedges or shelter belts of trees such as poplars are normally used.

Windbreaks should not shade the crop and should be semi-permeable to filter and slow the wind, as solid windbreaks can exacerbate the problem by merely deflecting the wind over them and into the orchard. On exposed sites where there is a greater risk of windthrow, maidens rather than standards should be planted. These will then have the chance to form a strong root system to anchor themselves before they develop a large crown.

Frost

Frost damage to blossom in spring can affect crops, particularly in frost pockets (see diagram 1 at the end of this note). These are usually in valley bottoms or hollows but can occur where thick hedges, woods or walls trap cold air on a slope.

It is therefore best to plant on a slight slope, preferably in the middle, to allow cold air to drain away and to make sure it can filter through boundaries. Where frost is a problem, later flowering fruit species or varieties that are less susceptible to damage should be planted.

Summer rainfall

In areas of low rainfall tree growth and fruit quality may suffer and summer irrigation may be needed to establish young trees. In wet areas there is likely to be a higher incidence of disease, particularly apple scab and canker. Careful selection of species and varieties should help to minimise these problems.

Soils and drainage

Fruit trees prefer an adequate depth (50 cm or more) of fertile, well drained, loamy soil, with a good structure and water holding capacity. They can tolerate a wide range of soil conditions, pH values and fertility levels.

Drainage can be improved on new sites by ploughing, subsoiling or installing a drainage system to break up compacted layers, open the soil structure and allow roots to penetrate. However, new cultivation of any land over 2 ha requires screening by Natural England if it has remained uncultivated over the previous 15 years. This is to assess whether an Environmental Impact Assessment is required.

Sites in valley bottoms and on clay soils may be more prone to water-logging. Early cropping varieties may be better suited to such sites as the fruit can be harvested when the ground is still dry enough to allow vehicular access.

When planting new trees it may be possible to overcome water-logging without draining the site by creating planting mounds or ridges and placing a layer of coarse sand or grit in the bottom of planting holes to aid drainage.

In established orchards plants that require wet ground may be present in the sward. If this is the case, or if a wider variety of habitats is desired, it may be preferable to leave wet areas as they are or create a pond.

Grassland diversity

Disturbing unimproved grasslands should be avoided and advice sought from an ecologist before planting trees in grassland suspected to be species-rich. It is possible that the grassland is of greater conservation value than the trees.

Tree selection

What size/form of tree to plant?

Fruit trees are sold in a number of forms depending on their age, size and how they have been shaped at the nursery.

Small trees establish more quickly and effectively, suffering less shock than trees transplanted as large specimens. They usually grow larger, live longer and develop a stronger root system less prone to windthrow. They are also cheaper, so most fruit trees are supplied between one and three years old.

Maidens

Often called whips, these are usually one to two years old and up to 1 m high. Depending on the

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species and variety they can be sold with a number of feathers or with no side branches formed. Maidens are easier to establish than standards but will have received less formative pruning in the nursery and therefore require careful pruning and training. This is a skilled task and if not carried out properly may produce a weak and unbalanced tree.

Standards/half standards

These are bigger trees (two to four years old) with a more developed branch structure. Much of the initial formative pruning will already have been carried out in the nursery. Standards are therefore a safer option for those without much experience of pruning fruit trees or in situations such as community sites where an instant impact is needed or vandalism is a problem. However, they may not establish as well and are more prone to windthrow.

Standards should have a clear central leader (trunk) of 2 m for apple, pear and cherry, 1.5 m for plum and damson, and 50 cm for cobnuts, with three to five branches coming off the central leader. Half standards will have a shorter central leader, usually with more upright branches coming off it (see TIN014 *Formative pruning of young trees*).

Propagating varieties

Propagation is necessary to produce a tree of a particular variety. If grown from a pip, nut or stone, the resulting seedling will be different to the tree it came from, with characteristics inherited from both parents (ie the tree on which it grew and the tree that pollinated it). Most fruit trees do not grow well from cuttings and so are usually propagated by grafting or budding.

Plums and damsons are sometimes grown on their own roots. Cobnuts are usually propagated from rooted wands and are also on their own roots. Grafted cobnut stock should be avoided.

In the past trees would have been grafted onto unnamed seedlings. This is still practised to produce standard trees, particularly for plums and pears, and has the benefit of maintaining genetic rootstock diversity. It may have variable results however, producing trees which may root

poorly, develop slowly, yield badly or be susceptible to disease.

Rootstocks

To overcome and control these factors a range of rootstocks have been developed which perform in a known manner to suit different situations. As rootstocks determine the tree's vigour and eventual size, they can be used to grow most types of tree into almost any form. They also have other specific influences such as winter hardiness, early yield, increased fruit size, and disease resistance. Although the choice of rootstock will have a major effect in determining the tree's eventual size, other factors including the variety, soil type and depth, location, and of course how the tree is trained and pruned will also affect the tree's growth.

The dwarfing rootstocks used to develop bush trees are not suitable for the full-size trees planted in traditional orchards. These trees require a vigorous rootstock to develop and anchor the tall trunk needed to lift the fruit branches above the reach of grazing animals and support the large tree canopy that will develop.

What species/variety of tree to plant?

Fruit tree varieties

There is a huge choice of varieties of fruit trees, particularly apples. Many old varieties grown in traditional orchards were very localised to a particular county or even a specific village. The same variety may have had different names in different areas. Although many old varieties have been lost, largely due to commercial pressures, old or local varieties can be obtained from a number of sources.

Many nurseries stock a large range of trees and local nurseries may have a selection of local varieties. Alternatively, some nurseries may propagate to order if an existing tree of the desired variety can be found. Fruit collections, such as the National Fruit Collection at Brogdale, Kent and local collections are a good source of old and rare varieties.

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Creation of new varieties

Fruit trees grown from seed will not usually produce worthwhile fruit which is why named varieties are perpetuated by vegetative propagation. Occasionally though, seedlings will produce worthwhile fruit and be propagated to create new varieties. Originally this process occurred by chance through the discovery of 'wildings' (where neither parent is known). Well-known varieties such as Bramley's Seedling and Ashmead's Kernel apples, as well as Victoria plum were found in this way.

Alternatively, the seed from a known variety can be grown in the hope of improving on that variety. This can be through natural unaided cross pollination (so only one parent is known). Cox's Orange Pippin apple is an example of this, raised from a Ribston Pippin pip.

New varieties can also be raised by the planned cross pollination of existing varieties under controlled conditions where both parents are recorded, for example Allington Pippin, raised from a cross between King of the Pippins and Cox's Orange Pippin. New varieties may also arise as 'sports', mutations that appear on a tree of an existing variety. Many red versions of existing varieties, such as Queen Cox and Crimson Bramley, been produced in this manner.

Selecting varieties

Tree species and varieties may be planted for a number of reasons, which should be considered carefully beforehand.

Historic, genetic and cultural value

Certain species of fruit tree may be particularly common to a local area, ie plums in West Gloucestershire, cherries in East Worcestershire and cobnuts in Kent.

To preserve historic continuity, genetic variety and cultural heritage and to reinforce local distinctiveness varieties historically grown or indigenous to the area should be used to restock or plant orchards. Many areas have fruit groups with detailed records of old local fruit varieties. Planting new species or varieties may be acceptable however, particularly if it helps ensure the orchard's long-term viability.

Suitability for local conditions

Local orchards and fruit growers can give a guide as to which varieties do well. Local varieties, subjected to the climatic and soil conditions of the area, may be better suited to the site than non-local ones. For example, Blaisdon Red plum is reputed to flourish only within a few miles of Blaisdon, West Gloucestershire. Foreign fruit varieties are generally less likely to do as well, often being prone to late frosts and requiring sunnier summers or drier winters than the British climate provides.

Agronomic

Although it may not be the only reason for planting, the end use of the fruit (eating, cooking or juicing) will affect the choice of species and variety. If the fruit is to be sold, either to supermarkets, local outlets, mail order or as pick-your-own then the variety's commercial value should be taken into account.

Many large retailers and consumers want uniformly-sized and blemish-free fruit available all year round that keeps well and does not damage or bruise easily. Therefore, yield and pest/disease resistance, particularly for organic orchards, are also important. Many old varieties which were grown primarily for their flavour do not meet all these criteria. There is a growing demand for these varieties however, and thus the potential to grow a much wider range of varieties for sale through local outlets, farm shops and markets, or simply for personal consumption.

Flowering season and pollination

Apart from cobnuts and walnuts, which are wind pollinated, fruit trees are pollinated by insects. A flower-rich sward or flowering shrubs, trees (ie hawthorn and other native woody species, wild plums, crab apples and wild pears) and herbs in the surrounding hedgerows will attract insects. Alternatively, bee hives may be brought in to ensure adequate pollination.

The pollination requirements are an important consideration, particularly where there are a limited number of trees or varieties. Although some fruit varieties are self-fertile (ie they can be pollinated from their own flowers) most need to

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cross pollinate with a different cultivar of the same species which flowers at the same time.

A few varieties, eg Blenheim Orange and Bramley's Seedling apples, are triploid, requiring two other varieties to pollinate them. Triploids produce little pollen so as well as needing another cultivar to pollinate them, a third variety is required if the pollinator is to produce a crop of its own.

Apple and pear varieties are grouped according to flowering season. Varieties will generally only pollinate others in the same pollinating group, or one group to either side. Therefore, when planting a range of varieties it is preferable to select from similar pollinating groups to ensure a good set, though nearby orchards may fulfil this role. Crab apples and wild pears are good general pollinators, with a long flowering season. Specific pollinating trees may be planted in commercial orchards which have only a few main varieties.

Cobnuts flower from January to March. Each plant carries both sexes but require pollination by another variety, as the flowering times of the female (the tiny red tassels at the tips of the buds) and male (the familiar 'lamb's tails' of early spring) flowers on individual plants rarely coincide. Most, if not all, cobnut varieties (including Kentish Cob) are compatible with wild hazel, which is often found in nearby hedges.

Species of fruit tree

Apples

The cultivated apple is descended from the wild apple *Malus evers*, found in the Tien Shan mountains on the border of China and the former USSR. From there it was spread west by man to Europe and first brought to Britain by the Romans. Apples have been an important crop since Norman times, providing a fallback for farmers during agricultural depressions.

Their ease of cultivation, climatic tolerance and the range of flavours and uses have made apples the world's most cultivated fruit. There are approximately 25,000 named varieties world-wide, 2,500 from Britain alone.

Apple trees on vigorous rootstocks generally live for 80-120 years, exceptionally up to 200 years. Those on dwarfing rootstocks have a shorter lifespan. Apples are fully hardy in the UK, although the range of varieties that will flower and fruit successfully diminishes the further north you go. They generally flower around the first half of May and so are less vulnerable to frost than pears and plums. Apples are usually divided into 4-6 pollination groups.

Apples have had a much wider range of rootstocks developed for them, reflecting their greater economic importance compared to other top fruit in Britain. The variety developed for standard orchards is named M25. This is very vigorous and suitable for a wide range of soil conditions. At maturity it reaches 7-10 m high, with a spread of 7 m. It fruits within 5 years and when mature can yield 90-180 kg of fruit, depending on the variety.

The variety MM111 is sometimes used for creating traditional standard orchard trees. It is less vigorous than M25 and will only be suitable in certain situations when vigorous varieties such as Bramley's Seedling are used, or on fertile sites that are only grazed by sheep or cut for hay. The variety MM106 is not suitable for use in standard orchards. Even if the tree is pruned to a standard shape, the rootstock is not vigorous enough to support the size of tree required.

Pears

Pears have a history of cultivation as long as apples. They have been grown in Britain for many centuries but this marks the edge of their range. They prefer a milder climate to apples, requiring plenty of sun to ripen fully and suffering in cold easterly winds.

Ideally, they should be grown on a sunny, sheltered, south-facing site and traditionally they were often grown in walled gardens trained as espaliers or fans. Pears are less drought tolerant than apples and fare worse in dry, sandy soils. They are more tolerant of wet conditions and heavier clays.

Pears trees have a longer lifespan than apples. Dessert and culinary pears will usually reach at least a century and perry pears may live for two

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or even three hundred years. They also produce lower yields than apples and begin to bear fruit at a later age, taking about 6-8 years. They are generally less susceptible than apples to pests and diseases, fireblight being a big exception.

Bearing in mind their climatic requirements, varieties should be selected carefully to ensure they are hardy, particularly in the north. There are fewer culinary and dessert varieties offered for sale than there are apples. Many French varieties are of questionable hardiness for growing in an orchard, those of British descent generally being more suitable.

Pears generally blossom about 2-4 weeks earlier than apples, from mid-April onwards. This makes them more susceptible to frost, so late flowering varieties should be selected. Being less commonly planted, pears are more likely to require a pollinator. Pears are divided into fewer (3-4) pollination groups than apples. Very few varieties are self fertile, although Conference is one of these.

There is a much more restricted range of rootstocks available for pears than for apples. Seedlings are widely used to produce standard trees but, as with apples, the variable vigour and compatibility with varieties has led to the use of other rootstocks. The Quince rootstocks Quince A, Quince C and Provence BA29 may require a stem-builder to overcome incompatibility problems. These and *Pyrus communis* pryodwarf are not vigorous enough to be used in traditional orchards.

Quince

Quince *Cydonia oblonga* may be either apple or pear shaped. In the UK they do not usually ripen fully to and so are cooked rather than eaten raw. They are often used to make quince jelly, or added to apple dishes.

Quinces prefer a moist soil that does not dry out in summer. Quinces are self fertile, but if two different varieties are planted together they will produce more fruit.

Plums, damsons, gages and bullace

Before the advent of imported foreign canned plums these were grown in domestic orchards for eating, cooking and pickling and on a

commercial scale for jam making and preserving. Nowadays plums and damsons are mainly grown in Gloucestershire, Shropshire and Westmorland in Cumbria. Plums flower around the same time as pears and so may also be vulnerable to late frosts.

Seedling rootstocks are often used. Suitable named vigorous rootstocks are Brompton and Myrobalan B. These rootstocks produce trees that reach 4.5 m high at maturity, with a spread of 4.5 m. They fruit within 4-5 years and are suitable for relatively poor soils and grassed orchards. St Julien A produces a slightly smaller tree, but may be suitable for traditional orchards on more fertile sites or if sheep are used to graze the orchard.

Damson and plum varieties that sucker readily (eg Blaisdon Red and Pershore Yellow Egg) can be raised by digging up the suckers and planting on, provided it is certain the parent tree has not been grafted.

Cherries

These were mainly grown in Worcestershire, Kent, Hertfordshire and the Tamar valley, Cornwall. They were traditionally produced on wild cherry rootstocks and known as Mazzards, Gaskins or Geans. Malling F12/1 is a vigorous *Prunus avium* rootstock, suitable for a wide range of soils including relatively poor soils and grassed orchards. It produces a tree at least 7 m high at maturity, with a spread of 7 m, which fruits within 5-6 years. The dwarfing Mahaleb, Colt and Gisela 5 rootstocks are not suitable for traditional orchards.

Walnuts

Those grown for fruiting are types of the English or Persian walnut, *Juglans regia*.

Some common cultivars include Broadview, Buccaneer, Franquette and Northdown Clawnut. Walnuts can be eaten pickled, wet (green) or dry. Pickled walnuts are harvested from June-July before the shell on the nut forms, and pickled in vinegar or port. Otherwise, walnuts are harvested in September-October and either eaten soon after while still fresh, or allowed to dry out and stored.

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Cobnuts

Cobnuts are the fruits of two species of hazel, the native hazel (*Corylus avellana*) and the filbert (*Corylus maxima*), native to southeastern Europe. Technically cobnuts are the fruit of the former species and filberts the fruit of the latter, although the terms may be used interchangeably; for example Kentish Cob is a variety of *Corylus maxima*.

Cobnuts are grown mainly in Kent, but are fully hardy throughout the UK, although they may not bear crops so well further north. Plantations of nut trees are known as plats rather than orchards. They grow in range of conditions but do not like waterlogged soils. Kentish Cob is the predominant variety found in old plats and one of the best to grow throughout most of Britain, but there are several other varieties available.

Cobnuts require cross pollinators and wild hazel is usually compatible with most varieties including Kentish Cob. Cobnuts are best grown on their own roots.

Further information

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

This note is aimed at managers of traditional orchards and agri-environment scheme land

management advisers. Other Natural England Technical Information Notes include:

- TIN012 *Traditional orchards - a summary*
- TIN014 *Traditional orchards - planting and establishing fruit trees*
- TIN015 *Traditional orchards - an introduction to pruning*
- TIN016 *Traditional orchards - formative pruning of young trees*
- *Traditional orchards - fruit tree health*
- TIN017 *Traditional orchards - maintenance pruning*
- TIN020 *Traditional orchards - orchards and wildlife*
- TIN018 *Traditional orchards - restoration and management of mature and neglected orchards*
- TIN021 *Traditional orchards - glossary*

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

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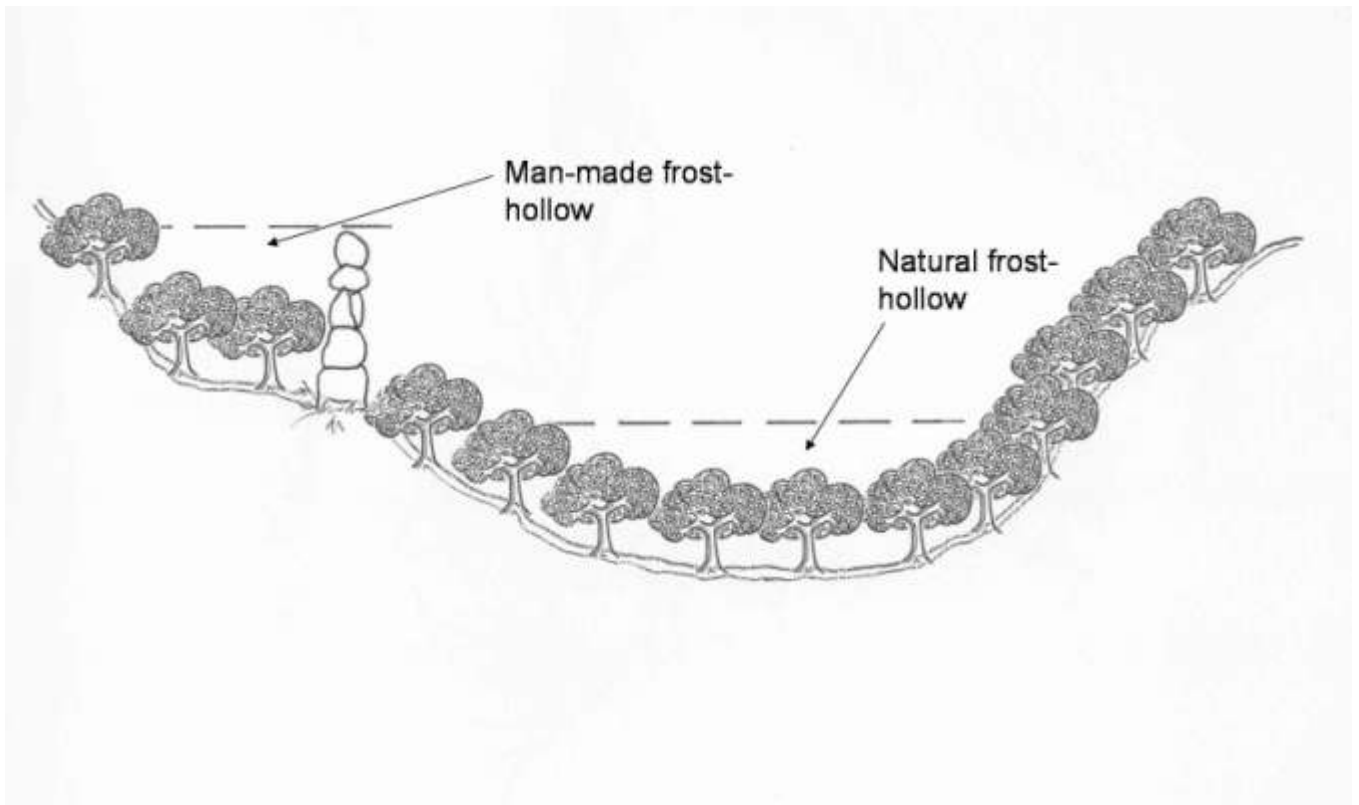


Figure 1 – diagram of frost hollows