

What ye sow so shall ye reap.

| 36.

Planting

Chris Beadle and Dugald Close

Why plant carefully?

Good planting technique will maximise the survival and growth of your trees and allow them to take full advantage of subsequent management, including fertilising, weed control, and control of stock and browsing animals. A well planted, healthy and productive tree will more quickly reach a size where it will do what it was planted to do.

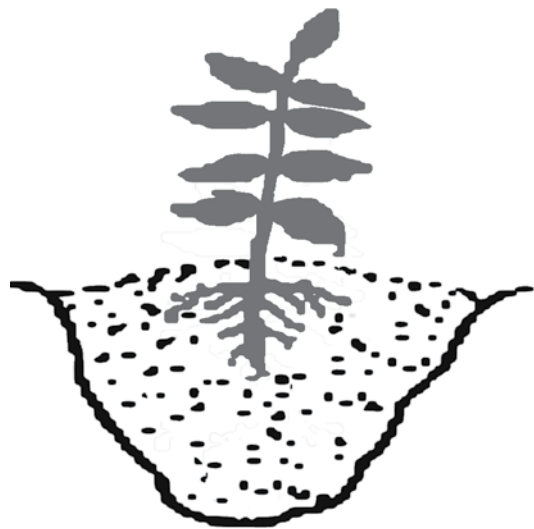
Selecting your planting stock

When selecting stock, the first task is to select species that suit the site into which you are planting (see [Chapter 32, Matching species to site](#)) and matches the objectives of your planting (see [Chapter 30, Plan for tree planting](#)). Objectives may be environmental, relate to shelter and amenity or involve commercial forestry.

Regardless of the type of planting considered, the planting stock chosen should be in the best possible condition. The discussion of quality of planting stock below focuses on commercial forestry species but can be equally well applied to other types of planting.

Environmental plantings

For environmental plantings of native trees and understorey shrubs (e.g. to create vegetation corridors to link remnant patches), planting stock should be grown from seed collected in local native stands of the species (see [Chapter 32, Matching species to site](#)). There are a number of nurseries that specialise in native Tasmanian species and will provide stock grown from a local provenance, or will organise to collect local seed of a particular species where this is necessary.



Careful planting is essential.

Poorly planted stock have poor survival and growth. If roots are not placed in the soil with care the tree will be more susceptible to windthrow because of poor root development.

Careful planting requires making a planting hole that accommodates the total root volume without distortion. For open-rooted stock, the positive pull technique has the following advantages:

- ▶ avoids J-root (below)



- ▶ avoids air pockets
- ▶ trees are firmed-in
- ▶ avoids stem damage
- ▶ produces straight trees



The positive pull technique for open rooted seedlings

Shelter or amenity plantings

Depending on the site quality and the broader objective of the planting, shelter or amenity plantings could comprise commercial forestry species managed for wood production (where sites are high quality), local native species (in areas adjacent to native forest, or where site quality is low) or special timbers for niche markets (e.g. Blackwood, Chapter 22; or Oak for wine casks, Chapter 23, Exotic special timbers).

Commercial plantation species

Seedlings versus cuttings

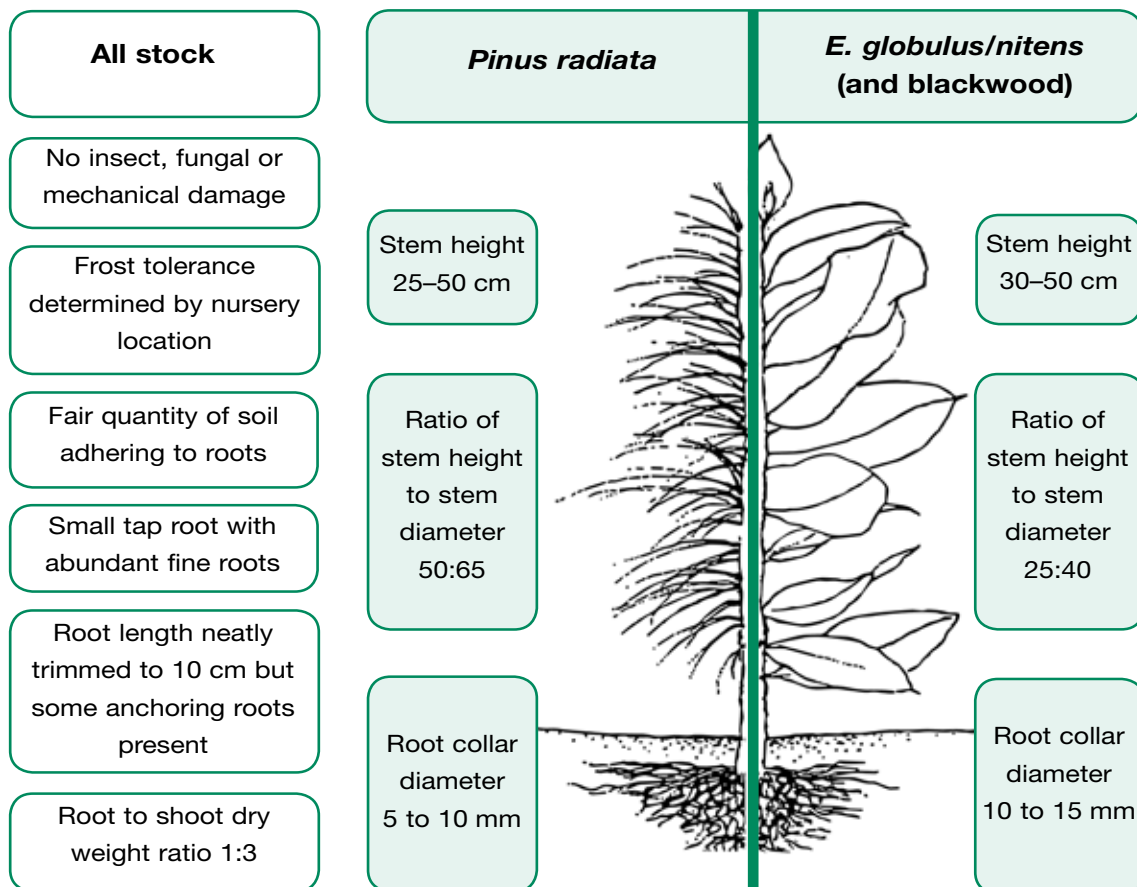
Planting stock may be raised as seedlings or cuttings. Seedlings are cheaper, but for the best planting stock, the seedlings

should be grown from genetically improved seed collected from a seed orchard (see Chapter 32, *Matching species to site*). This stock will give you better quality trees of uniform growth rate and more even size at harvest. Cuttings originating from the same mother tree will be the most uniform in growth and size at harvest. However, there is little genetic variability amongst cuttings and there is a risk of greater damage to the plantation following a single stress (from frost, insects or disease) if the cuttings are susceptible.

Potted versus open rooted seedlings

Potted stock is supplied in paper or plastic pots and these may be single or more commonly, in trays. Potted stock should not have reached a size where roots are bound within the pot. You can check

Figure 1: Desirable attributes for open-rooted planting stock



this by removing the seedling from the container. There should be no spiraling of roots. Modern plastic cells have root trainers on the inner walls to ensure that the roots grow downwards.

Open-rooted stock has been raised in nursery beds from which they are lifted just before delivery. Potted stock may be quite small whereas open-rooted stock, which has usually been grown for longer before sale, may be quite large. However, open-rooted stock does not necessarily grow faster than potted stock.

The quality and size of open rooted stock can be assessed further using the following criteria:

- ▶ the diameter of the stem where the root and shoot meet (root collar diameter: see Figure 1)
- ▶ the comparative size of root and shoot (root to shoot ratio: see Figure 1)
- ▶ the appearance of the roots (root formation; see Figure 1)

Preventing transplant shock

The physical and physiological characteristics of a seedling can have a big effect on survival after planting. Ideally seedlings should be hardy enough to cope with “transplant shock” but have the capacity to grow immediately after planting. Generally, placing seedlings in a holding bay outside the glasshouse for 4 weeks, where they experience normal external temperature, light and wind conditions is sufficient to harden plants before transplanting them into the field.

Naturally regenerating seedlings have ten times as much root as the average nursery seedling of the same size. This is because, in the nursery, water and nutrients are regularly supplied and the root system is constrained by the pot. Therefore immediately after planting, extensive root

growth is required to establish a balance between root and shoot so that the shoot receives an adequate supply of nutrients and water.

To maximise early root growth when a seedling is planted, it must have:

- ▶ Stored nutrient and carbohydrate
- ▶ The potential for high rates of photosynthesis
- ▶ A good balance between root and shoot in the nursery
- ▶ Good root architecture

If seedling stock is to be planted into a harsh environment, nursery practices can be adjusted to increase the level of survival of seedlings. Frost, drought and animal browsing are major influences on early seedling survival. The resistance of your planting stock to all these factors can be increased by hardening. For example, the nursery can harden your stock by exposing it to cold nights (maximum frost hardening of eucalypts is obtained by exposure to minimum night temperatures of 0-4°C for 4 weeks). Root-pruning and starving seedlings of nutrients will also harden stock. Hardy eucalypt stock usually has a red tinge to the foliage. If the site being planted is harsh, avoid material that is lush and green with obvious recent new growth.

Condition of seedling stock

Once you receive your planting stock, make sure it has not been exposed to drying conditions and has not been squashed during delivery. Stock should be planted as soon as possible after delivery. If storage is required, this should be undertaken in cool conditions and seedlings kept watered. Avoid elevated temperatures (minimum temperatures greater than 4°C) that cause dehardening. Avoid exposure to wind which will dry-out seedlings. If open-rooted stock cannot be planted for at least three days, heel into

moist, loose soil without separating the plants. Provided dehardening is not an issue, seedlings can be placed at the edge of a dam so that their roots are in water but not so the potting mix is submerged.

Planting technique

Once you have chosen your site (Chapter 33 Matching species to site) and prepared it (Chapter 34, Site preparation) you are ready for planting. Planting should be scheduled to avoid the risk of severe frosts on cold sites and early drought stress on dry sites. On frost-free sites plant as early as possible, usually late winter to mid spring.

If your site is well prepared on ex-pasture you may consider a tractor-mounted planting machine (see Private Forests Tasmania for contractors). There is also a hand held planting device, the Potti Poukki, available. Custom-made or garden planting spades are effective and well-suited to the scale of farm forestry. Mattocks are less effective unless the ground is stony.

Make a planting hole that accommodates the total root volume without distortion. For open-rooted stock, use the positive pull technique (See SNAPSHOT as a guide).

Checking on survival

Between four and eight weeks after planting, survival counts should be made and, if necessary, replant immediately (see *Chapter 14, Quality assurance and assessment*).

References

- Forestry Commission Tasmania (1990). Plantation Handbook. Edited by W.A. Neilsen. Forestry Commission, Tasmania. 270 p.
- MacLaren, J.P. (1993). Radiata pine growers manual. FRI Bulletin No 184. New Zealand Forest Research Institute.