Tree planting guide

Planting new trees – of the right kind and in the right places – is something anyone can do to improve their environment.

This guide sets out the main points that you will need to consider, whether they are carrying out the planting themselves or taking the lead in community tree planting. It gives tips on choosing a planting site and selecting the appropriate species and size of stock, planting techniques and methods of tree protection.

Section one: planning tree planting

Selecting the correct planting sites and the right trees is critical – mistakes can be long lasting and difficult to rectify. An important factor to take into account is what the area may look like in 20, 50 and 100 years. A single well-placed tree can grow to be seen above the rooftops and may give more visual benefit than several scattered small ones. The ideal is a tree able to grow to full maturity with little or no surgery. Mature trees do not necessarily take up large amounts of space.

Choosing a planting site

Options include:

- front and back gardens
- existing tree pits
- roundabouts
- grass verges
- traffic islands
- housing estates (but beware of
- underground services)
- parks and open spaces
- alongside public footpaths
- school/college grounds
- city farms
- local nature reserves (without disturbing
- the ecological balance)
- woodland (without disturbing the
- ecological balance)
- golf courses
- hospital grounds
- industrial estates
- shops and office car parks
- playing fields
- development sites.

Assessing a site

Here are some important points to consider about a site.

- Ownership of the land
- Trees may only be planted with the landowner's permission
- Will the owner carry out planting?
- If not, will permission be given for planting?
- Can planting be planned to meet the owner's objectives and also benefit the community?
- What is the foreseeable future of the site (and therefore the trees)? Seek assurance
- from the owner.
- Who will look after the newly planted trees? This needs to be agreed.

Proximity to buildings and other structures

Many recent buildings will have adequate foundations to enable selected trees to be planted nearby.

Tree-related subsidence usually occurs only on shrinkable clay soils where foundation damage may result from roots extracting water.

Poplars and willow species should be planted with caution in built-up areas on clay as they require so much water.

See section 6, Trees – threats and challenges.

Ultimate size of the proposed tree

Trees grow in height and spread over a life of 100 years or more, and might eventually cause problems in terms of shade, light and building foundations.

What will be the ultimate spread and height of the tree?

How far will the roots spread? They may extend as much as twice the ultimate height of the tree.

See section 6, Trees – threats and challenges.

Safety concerns

There are some sites where planting trees could be hazardous.

Before carrying out any work, it is vital to check whether any services are likely to be running underground. Seek advice from the local authority about this.

Trees will require constant pruning in order to maintain statutory clearance if planted under overhead services (such as electricity cables and phone wires).

Trees should not be planted where they could obscure road sight lines, road signs or street/security lighting.

The local ecology

Ecological factors may mean that it is best not to plant trees at all.

Is natural regeneration already taking place? If so, this may be preferable for wildlife.

Is the site already valuable tree habitat, like thickets and old orchards, which

should normally be retained?

Will trees shade out old grassland, streams or ponds, or damage heath, peat or very damp ground such as bogs (which should be left unplanted)?

Are there good reasons for the site being treeless (e.g. it is heavily grazed, too

exposed, thin or polluted soil, or waterlogged ground)?

Choosing the right species

- Copy nature by planting trees already successful on or near the site.
- For a rural site, choose species in keeping with the existing woodland.
- In urban areas, options range from ornamental planting schemes to creating new 'natural' areas.
- Choose species for urban areas that are tolerant of atmospheric pollution and soil chemicals such as road salt (see also section 6, Trees – threats and challenges).
- Consider the eventual height and spread of trees in relation to nearby roads, buildings and overhead lines.
- Fallen fruits from trees such as hybrid hawthorns and rowans make pavements slippery.
- Large leaves from species like horse chestnuts may also make pavements
- slippery.
- Trees which extract moisture from shrinkable soil may affect nearby
- foundations.
- Trees that produce poisonous fruits (e.g. yews and laburnum) are unsuitable for children's play areas and where animals graze.
- Trees with fruit that causes stomach-ache (e.g. crab apples) are best avoided near
- play areas.
- Some trees, like white poplar, false acacia and wild cherry, have suckers and surface roots which may disrupt paving or light structures such as boundary walls.
- Trees casting dense shade and reaching large dimensions, such as oaks and beeches, can shade windows and gardens.

Choosing the right size of stock

Once the tree species has been chosen, the next step is to select the planting stock.

Generally, the smaller a tree is when planted, the more readily it becomes established and begins to grow.

This is because small trees have a relatively large root system in relation to their canopy or leaf surface area. This means the aerial portion of the tree can be well supplied with water, oxygen and minerals which are essential once a tree has started into growth.

It is not uncommon for a self-set tree seedling or whip to outgrow a larger tree (even one that is well-maintained) and reach maturity before it.

However, if the aim is to have instant effect, it is a good idea to choose a standard or semi-mature tree.

Seedlings, transplants and whips

- Very cheap – so a good way to achieve large-scale planting.
- Easy to plant – so ideal for community/school planting involving
- volunteers.
- Readily stands the stress of transplanting.

Feather

- Relatively cheap – so still practical for large projects.
- More likely to be damaged or stressed during planting than smaller stock.
- Requires more skill in planting because it needs to be well-anchored in the soil to
- reduce the risk of wind damage.

Standard

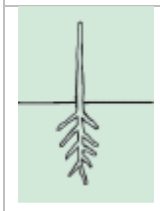
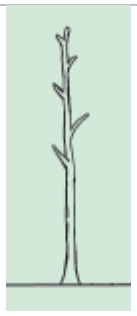
- Relatively expensive to buy and also requires more planting preparation.
- Less susceptible to damage during planting than smaller stock.
- A good way to achieve immediate impact in gardens, streets or shopping precincts.

Heavy standard

- An expensive option.
- Good for achieving effect in prestigious sites.

Semi-mature

- The most expensive option.
- Achieves instant impact but needs very careful planting and a great deal of maintenance (particularly watering) for a long time after planting.

Normal trade descriptions of trees of various sizes – used throughout the nursery trade	
 **Seedling** height: 0.2 to 0.9m (8in to 3ft)	 **Whip** height: 1m to 1.75m (3ft 3in to 5ft 9in)

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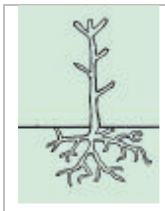
<td> 
Transplant height: up to 1.25m (4ft)</td>
<td> 
Feather height: 1.25 to 2.5m (4ft to 8ft)</td>
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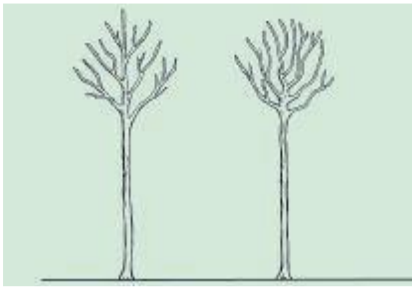
<td> 
(From left)
Standard with leader height: 2 to 3.5m (6ft 6in to 11ft 6in)
Standard with branching head height: 2 to 3.5m (6ft 6in to 11ft 6in)</td>
<td> 
Multi-stemmed height: various

Also available are:
Heavy standard same as standard but height 3.5m (11ft 6in) or more, girth 140mm (5in)
Semi-mature size varies</td>
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</table>

Types of stock

- As well as being available in different sizes, trees are produced in different types of
- stock.
- Bare-root – grown in open ground, dug up in winter and sold with no soil covering the roots; usually small stock, i.e. whips and feathers.
- Root-balled – like bare root but sold with a covering of soil and wrapped in hessian
- for transportation; usually larger stock, i.e. standards and upwards.
- Containerised – like rootballed but put into a container for sale.
- Container-grown – most common type of stock in garden centres; all sizes are now available.
-

Obtaining trees

One way to obtain new trees is to grow them from seeds or by taking cuttings or grafts (see section 3, How to grow your own trees). If this is not an option, here are points to consider when buying them.

Ordering trees

- If ordering native species, check their origin and be wary if the nursery is unable to supply the information. Some nurseries list the origin of each species in
- their catalogues. Some nurseries will raise plants from seed of acceptable origin if collected and supplied by the customer.
- Place orders early with a reputable nursery to ensure a prompt delivery; if possible stipulate a date.

Local suppliers, listed in the Yellow Pages under 'Nurseries – Horticultural'or 'Garden Centres', will mostly specialise in containergrown ornamental stock. However, many will supply other types of tree to order. For sources of native trees in quantity, a good starting point is the local wildlife trust or BTCV office, or even the local authority officer.

For large numbers of trees it is best to place orders by July or August for supply in the late autumn/winter. Beware of accepting substitute tree species which seldom have the desired characteristics of the plants ordered. Inspect the trees as soon as they arrive and return them immediately to the nursery if they are unfit for planting: e.g. have broken leading shoots or side branches, damaged bark or dried-out and damaged roots. For container-grown trees, check they are not pot-bound.

Section two: planting the trees

To give new trees the best possible start and the greatest chances of survival, there are a number of key considerations.

When to plant

Bare-root trees should be planted during the dormant season. Container-grown trees can be planted all year round. In all cases, avoid days when the ground is frozen.

A good time to plant is during The Tree Council's National Tree Week (end of November – beginning of December). In dry areas, late autumn planting is best for most species as this gives trees a chance to become established before spring droughts. In wet areas, early spring planting is best.

Ideally, the site should be drained of excess water. Where soils are wet and then freeze there is a risk of 'frost lift' which can devastate newly planted trees, though this is unlikely in most years. Evergreen trees are best planted either early or late in the planting season. Spring planting should not take place until the soil has begun to warm. Although container-grown trees can be planted at any time of year, the same guidelines will give best results for them too.

If planting is in late spring or summer, container-grown trees should be watered during dry spells for the first growing season (see section 5, Managing and caring for trees).

Pre-planting care

Many bare-root trees are already dead when planted. This is often because of careless handling between the time they are lifted from the nursery and final planting-out.

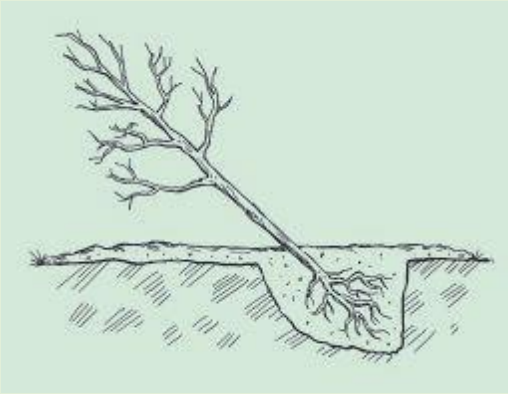
Unfortunately, these trees are not easy to identify before planting and the first sign of a problem may be when they fail to grow.

It is essential to ensure that:

- bare-root trees are delivered with their roots wrapped in plastic
- if not planted immediately, bare-root trees are removed from the bags and heeled-in, see diagram (for 24 hours or less, bags of trees may be stored in a cool shady position out of the wind)
- as much short fibrous root is kept on the trees as possible
- trees are safeguarded from damage, such as broken stem tops and bark stripped from stem or roots
- trees are stored only where there is free drainage, so that they do not stand in waterlogged conditions
- roots are protected from heat.
- Ideally, trees should be lifted, transported and replanted without interruption.

However, they may need to be stored before planting and the best way to store bare-root trees is by heeling-in.

Heeling-in
Dig a trench in good fresh moist soil which will not dry out or become waterlogged. Cultivated nursery ground is ideal, provided it is shaded. Dig the trench with a sloping back, deep enough for the tree roots to be completely covered.
Trees in bundles should be separated and spaced along the trench, otherwise those in the centre may dry or – in the case of evergreens – heat up. Putting a marker stick every 50 or 100 trees saves counting later. Place the trees with their roots completely in the trench but with their tops out. Cover the roots with soil and firm it lightly by treading.



Preparing the ground

Before trees are planted, the ground may need some preparation, particularly in urban areas where soil compaction is often a problem.

Compaction can happen on brownfield sites, on land where there is a plough pan (an area of the ground compacted by frequent ploughing) and on new development sites (see section 6, Trees – threats and challenges).

In severe cases it stops the tree roots from establishing, so the trees fail to grow well and may eventually die. If the planting site suffers from soil compaction then ideally the area should be subsoiled.

This is a process that loosens the soil and breaks up the compaction or plough pan. It is usually done with a mechanical digger.

If subsoiling is not practical, a solution can be to plant in large planting pits where material has been introduced to improve drainage and add nutrients.

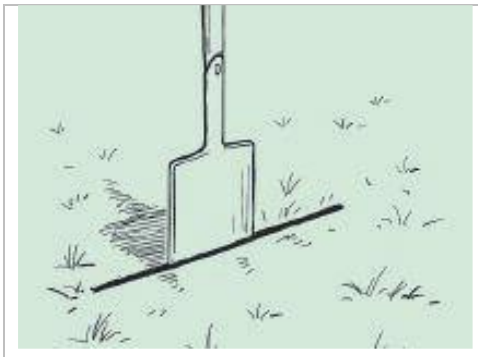
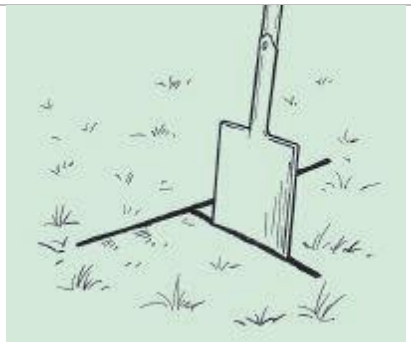
Planting small trees

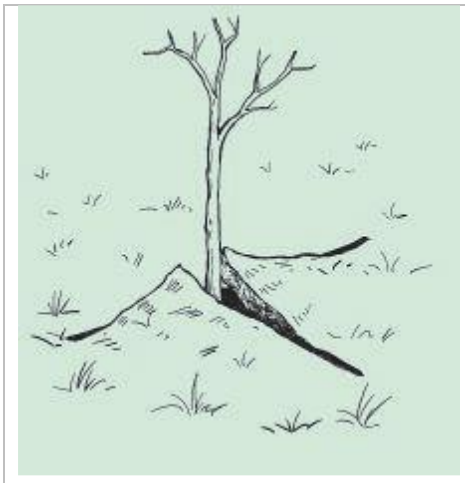
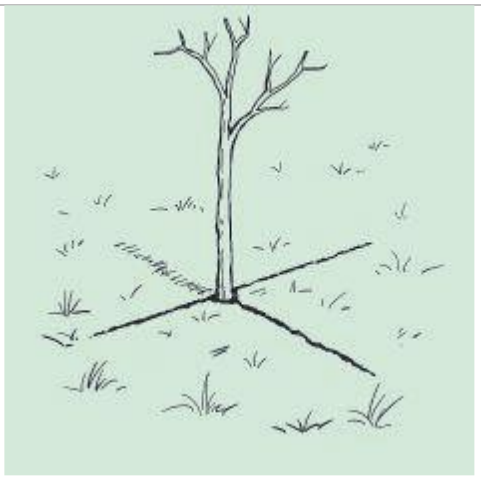
There are three ways to plant small trees:

- notch planting
- turf planting
- mound and ridge planting

Notch planting

Notch or slit planting with a garden spade is the quickest, but not the most reliable, method for planting small trees. It is generally suitable for mass planting of bare-rooted transplants and whips under 90 cm (3ft) high. It should not be used in wet soil, for large or expensive trees or where failures must be minimised.

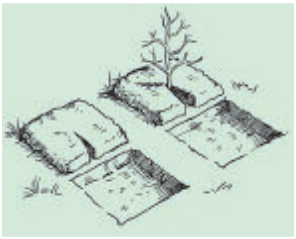
 Where there is a thick grassy mat, clear a bare patch about 0.5metre (19in) in diameter by scraping off vegetation and the top inch or so of soil with a spade or mattock.	 Use the spade to cut through the turf into the soil to a depth that will accommodate the roots of the tree being planted.

	
Push the spade backwards and forwards in the slot to create a hole large enough for the roots.	Hold the tree in place and firm the soil around the stem with the heel.

Turf planting

This method is useful for planting small trees in wet ground, especially peaty soils, as it improves drainage around roots.

Cut out a square of turf and turn it grass side down. Cut a notch into the turf and soil below. Insert the roots, then firm.



Mound and ridge planting

For poorly-drained sites where the turf is difficult to cut, mound planting provides extra freely-draining soil for roots. In all cases it is important to apply a mulch at the time of planting because this will reduce the need to weed and water, helping to ensure the survival of the tree (see section 5, Managing and caring for trees).

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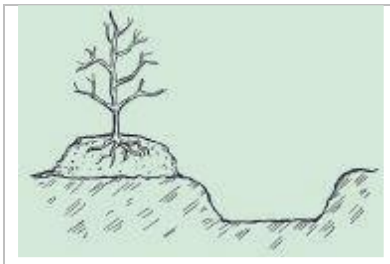
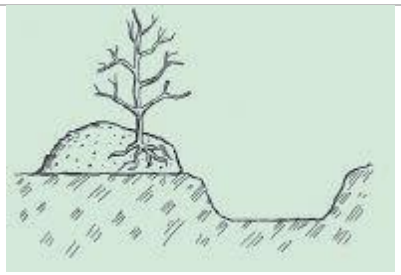
	
In some cases it may be possible to arrange for the site to be ploughed to create ridges and furrows to improve drainage.	In exposed sites, plant on the downwind side of the mound/ridge.

Protecting trees from damage

Trees, especially when young, are extremely vulnerable to damage from animals and people. Protection requires planning.

Points to consider

- Cost: protective measures can add considerably to initial costs. It is usually cheaper to protect groups rather than individual trees.
- Maintenance: all forms of protection add to maintenance costs.
- Appearance: protection can sometimes be unsightly.
- Land take: protective measures often reduce the land available for other uses.
- Susceptibility to animal damage: is the species of tree particularly susceptible?
- Could a more resistant species be planted?

The choice: fences, guards or shelters

The cost of individual tree protection increases with the number of trees, but fencing costs relate to the size and shape of land enclosed, irrespective of the number of trees. Long, thin or complex shapes are the most uneconomical to fence, with squares and wide rectangles being the cheapest.

Tree shelters (wire mesh or plastic) are the most common tree protection for plantings of less than a hectare (2.5 acres). For larger areas, perimeter fencing is usually cheaper, but it will not deter rabbits or squirrels.

Shelters make it easier to locate newly planted trees for weeding and maintenance.

They also protect against damage by animals and herbicide around the base. Plastic shelters act like mini-greenhouses. Growth can be up to five times the normal rate in the first two years.

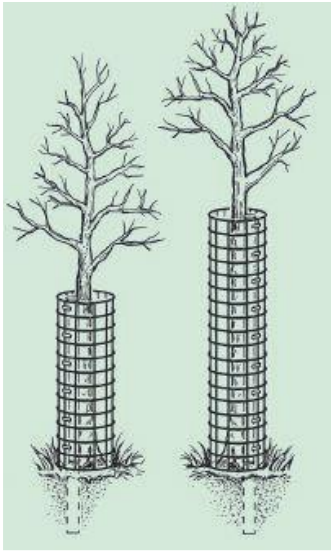
Methods of tree protection

- Stock-proof fencing: essential if animals are to graze nearby. Fencing must be at least two metres from any new planting.

- Rabbit-proof fencing: around plantations where there is a problem – but ensure the rabbits are not fenced inside.
- Shelters for individual trees: it is important to find out which animals are likely to threaten the survival of newly planted trees and then use shelters and stakes of the appropriate height.

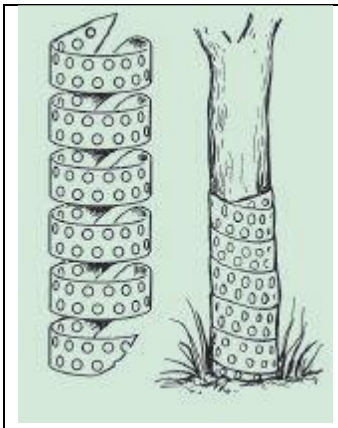
Shelter	**Stake**	**Animals**
0.6m (2ft)	0.8m (2ft 6in)	Rabbits and hares
1.2m (4ft)	1.2m (4ft)	Sheep and roe deer
1.8m (6ft)	1.8m (6ft)	Fallow, sika and red deer
1.8m (6ft)	Heavy duty	Cattle and horses

Rabbit sleeves, spirals, Netlon guards and grow-tubes

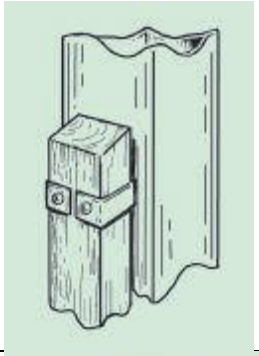


There is a risk that spiral guards will unravel and damage the tree.

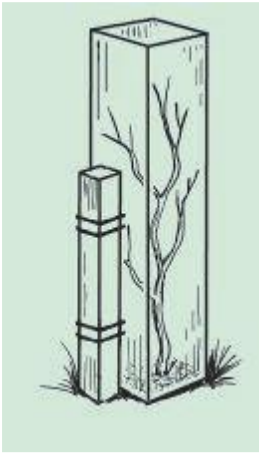
Extruded plastic tubes protect individual trees. The top of any stake must be below the top of the tube to prevent the tree chafing later.
Push the end of the guard into the ground around the base of the tree.



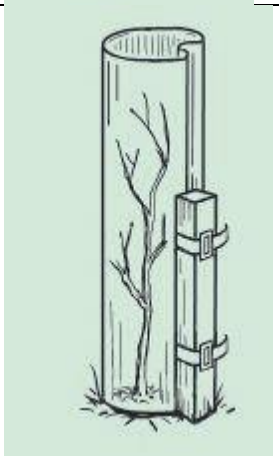
Make sure tall shelters are well attached to firm, strong stakes so that the shelter does not move and damage the tree.



There are various types of extruded plastic tubes, but all have the same function. There are also different ways of attaching them to a stake.



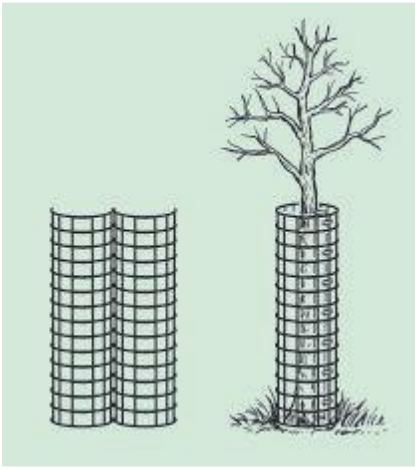
Using wire or zip ties



Using tree ties

Tree guards

Stout, tall metal guards deter vandalism of individual standard trees.



Planting large trees

Although labour-intensive, pit planting is the best method for large trees because it ensures plenty of room for the roots. It is essential for trees over 90cm (3ft) tall. It is also worthwhile when planting only a few trees or where failures would be expensive or difficult to replace.

Pit planting

<table>
<tr>
<td> 
In good soil, dig a hole big enough for all the roots to spread out. In poor soil, dig a hole wider and deeper than needed for the roots, and partly refill. Consider adding a soil improver.</td>
<td> 
Break up compacted soil to improve drainage and aerate the roots.</td>
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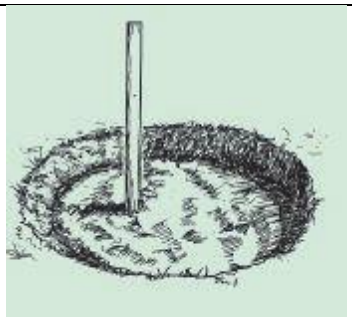
<td> 
Gently tease out the roots that have wound around the inside of the pot.</td>
<td> 
Use a stake if the tree is over 1.5m (5ft). Drive the stake into the bottom of the pit and then place the tree on the downwind side. Stakes should not be more than a third of the height of the tree.</td>
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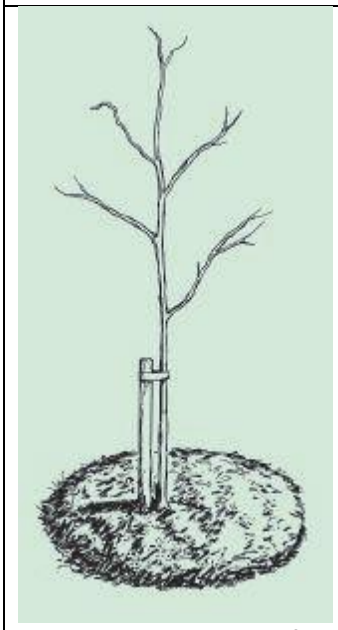
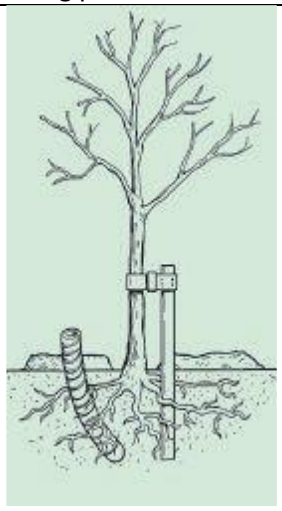
<tr>
<td> 
Keep the top of the rootball level with the</td>
<td> 
Backfill and gently shake the tree up and</td>
</tr>
</table>

soil surface.	down to ensure a good contact between root and soil. Once the roots are covered continue treading more firmly until the hole is over-filled, leaving the soil slightly above the surrounding ground.Treading in is most important when pit planting. Many failures are due to lack of firming. In heavy soils, do not firm so much that the soil becomes compacted. Water the tree. Drench the soil with at least five litres of water. The amount will depend on the size of the tree being planted.
 Clear grass and weeds for an area of approximately 1m (3ft) diameter around the tree, and apply a layer of mulch. For more information about mulches and how to apply see section 5, Managing and caring for trees.	 **Watering tubes** Whether to use a watering tube will depend on the situation Heavy standards planted into pavements are often planted with a watering tube to make it easier to get large quantities of water to the roots. However, this may encourage roots to stay within the planting pit and not grow into the surrounding ground.

Staking and tying large trees

Recommendations for staking trees have changed in recent years. Tying a tree just below the start of the crown using a tall stake is not now recommended. This is because the stem cannot sway, so little increase in stem diameter occurs from crown to base.

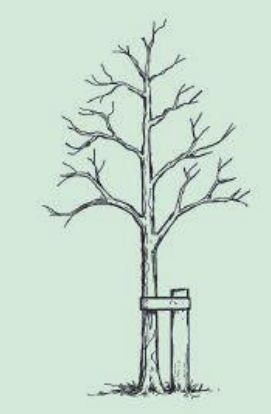
Swaying in the wind stimulates growth of stem diameter.

With no stake, the whole tree sways, stimulating maximum diameter growth near the root collar (i.e. the transition from stem to root). Where support is necessary (normally if the tree is more than 1.5m [5ft] tall), stake the tree sufficiently to anchor the rootball in the ground, but allow the stem to

sway in the wind.

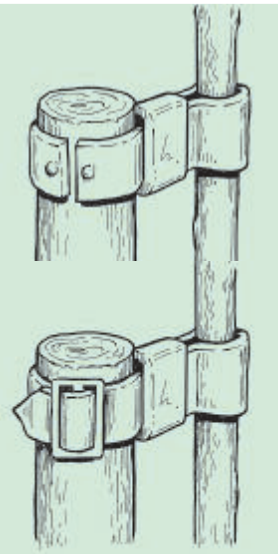
For large trees, two-thirds of the stake should be below ground. It needs to be driven into the base of the pit to make it stable.

Using a single stake



Position the stake first, on the side of the tree facing towards the prevailing wind, to reduce chafing in storms. Position the tree 25 to 50mm (1 to 2in) from the stake.

Attaching tree ties with pads



Fix the pad 25mm (1in) from the top of the stake.

Thread the belt through and either fasten the buckle or tack as shown to allow adjustment as the tree grows.

The right size of pad is important. If it is too small it can split as the tree grows. The belt should form a loop and not be drawn in tightly by the pad.

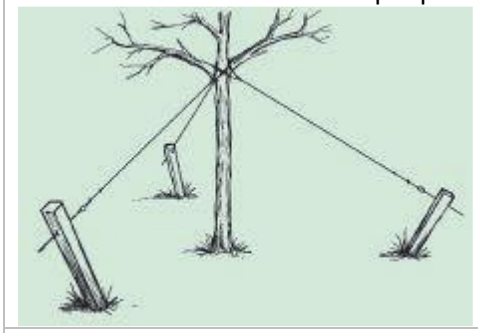
No stake should extend higher than a third of the height of the stem. Use a single flexible tie, to allow movement. Old inner tubes and tights are suitable, though not particularly attractive. A pad between the stake and the tree is always necessary.

If trees are well tended, roots should have grown enough to anchor them two years after planting, when stakes should be removed. Sometimes it is best simply to cut off the stake at soil level, being careful not to damage the bark. This will avoid disturbing the roots.

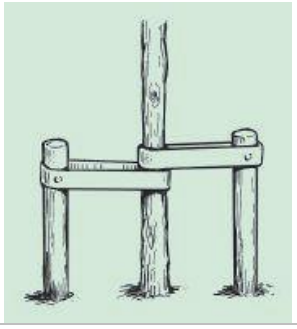
Other methods of staking trees

There are also various methods for staking trees in particular situations.

Guy ropes
Only suitable for large heavy standard trees on sites where there is no risk of people tripping.

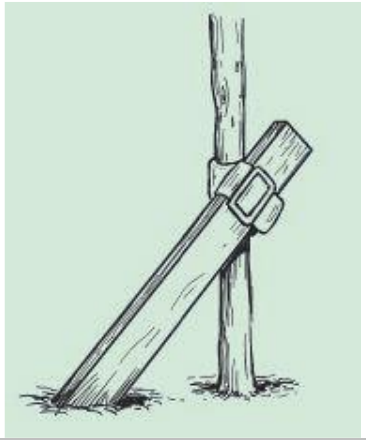


Double stake
For windy exposed sites



Angled stake

Used for trees with a large rootball. Driven into the ground after planting.



<u>Find out more</u>

- Hillier's Gardeners Guide to Trees and Shrubs
- Collins Tree Guide
- The Garden Tree, Alan Mitchell and Allen Coombes
- Encyclopaedia of Gardening, RHS
- Trees in Your Ground, The Tree Council
- Trees: Their Use, Management, Cultivation and Biology.
- A comprehensive guide, Bob Watson

References

1. Tree Roots and the Built Environment – Urban soils for amenity trees, page 79, DCLG Research for Amenity Trees No 8