Guidance for Woodland Tree Planting

Introduction

There are many reasons for planting trees and the balance of these objectives should be considered carefully in planning new woodland so as to make the best choice of management systems and species. It is important to consider all the major objectives; timber production, landscape, conservation, sport, recreation, shelter and minor products, because if one objective alone is followed, opportunities could be missed which may become more important as the woodland matures. The choices made at the planting stage are likely to have a major effect on the use, attractiveness and profitability of the woodland.

1. Preparing the planting site

To aid tree establishment it may be necessary to do some ground preparation before planting takes place to improve the soil conditions, suppress weeds, or provide a suitable planting position. Usually this involves some form of cultivation, although weed control may be suitable. Ground preparation operations may include pre planting weed control, soil manipulation for drainage, to break up pans and for cultivation. It is a generally accepted that the objectives of ground preparation should be achieved with minimal soil disturbance.

The timing of ground preparation operations is crucial to ensure tree establishment benefits are maximised while environmental impact is minimised.

The following should be considered

- Ground preparation should be undertaken during dryer periods; in very wet weather there is potential damage to the soil structure and a serious increase in water run-off and erosion.
- There may also be potential to damaging soil structure in very dry weather – drought conditions
- Sites with potential weed problems can be considered for cultivation in the autumn. This will minimise the weed colonisation before planting
- Generally leave 2 months before planting to allow cultivation to settle.

2. Protection

You will need to plan how to keep rabbits, deer, hares and voles away from your trees as well as avoiding damage from stock. Leaving planted trees without protection, even overnight, is likely to result in damage so get your fences and shelters on sites before

planting. Choosing whether to use fences or tree shelters is mostly a matter of looking at the pros and cons and the relative costs for your project.

A variety of tree shelters are available for protection against hares, rabbits and voles.

Tree shelters - Pros	**Tree shelters - Cons**
Can be cheap for small areas	Can be knocked or blown over
You can always find the trees	Young trees may be less stable on exposed sites
Keep herbicides off	They prevent low shrubby growth
Easy to fit	Must be removed
Individual protection	Can be expensive for close spaced planting
Help reduce plant stress	
More rapid initial tree growth	

Different styles of fencing can be installed to protect against cattle, horses, sheep and deer. A buffer zone is needed as stock can reach over fences and graze the trees. Please see Appendix 1 for the minimum Glastir Fencing Specification.

Fencing - Pros	**Fencing - Cons**
Can be cheaper for large areas	Needs regular checking
Allows shrubby growth to develop	If broken or in deep snow, all trees are at risk
Keeps stock out	May restrict wildlife
More permanent	

Grey squirrels can be a serious threat to the establishment and long term survival of trees, especially broadleaves. If there are trees or woodlands anywhere near your new woods then squirrels may be a threat. Gnawing and stripping of the bark can result in die back of the upper parts of the tree or death if they are attacked near the base. Certain species are more vulnerable and if squirrels are abundant locally then species choice will be important.

They can be controlled by shooting, trapping, or poisoning (restricted in certain parts of Wales).

2. Tree Species Choice

Careful consideration should be taken on whether to choose native or introduced species. The species must be chosen to best suit the site conditions and the objectives of the woodland. It must be taken into account that the local environment is likely to change over the coming decades and plants should be sourced from nurseries where seed has been collected at comparable elevations to those where planting is proposed.

'A guide for increasing tree species diversity in Wales' provides advice on species choice. This can be found at www.forestry.gov.uk/glastirwoodland

4. Selecting Planting Stock

Good quality plants lead to the best results. Do not try to cut corners to save a few pence as it is not worth it in the long run. If you are not happy with the plants supplied, do not plant them. Contact the nursery the same day, tell them what you think is wrong and ask for replacements. Nurseries keen to keep a good reputation will be helpful. The table in Appendix 2 may help you organise your tree order.

Young trees are grown in the nursery using several different techniques. The major difference is whether a tree has been grown in a nursery bed and sold as bare rooted or in a small container.

When trees are planted, any damage to the roots is a key factor in the tree's survival. Small trees are easier to handle and plant, so they tend to sustain less damage and often grow faster than larger plants. This is why you should obtain forestry-sized plants rather than whips or standards. Ideally these should be between 25 and 45 cm, with nothing over 60 cms. On exposed sites they will be easier to establish having less "sail area" than tall leggy plants. The plants should also have a well-developed root system with plenty of small fibrous roots.

Good quality forestry plants will:

- Be from a reputable commercial nursery
- Be only one, two or perhaps three years old
- Be undamaged and moist
- Have plenty of small fibrous roots
- Appear sturdy and well proportioned
- Have a good colour and scent if conifer

A container grown oak

A bare root oak

5. How do I take good care of plants

Once the trees are delivered from the nursery it is likely that you will need to store them temporarily before you are ready to plant. These trees are very young, easily harmed and just starting out on a century of life. Upon receipt open up a number of bags at random and check the trees for size, quality and number. To check whether a tree is alive scrape a sliver of bark off the main stem, if it is alive it should be green/white below the bark. If it is dead or dying then it will be brown/yellow. Check that the roots are not damaged and that there is fibrous root present. Containerised plants can remain in the 'pots' until needed if they are kept moist. For bare root plants, many nurseries use special bags that are white outside and black inside to help maintain an even temperature. If you intend to plant soon, (within four weeks), then they can usually stay in these bags. For longer storage, you will have to take the trees out and cover the roots with soil.

Plants need protecting from:

- Rough handling
- Rabbits, hares, voles, livestock and deer
- Direct sunlight

- Frost
- Wind and strong draughts
- Harmful substances

Before the plants arrive, decide where to put them

- Choose a place that is free from frost
- Choose a place that is cool and shady all day: inside a barn or under the shade of trees are good places
- Keep them away from oil, diesel, chemicals and fertilisers
- Containerised plants will arrive in trays or boxes and you will need enough floor spaces for these
- Make sure they are out of the wind and strong draughts as these can dry out the tops and kill the roots within minutes. Bales give good shelter
- Make sure animals cannot get at the plants. Use temporary fence or the corner of a pheasant pen if you can make it rabbit proof

Look after them until they are planted

- Carry the plants gently and set them down carefully. Dropping or throwing them can cause expensive losses later
- Containerised plants may require watering, so do so if necessary using clean water
- Never allow bags of plants to overheat. If plants get warm, open the tops of the bags a little to let air in, but do not allow plant roots to dry out
- Always place bags and trees upright, spaced singly with more than 25cm between each bag
- Do not stack bags of plants or place in heaps.

6. When to plant

Trees should be planted whilst dormant. Planting any trees when they are growing will reduce the success rates as the root system of the stressed tree will not be able to provide the immediate water needs of the foliage. In lowland areas, plants are usually dormant from October to the end of March, although in mild autumns it may be November before plants can be lifted in the nursery. Cell grown stock can be despatched from the nursery at any time of year and may be planted from late September in years when late summer

rainfall has been plentiful. The table in Appendix 3 may assist in the planning and timing of operations for your new woodland.

7. Planting

When planting starts take bags to the site and keep them shaded. Only take a days worth of plants to site. It is essential that the tree roots are not allowed to dry out whilst planting, so carry the trees in a planting bag to keep them moist and only take one tree at a time out of the bag.

Single notch planting is the most commonly used technique for planting bare rooted trees. This is the fastest and simplest method, and will result in good quality planting when done correctly.

- Poor planting which exposes the root system can increase drying out damage in early summer
- The planning, handling and planting procedure ends when the trees are finally planted
- Do not allow the condition of the trees to deteriorate during planting or on the planting site
- Do not prune the roots when planting

Do not allow roots to be pushed in with the spade

The correct planting technique using a spade is shown below

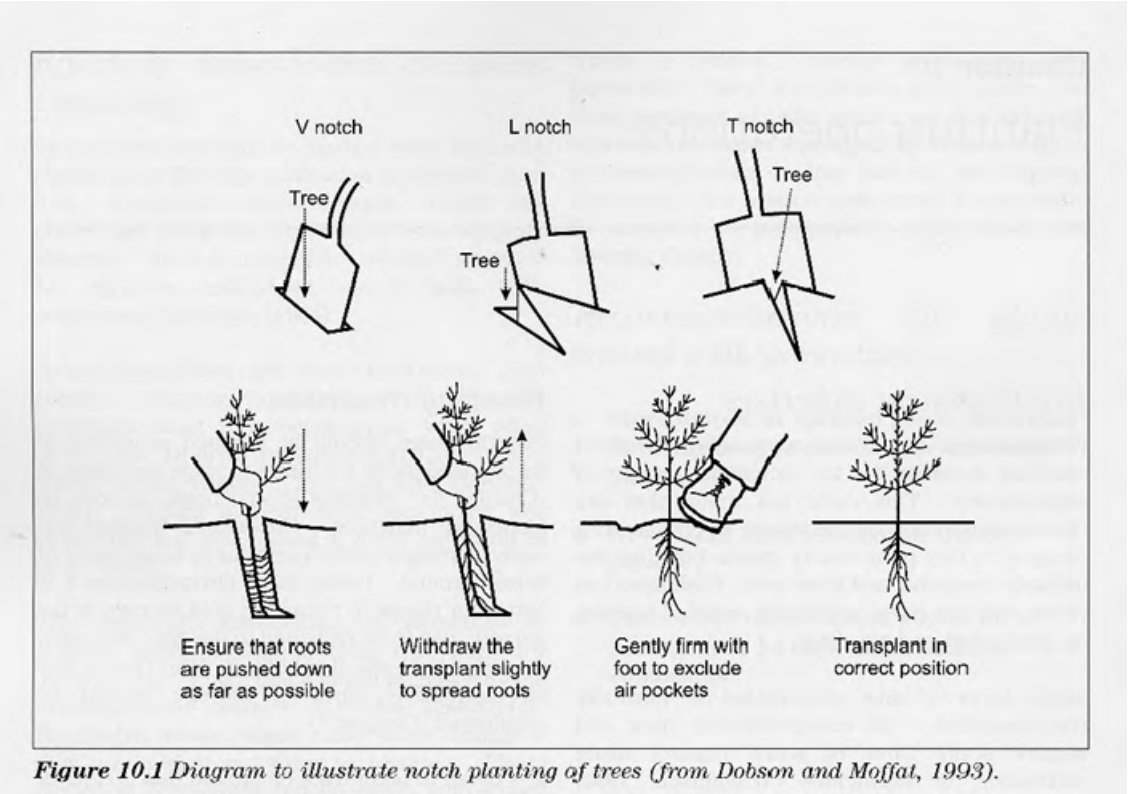
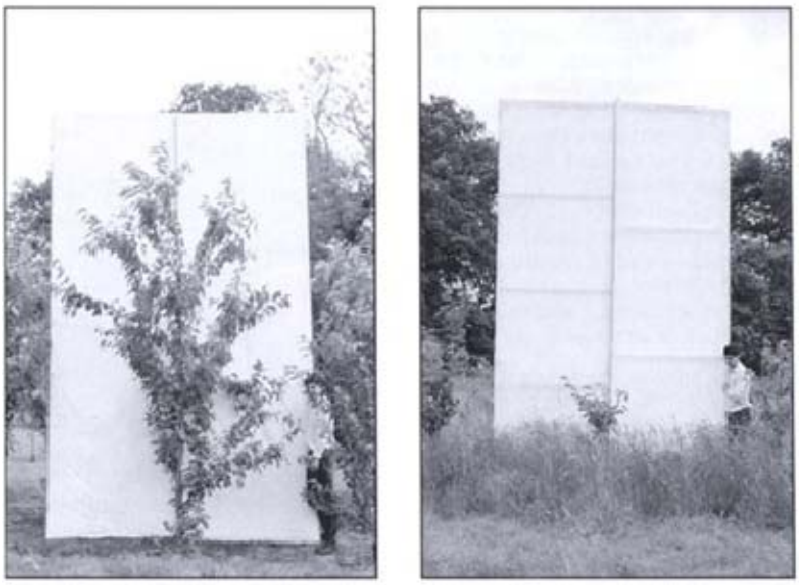


Figure 10.1 *Diagram to illustrate notch planting of trees (from Dobson and Moffat, 1993).*

8. Weeding

Weeds can kill young trees by competing for light, nutrients and moisture. Lack of water becomes critical when the ground cover is dominated by grasses. You will need to weed each year until the trees are established. If the trees have got off to a good start you will normally have to weed for 3 years. It's important to remove the weeds before the trees start growing each year. The photograph below shows the difference in growth rates of a tree where weeding and no weeding have taken place.



Good growth of wild cherry, after four years with total weed control through the use of herbicides (left). Poor growth of wild cherry, after four years with no weed control (right). (Photos: Forestry Commission)

Forestry Commission research has shown that a weeding a circle of 1m around each tree is the minimum requirement for good tree establishment. If ground preparation has been carried out as detailed earlier there should be little need for weed control during the first growing season as the vegetation will have been killed by screefing or mounding.

Grass present or reappearing by the end of the season can be controlled by the application of mulch, soil acting herbicide during the winter months, or control can be left until the spring/summer of the following year. Whatever method is chosen it is vital for the success of the trees that these operations are planned and carried out effectively.

There are 3 basic techniques to consider

Mechanical weeding – cultivating / hoeing

- Requires no special skills

- Effective
- Needs to be done several times each season
- Difficult to get close to the trees without damage

Chemical weeding – herbicides

- Relatively cheap
- Very effective if applied properly and at the right time
- Most trees will need to be protected form the spray of herbicide
- You can only use chemicals which have approval for use in woodlands

Mulches – organic mulch or plastic/fabric mats

- Effective, however stem damage at ground level can occur from voles that nest in or under the mulch. Severe damage can kill the trees.
- Organic mulches must be well rotted
- Mats need to fitted and fixed correctly
- Loose mulches e.g. organic matter may need to be topped up occasionally

Weed cutting or mowing is not an option. This does not help the trees and can cause the weeds to grow even faster. You will need to choose one method or a combination which you can guarantee to carry out within your budget and time constraints.

9. What if any trees die?

100% success rate is rare, but you want your woodlands to succeed and the grant scheme contract will require you to achieve a minimum level of survival. 'Beating up' is the term used for the planned replacement of those trees that die. Good planning together with planting sufficient numbers of trees carefully and properly to start with are always more cost effective than having to replace dead trees. Nevertheless, if you need to replace trees it is very important to get the job done as adequate stocking levels are vital to the success of your project.

During the first summer, keep an eye on the trees. If many appear to be dying, get advice quickly. If everything looks okay, concentrate your efforts on weeding and protection. It's easier to spot dead trees and check on weed growth in mid summer and

early winter so make sure you inspect the trees at these times. You can then plan the replacement of losses and next seasons weeding. During the second and third summer, count any dead trees and place an order with the nursery ready for planting in the next season.

Seek professional advice if the following occurs before you spend any money on replacing trees:

- When more than 20% of your trees have died overall
- When the dead trees are mostly of one species
- When deaths are concentrated in one area

Appendices

Appendix 1 – Glastir Fencing Specification for Woodland Creation

Fencing timber must comprise of either hardwood produced from Welsh woodlands or pressure treated softwood. Your Project Officer may be able to provide a list of sources of Welsh hardwood and/or pressure treated softwood. A minimum life of 10 years is required for all timbers used.

Trees shrubs must not be used as strainers or fencing posts nor should they be used to support fencing wire, staples or netting.

Fencing timbers, line wire, netting and staples used to construct approved fence lines must always consist of new materials. The standard payments include an allowance for the dismantling, removal and safe disposal of existing derelict fences. All materials and construction standards must also conform to the following detailed specifications in addition to British Standards 1722 and 4102

Straining posts must be a minimum of 12.5 cm cross section and at least 2 metres long of which 1 metre must be below ground level unless otherwise agreed with the Project Officer. Straining posts must be placed at either end of the fence line and at centres of 100 metres or less as well as at every horizontal or vertical change of direction.

Straining posts must be strutted at each end of the fence line and at all changes of slope and direction. Struts must have a top diameter of at least 6.5 cm and must be supported with either a base plate or a suitably positioned intermediate post.

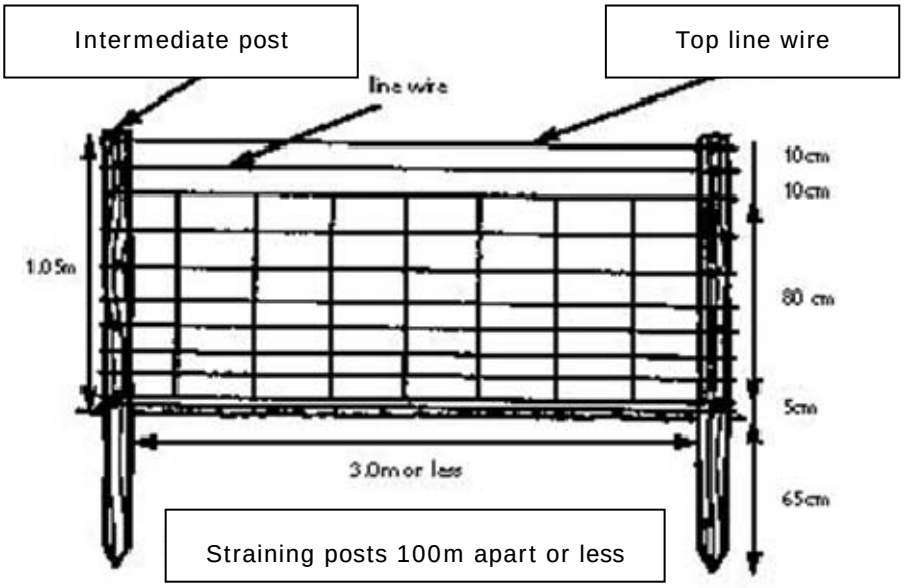
Intermediate posts must be not less than 6.5 cm diameter (round posts and sawn timber) and at least 1.7 metres long. Half round posts are acceptable provided they measure at least 6.5 cm from the mid point of the sawn side to the mid point of the round side.

Intermediate posts must be set at centres of 3 metres or less. All wire must be affixed to the posts with galvanized staples with the distance from the ground to the top wire no less than 1.05 metres.

All stock netting must be protected by galvanizing and at least one line wire must be used above the top of the netting. The distance from the ground to the top wire must be no less than 1.05m. In cases where there is heavy pressure from sheep or cattle it advisable to add a second line wire on top of the netting as well as an additional wire at the bottom.

All netting and wire must be affixed to the posts with galvanised staples

Diagram of stock netting



Appendix 2 Plant supply order

Species	Trees per hectare	Size	Bare root or container	Compartment	Compt area	%	Area per species	Trees to be ordered
e.g. Ash	2,500	20-40 cm	Either	1a	1.2 ha	30	0.36	900

Appendix 3 Sequence of Events

Depending on site conditions and establishment success maintenance may be required after year 3

Operation	Year 1				Year 2				Year 3			
	Jan-mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-mar	Apr-Jun	Jul-Sep	Oct-Dec
	Area where work is needed											
Ground Prep												
Fencing												
Order plants												
Planting												
Weeding												
Inspect trees & count losses												
Beat up (replace losses)												

Guidance for Woodland Tree Planting

All new planting should take into account the following guidelines

FC Forest Water Guidelines

FC Archaeological Guidelines

FC Forest Conservation Guidelines

FC Forest Recreation Guidelines

UK Forest Standard

UKWAS

Certain works you may be carrying out under your Glastir Contract may require permission or a licence before they are undertaken. In all cases it is the responsibility of the Contract Holder to contact the relevant authority to obtain the necessary permission or licence. The Project Officer may be able to provide information on suitable contacts. The Welsh Government cannot be held responsible for any failure to obtain such permission or licence. You will be responsible for ensuring that all safety requirements are observed when undertaking any work. Your local LANTRA and Health and Safety Executive can advise on this.