

# ABUNDANT BORDERS



Creating a network of local food production in the Scottish Borders

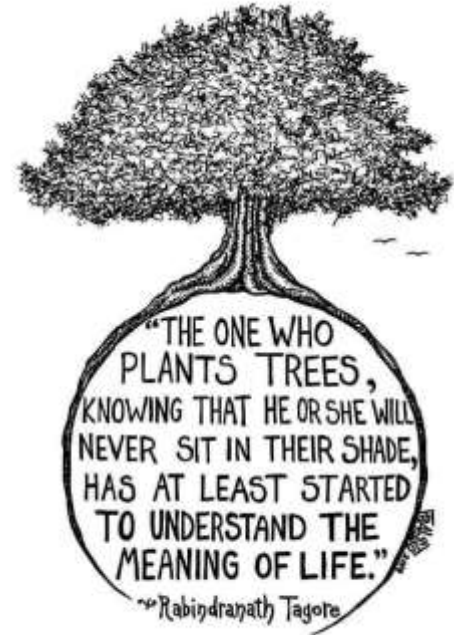
**visit** [www.abundantborders.org.uk](http://www.abundantborders.org.uk) **contact** [robin@abundantborders.org.uk](mailto:robin@abundantborders.org.uk)

# TREES

When we plant trees, we think that we are introducing them into our garden space, when it is really our gardens that have been sited in the tree space.

- Around 11,000 years ago, after the last ice age, Britain became colonised by trees
- 5,000 years ago the land was forested as far as Shetland and the Western Isles
- With early farming, woodland cover began to decline, until the time the Romans invaded Scotland in AD 82, at least half of the natural woodland had gone
- In the 17/18th centuries woods were exploited for timber, charcoal and tanbark
- By 1900, woodland covered only about 5% of Scotland's land area, in small and isolated blocks

When we plant trees, we can re-create a natural landscape - **Re-Forest Gardening!**



# RE-FOREST GARDENING

The median garden size for a house in London is 140 square metres, just over half the size of a tennis court. This compares with 226 square metres in Scotland as a whole, while here in the Scottish Borders this rises to 406 square metres.

Imagine if all those gardens were forest gardens, filled with an abundance of food, fuel and happy folk and a joined-up habitat for wildlife.

Let's start by taking a few moments thinking about a tree.

What do you see? What don't you see?



# WHAT IS A TREE

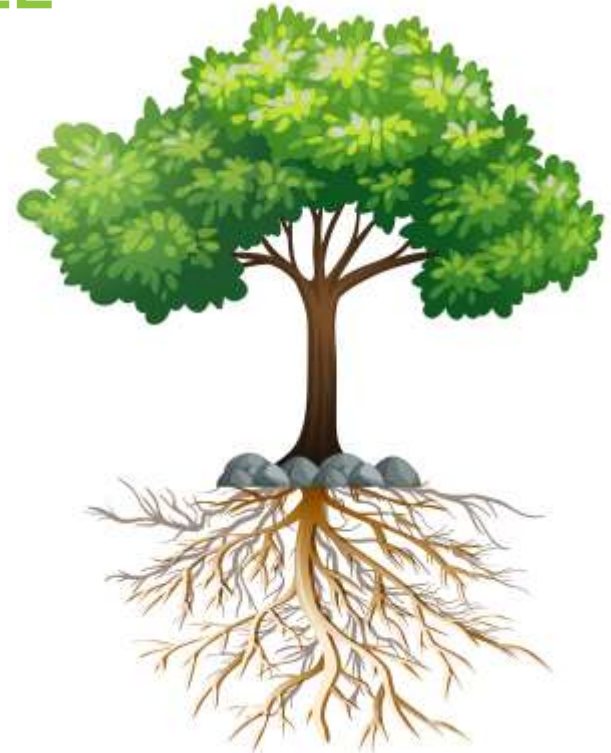
**Trees are plants like any other – the ultimate garden perennial**

**Leaves:** leaves which turn air and water into sugar by the process of photosynthesis (see module three)

**Trunk:** The bark is a specialised stem which provides protection from physical damage, insects and extremes of temperature

**Roots:** have two jobs, they feed nutrients and water into the tree and form the structure which keeps the tree upright

In thinking about, and caring for, a tree it is important to think below ground – what we can't see – as well as the part of the tree we see above ground.



# WHAT IS A TREE - LEAVES

A leaf must absorb CO<sub>2</sub> and light and at the same time be able to restrict heat intake, minimise the risk of freezing and control water-loss through transpiration.

Round leaves are better at absorbing sunlight but are more prone to wind damage. Larger leaves tend to be lobed to better withstand the wind. Leaves at risk of being regularly frozen tend to be needle shaped as a reduced surface area reduces the risk of freeze damage. This is also true for trees in arid zones, as reduced surface area minimizes water loss.

## Broadleaf:

- Simple leaves are whole, not divided. Their edges may be different, smooth like beech, toothed like lime or lobed like hawthorn
- Compound leaves are divided into separate leaflets, like ash, elder or rowan

## Conifer:

- Scale leaves, like cypress
- Needle leaves, such as pine, spruce and larch

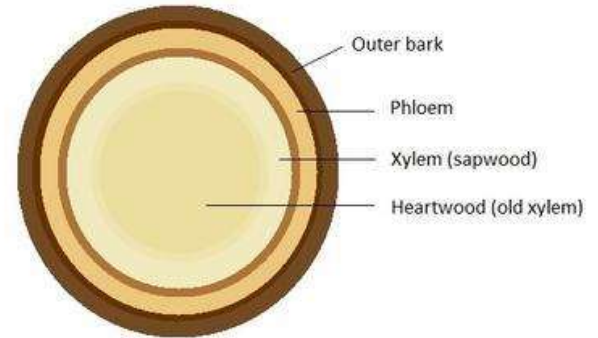


(This image is available as a download with this module)

# WHAT IS A TREE - TRUNK

The **Tree Trunk** has several layers:

- **Outer bark** provides protection from fire and insects and provides insulation against extremes of temperature
- The **phloem** is a layer of cells forming a pipeline to bring the sugars from the leaves to the rest of the tree. As the cells die, they build up the outer bark
- The **cambium** is the part of the trunk which grows. Each year it makes more phloem and sapwood which grow more slowly in the winter resulting in the production of the tree's annual rings which allow us to age a tree
- The **sapwood** is xylem tissue containing living cells, usually around the outside circumference of a tree. It carries water and nutrients from the roots to the leaves. As new layers develop, the older layers die and become heartwood
- **Heartwood** is the dead wood at the centre of the tree which gives it its strength





# WHAT IS A TREE - ROOTS

**Roots:** have two jobs:

- they feed nutrients and water into the tree
- form the structure which keeps the tree anchored and upright

The majority of tree roots are close to the surface. Soil disturbance around the tree should therefore be kept to a minimum as it may affect the structure and take-up of nutrients by the tree

Trees have fungi that live in and on the root cells which help the trees absorb water and nutrients. In return, the fungi obtain nutrients from the tree.



# BENEFIT OF TREES

**Take a few minutes to think of benefits and uses of trees**



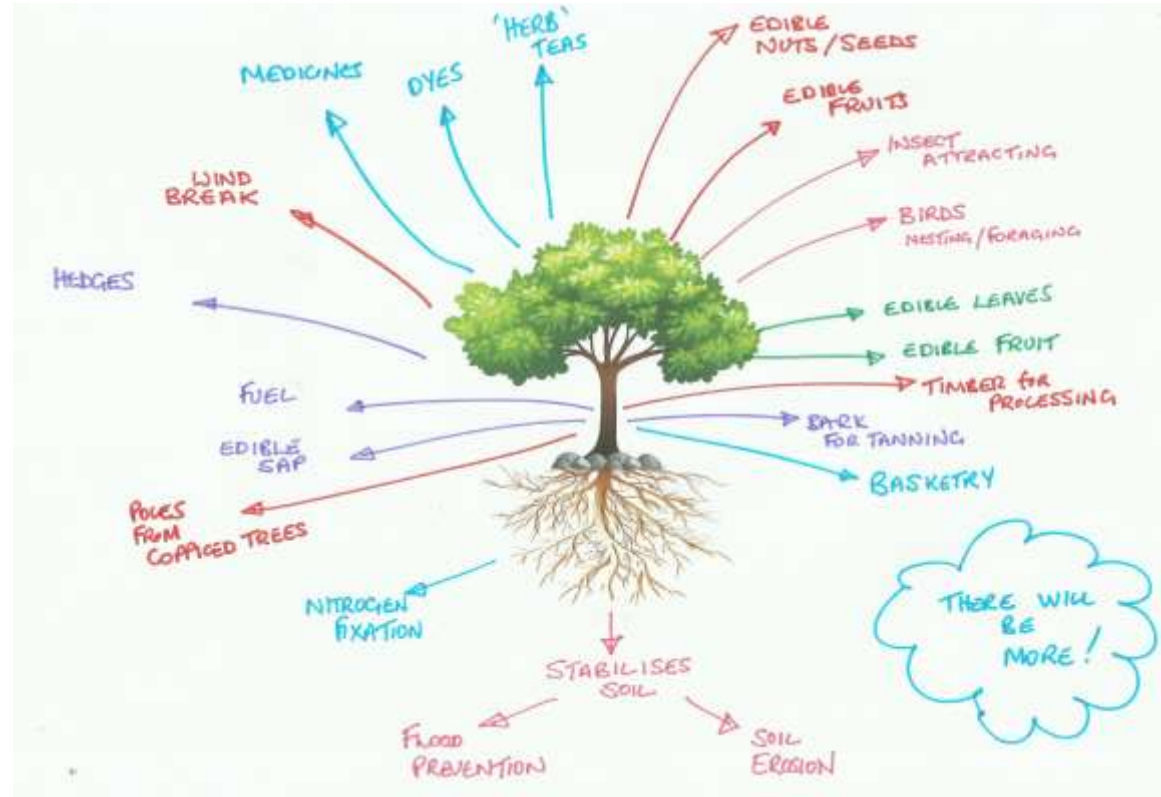


# BENEFIT OF TREES

With trees offering so much to the garden, how to choose which trees and how many?

As we saw in Module 3, choosing the right plant for the right place involves developing a good understanding of your own garden.

**Take time to think about what you already have. Think about what you might need, then move on to what you want.**



# CHOOSING THE RIGHT TREES

## Tree density

- When they are young there always seems to be loads of space around them, but think big tree!
- Think about shading and getting sun to the lower layers of the forest garden
- Rubbing branches can cause damage and disease
- How will the tree work with the other plants in the garden

## Location

- Think about having the lower trees at the south side of the garden with higher trees to the north. This helps to minimise the total amount of shade cast

## Your taste

- No point in having lots of lovely medlars if you don't like or know what to do with them.

## Nitrogen fixation

It's good to have some trees that can fix nitrogen

## Insects

It's good to have some trees that attract insects for pollination – and if you attract insects you will attract birds too!

Try to select trees that cover as many of your criteria as possible. For example it may be that at one edge you need a wind-break but you could look at trees that are good for this but can also fix nitrogen and are good at attracting insects

Think too about how diverse a natural healthy wood is. It's not trees of the same variety lined up in rows like an orchard. Have different species co-existing to give the garden a more natural feel

# CHOOSING THE RIGHT TREES

Other things to think about:

- Hardiness, vigour of growth and disease resistance
- The overall height you want in your garden
- Are there soil differences across your garden?
- Is your garden completely flat or on a slope?
- You may need to site trees to ensure cross-pollination
- Some trees are detrimental to others, for example poplars and willows have very competitive roots
- Plan where you put nitrogen-fixing trees. It's good to have them next to fruit trees which give you a consistently good crop.







# Any Questions?

We will have a Q&A each Wednesday morning 10am to 12 noon to answer questions in real time.  
But please feel free to post your questions to the group at any time.

# GROWING TREES

**Question: When is the best time to plant a tree?**

**Answer: 20 years ago**

**Question: When is the next best time to plant a tree?**

**Answer: Now!**

## From Seed

- This is a really good way to get native trees as seeds like chestnuts, hazelnuts and acorns are easy to find
- It takes a LONG time to grow trees this way
- Apples do not reproduce true to type, meaning that the tree from the seed will produce apples that are almost certain to be different than the parent

## From Cuttings

- Conifers will grow from shoot cuttings placed in well-draining compost
- For other trees, cuttings can be **grafted** on to root stocks. This technique is thousands of years old and is the only way to guarantee that the fruit grown on a new tree is the variety we want

## Air Layering

- For trees that do not root readily from cuttings and which often lack low-growing shoots suitable for conventional layering, such as hazel



# GRAFTING TREES

Living material is taken from the tree you want to grow and attached “grafted” onto an existing, rooted tree

It is a fiddly but straightforward process and

**SUCCESS COMES WITH PRACTICE**



Image courtesy of Graham Bell, The Permaculture Garden



# ROOTSTOCK

Almost all fruit trees are grafted onto a rootstock. The scion determines the fruit variety while the rootstock determines the characteristics of the tree as a whole.

Choose your fruit trees based on

**Yield:** the right amount for your needs, particularly for fruits that don't store well

**Space:** choosing dwarf varieties would allow more trees of different varieties in the space

**Reach:** how tall are you? How able are you to climb ladders for picking?

**Lifecycle:** dwarf varieties tend to crop earlier but live less long

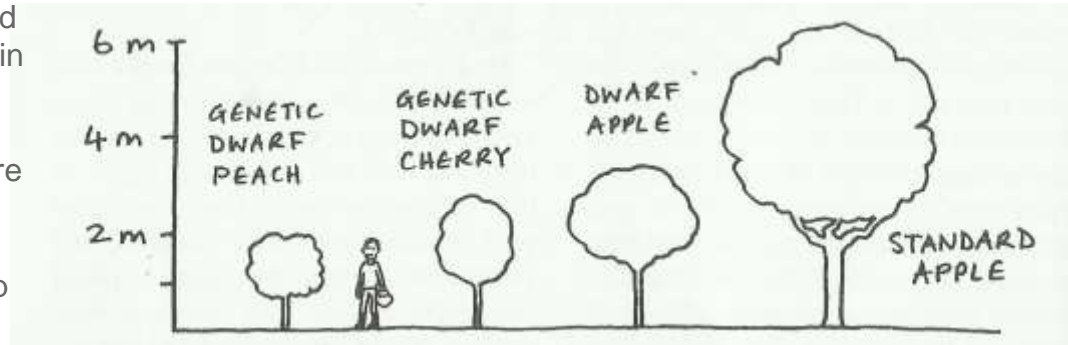


Image courtesy of Graham Bell, The Permaculture Garden

# PLANTING TREES

## Prepare your site:

- Mark where the trees are to be planted
- Ensure that the planting area is free of grass and other plants, especially if the trees are young. Planting will be easier and the trees will not have to compete for water and nutrients
- Make sure you leave sufficient space between trees. Remember to think BIG TREE and how much space the fully grown tree will need
- Remembering the permaculture approach of attempting to follow nature, try not to plant in lines
- Choose the right time to plant:

- Cloudy weather when there isn't as much sun
- Plant early in the morning or late in the afternoon
- Plant when the tree isn't in full growth  
October – April in Scotland



# LOOKING AFTER TREES

- Be careful about activity around the tree, including parking close to a tree. If the ground becomes compacted over time it can kill the tree
- Be careful when mowing or strimming close to a tree, you don't want to nick the bark as it could be an entry point for disease
- Mulch your tree, starting a couple of inches from the trunk extending to the drip line
- Young trees (up to four years approximately) benefit from watering and being fertilised. This is unnecessary for mature trees
- Watch out for disease by checking your trees regularly. Also check for insect activity and mushroom growth around the base of your tree
- Pruning should be judicious. Mature trees don't tend to need pruning unless branches are rubbing but fruit trees can benefit from an annual prune. Thin, crowded growth should be cut away and again any rubbing branches removed





# PRUNING FOR PRODUCTIVITY

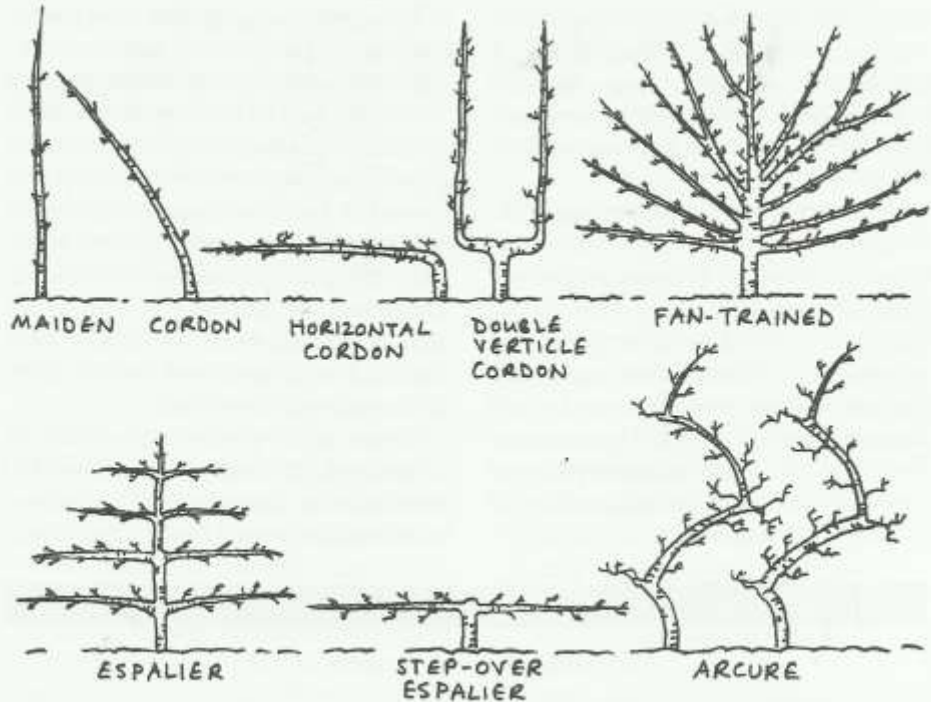
**Maiden:** a single stemmed young tree, ranging from 1-2 metres tall

**Cordon:** a single stem with short side-shoots usually trained to 45 degrees but can be horizontal (stepover) or double

**Fan trained:** multiple branches from near the base. These trees generally need a spacing of not less than 8', and a usable height of 6' or more

**Espalier:** grown flat against a wall or a free-standing trellis

**Arcure:** trained on a trellis in a succession of arcs



*Trees pruned to shape give high productivity from small land areas.*

Image courtesy of Graham Bell, The Permaculture Garden





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# FRUIT BUSHES

Scotland has the perfect climate for growing soft fruit, with many plants growing freely in woodland and hedgerows. There is an information sheet with pointers to good fruit bushes to choose along with this module.

Picking fresh blackcurrants is one of the delights of early summer and foraging for brambles late on is the first sign of autumn.

In a Scottish Food Forest garden, fruit bushes are the perfect plant for the shrub layer, particularly as red currants, white currants and gooseberries are shade tolerant and grow well in the dappled shade of fruit trees.

Growing, propagating and caring for fruit bushes is easy too!





# FRUIT BUSHES

## Growing from Seed

All berries can be 'pulp'd to remove the seed from the skin and flesh:

- Take stalks of berries and place in a bucket
- Mash ( not too rough that you break the seeds) with a blunt tool (old tool handle)
- Use a hose with jet nozzle to fill the bucket with water (the power helps break seeds from flesh)
- The heavy seeds will sink, non-viable seeds, skin and debris will float
- Pour through a sieve so that the wastewater goes onto compost heap
- Rinse and repeat
- Collect and plant or store the (relatively) clean seeds



<https://treegrowing.tcv.org.uk/grow/extraction/berries>

# FRUIT BUSHES

## Growing from Cuttings

It's easy to propagate your fruit bushes by taking hardwood cuttings from healthy plants over winter:

- Choose a healthy stem from this season's growth
- Reduce the cutting to about 20-30cm by cutting at the base and removing the soft growth at the tip
- Remove all but the top 3-4 buds (leave all on with blackcurrants)
- Make a narrow trench in the soil if planting outside or fill a pot with compost
- Insert cuttings to about half their depth, fill in the trench and water
- Leave in situ throughout the following growing season and then plants can be moved to their final site

**In practice, cuttings can be taken at any time during pruning and simply put into the ground. There may not be 100% success rate this way but you will still have lots of new plants!**

Picture is of last years prunings, grown on in compost filled fish boxes being relocated to community gardens







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# FURTHER INFORMATION

## Books

- The Permaculture Way, Graham Bell
- The Permaculture Garden, Graham Bell
- Creating a Forest Garden, Martin Crawford
- Permaculture 1, Bill Mollison and David Holmgren
- Permaculture, A Design Manual, Bill Mollison
- People and Permaculture, Looby Macnamara
- The Grafters Handbook, R J Garner

## On-line

- The Permaculture Association - [www.permacultureassociation.org.uk](http://www.permacultureassociation.org.uk)
- Permaculture Scotland - <https://Scotland.permaculture.org.uk>
- Abundant Borders - [www.abundantborders.org.uk](http://www.abundantborders.org.uk)
- Royal Horticultural Society - [www.rhs.org.uk](http://www.rhs.org.uk)

## Facebook groups

<https://www.facebook.com/groups/virtualcommunitygarden/>  
<https://www.facebook.com/groups/foodcommunities/>  
<https://www.facebook.com/groups/permaculturescotland/>  
<https://www.facebook.com/groups/reforestingscotland/>

# THANK YOU

We are a small, growing charity (SCO49008) supported by several organisations.

We are grateful for their support - without which we wouldn't be able to do what we do.

Thank you

