

Seedling and Planting Information

Introduction

This fact sheet provides information to assist in the establishment of plantation forestry trees. It covers seedling orders, transport and storage, and hand planting. For further information on growing trees, look out for other Trees on Farms fact sheets.

Rules of thumb

Good seedling/cutting care and planting technique are two of the most important factors in plantation growth and survival.

Using best practice when establishing your plantation can avoid the need to conduct extra weed control, re-plant, or delay thinning and harvesting your plantation due to poor growth.

Planning ahead will also minimise costs and efforts in maintaining the plantation in the long-run.

To be guaranteed trees for planting, it is necessary to order your trees by December the year before planting. This is when most nurseries will sow their seeds and set cuttings. Typical nursery setups are shown in Figures 1 and 2.

Within South Australia, planting generally takes place between June and August as this is when there is sufficient soil moisture for the plants to have a good start. The actual time will depend on the timing of the opening rains and any applications of residual herbicide.



Figure 1. Container grown pines (source: PIRSA)



Figure 2. Nursery growing healthy eucalypt seedlings (source: PIRSA)

Ordering trees

It is important to select a species that will suit your site and meet your desired outcomes.

Once a species has been selected, it is best to source seedlings grown from good quality seed, or cuttings from select plants to ensure that your plantation has the most appropriate and best available genetics in terms of wood properties and growth. This will help to ensure straighter trees with smaller branches and a faster, more even growing plantation. Healthy bare-rooted pines are shown in Figure 3.

As minor seedling deaths may still occur even with the best practices, consider ordering 5 percent (%) more than you require. These extra seedlings can be used to refill any losses that occur before the end of September in the year of planting.



Figure 3. Bare-rooted pines in nursery beds (Source: PIRSA)

Transporting trees

Seedlings are generally available as container-based stock and are often transported from nursery to planting site in cardboard boxes. Pines may also be available as bare-rooted stock which are transported in bundles of 150-200 wrapped in hessian or plastic, with their tops exposed to the air. They can be delivered via a freight service or picked up by the forest grower. In both cases, the plants should be kept out of direct sunlight and wind during transit. They should be inspected to ensure they are healthy and have a good root development. A healthy container grown eucalypt is shown in Figure 4.



Figure 4. Healthy leaves and root system of a eucalypt seedling ready for planting (source: PIRSA)

Appropriate storage

When receiving your container grown seedlings you should:

- store your seedlings in a protected area. Covering the seedlings with chicken mesh is a good option, as this will allow light to reach the seedlings while protecting them from browsing wildlife. The mesh needs to sit at least 50 centimetres (cm) above the tips of the seedlings and be well supported by sturdy posts.
- ensure that seedling trays are not resting directly on the ground. If they do, the roots will grow through the tray and make seedling removal difficult or even break the roots from the stem. Try storing the trays on raised planks or on sheets of cardboard.
- apply snail bait around young eucalypt seedlings while in storage.
- make sure you water the seedlings regularly throughout the week and more often during windy conditions. Do not allow the seedling soil plug to dry out.

For bare-rooted pines, packs should be handled gently to avoid damage to root systems and needles. Once received you should:

- place seedlings out of direct sunlight and wind and keep the packs moist. Trees kept in this manner should be planted within 4 days. If kept for longer, they will wilt and decompose due to little airflow in the tight bundles. Pines packed in hessian are shown in Figure 5.
- dig a trench in a shady position, remove trees from packs and place in a line approximately 3 trees thick and then back fill with dirt, covering about 5 cm up the needles. Trees should be kept this way if they will not be planted within 4 days. Make sure the soil is kept moist and don't leave for more than 10 days, as they may take root, which will make removal difficult and damage the root systems.



Figure 5. Bare-rooted pine seedlings packed in hessian, ready for transport (source: PIRSA)



Figure 6. Pottiputki planting tool (source: PIRSA)

Planting your seedlings

Planting should occur during winter when there is adequate soil moisture content. This can be tested by checking the top 30 cm of soil for dampness. In South Australia, this generally occurs no earlier than June and planting should be completed before the end of August.

Spacing

Tree growth is influenced by the availability of soil, water, and sunlight resources to each tree. This can be adjusted through spacing and thinning and can affect how fast and straight a tree grows as well as the size of branches.

Generally, the standard initial stocking rate for most eucalypts, including Tasmanian bluegum, is around 1000 trees per hectare in South Australian regions with an average annual rainfall of at least 600 millimetres (mm). Typically, seedlings are planted in rows 4 metres (m) apart, with 2.5 m between trees within the rows.

For pines, the standard initial stocking rate is between 1300 to 1600 trees per hectare in regions with at least 600 mm average annual rainfall, which equates to spacings of 2.5 m to 2.7 m between rows and 2.5 m to 2.7 m metres between trees within the rows.

These stocking rates allow for a 5-10% loss due to animal browsing and other causes.

It also accounts for genetic variability as even the best genetic material will produce seedlings that vary in growth and form. In lower rainfall zones, trees are generally spaced further apart.

If seedling survival is less than 85% refilling can be conducted after second year weed control, where there is a gap of 2 or more trees within a row.

Later the plantation will be thinned in stages where trees are selected for certain wood products, removed due to poor growth, or left to grow larger and harvested later for other wood products.

Hand planting hints

Immediately prior to planting, it is recommended that each tray of seedlings be submerged completely in water until all the air bubbles disappear to ensure they are well watered.

Eucalypt seedlings are generally planted using a tool such as a Pottiputki (Figure 6) with seedlings usually carried in a kidney tray (Figure 7). It is possible for one person to plant up to 3000 trees a day with these tools.

Seedlings should be planted deep enough so that the seedling soil plug is completely covered with soil. It is often common practice to have about a third of the seedling stem under the ground. This keeps the seedling soil plug moist for longer and provides some protection against heavy animal browsing. If large cracks and air pockets are found to be present in the soil, it is suggested that a border spade is used instead of a Pottiputki.

For bare-rooted seedlings/cuttings, the general planting tools used are a border spade and a planting bag (Figure 8). Around 1500 trees can be planted by one person in a day on a second rotation site and about 3000 seedlings on a first rotation site. Correctly planted trees should not be able to be easily pulled out.

The standard planting technique for planting with a border spade is to:

1. Open a hole large enough to take the seedling roots.
2. Place the seedling in the hole such that the roots are not curled up in a 'J' or distorted. This is achieved by placing the seedling

deeper and lifting it slightly to achieve the ideal depth. About 5 centimetres of the seedling stem should be under the soil.

3. Firm the roots at the bottom of the hole, first by driving the planting spade in alongside the hole and pushing in the soil to cover the hole and levering it closed. Make sure there are no air pockets around the roots.
4. Compress the soil around the seedling by firming with the foot on one or both sides.



Figure 7. Kidney tray for transporting seedlings (source: PIRSA)



Figure 8. Planting bag (source: PIRSA)

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