

Introduction

Direct seeding is the sowing of tree, shrub and groundcover seed directly into the ground you want to revegetate. The main reasons people choose this technique over planting seedlings are:

- significantly lower costs; and
- a reduction in the time and labour required.

Preparing to seed

Good preparation is the key to successful direct seeding. Ideally you should start your planning at least 12 months prior to when you want to seed. This will ensure you have plenty of time to fence the site, control problem weeds, and collect seed if you are unable to buy it.

Know your site

What are the soils like, how much rainfall do you receive, are there any weeds or perennial grasses that could present problems, how steep is the land, what species mix will be suitable for the site, do you have a rabbit or hare problem? Write down your answers to these questions, as they will determine things like the most suitable seeding technique, timing of operation, weed control etc.

Timing of sowing

For most areas in the Goulburn Broken, sowing in August and September will give the best results. There is generally sufficient rainfall and soil moisture to enable the seeds to germinate and establish prior to the summer, you have missed most of the frosts, and the ground is beginning to warm up, which is essential for the germination of many species. Sowing at this time also gives the best chance of your weed control being effective through to the next autumn. If your annual rainfall is closer to 500mm, you may look at sowing as early as July, and if it is less than 500 mm, autumn sowing may be necessary.

Sowing techniques

There are several common methods of direct seeding.

Mechanical

There are a number of purpose-built direct seeding machines that can easily be towed behind a tractor, and can sow large areas in a short time. They are generally a one-pass machine, scalping the topsoil, placing the seed, and pressing the seed into the fresh soil with a press wheel. Before the seed is sown, the site is sprayed (or sometimes graded) to control weeds. This technique is suitable for areas which are not too steep. Department of Natural Resources and Environment and Greening Australia have several of these machines for use by landholders.



Figure 1 Mechanically seeded site at Nagambie 9 months after sowing.

Hand spot seeding

This technique is suitable for steep sites, river banks and for seeding in areas where you may want to cause minimal disturbance (e.g. among existing trees). If you have the time, you can use this technique on larger areas. Generally involves spot spraying, and then sowing the seed, often with the aid of a rake-hoe to remove trash, prepare a suitable seed bed, and remove herbicide-treated soil if a residual herbicide has been used. Seed should then be lightly pressed into the soil with the rake-hoe or your boot.

Mouldboard plough technique

On fairly flat areas with reasonably high rainfall and good soil depth, mouldboard ploughing may be an option. The site is sprayed with a knock down herbicide in the late winter, and then a mouldboard plough is used to invert the soil to

create a seed bed and bury weed seeds. Your seed is then mixed with a bulking agent such as sand, and hand-broadcast on the site. It is often recommended that you then drive over around 50% of the site, to ensure good seed/soil contact.



Figure 2 Results of hand broadcasting of seed on a site that has been mouldboard ploughed

Pest control

People often underestimate their rabbit problem, thinking they only have one or two and that these will not cause much damage. However, rabbits can cause your seeding to fail, and may particularly be a problem near roadsides or old tree lines where there is long grass or other harbour. Rabbit control is usually best carried out in the late summer before your winter/spring sowing. At this time, feed is scarce and rabbit burrows are usually easier to find. Contact your local DNRE office for specific advice on what control techniques are best suited to your problem.

Hare control is less likely to be an issue, but they can present problems where they are present in significant numbers. Control measures may need to be undertaken for several weeks prior to sowing.

Ripping

If you are using a mechanical seeder, you may consider ripping if you have a low annual rainfall (i.e. less than 600mm); a dry year is forecast or you have a soil with a hard pan. Ripping should be done in the early autumn or winter before seeding. At this time of the year, the ripping will get a better shattering result. Be careful not to bring the underlying clay up to the surface. When you are seeding, you will be sowing beside the rip line, not directly in it. This avoids any problems with air pockets, roots becoming confined to the rip line, or sowing into clay that has been exposed by the ripping. An alternative to single rip lines is

two rip lines around 40cm apart, and you then sow between the rip lines. Whatever spacing you use, ensure that the spacing is suitable for you to drive your tractor over the site with the seeder, without experiencing problems with the front wheels of the tractor running into the rip lines. Getting bogged wastes a lot of time!

Weed control

Good weed control is the critical factor determining the success of your seeding. Poor weed control deprives your seedlings of moisture and light, resulting in their death or severely restricting their growth. You are aiming for a weed-free zone of around 1.5 metres wide, with your seedlings in the middle.

Your strategy will depend on the weeds present and whether or not you intend to include a residual herbicide in your plans. If you have perennial grasses such as phalaris or competitive grasses such as annual rye grass, and you are not planning on using a residual herbicide before sowing, you may want to limit seed set by applying a knock-down herbicide in the spring 12 months before seeding. One to two follow up applications of a knock-down herbicide will then be required: one possibly in the following autumn, and one definitely in the two weeks or so before seeding in the spring.

Many people choose to use a combination of a knock down and a residual herbicide. Residual herbicides give weed protection for longer periods, and can be used where the seeding machine has the ability to scalp a herbicide-free line for the seeding. Longer weed control may be particularly important where you have not undertaken any early weed control, where there are problem weeds present, or if you have any bad summer weeds. It can also help avoid problems with late germinations of plants such as annual rye grass and hogweed, which may quickly smother your young seedlings in the late spring or early summer. If you are using a combination of a knock down and a residual herbicide, you may need two spray applications. The first is an application of just a knock-down herbicide in mid to late winter. This early application will help conserve soil moisture. The second, two weeks or so before seeding, can be a mixture of knock-down and residual herbicides. When using residual herbicides, care needs to be taken with the rate at which the herbicide is applied. Seek advice when planning your program.

Follow up weed control may be necessary in the year or two following seeding. Again there are several choices of herbicide for post-establishment weed control. If there are few weeds present in the following autumn, an overspray with a residual herbicide may be appropriate. This needs to happen before the weeds germinate with the autumn rains, but should occur when the soil is moist. If the weeds have already germinated and they are mainly grasses, there are several grass selective herbicides that can be used. Once again, seek advice when planning your program, and remember that good weed control before you sow, may mean you have fewer problems in the following years.

Seed

For revegetation with local species, it is ideal to collect your own seed. Detailed seed collection advice is contained in Chapter 16. If you are unable to collect your seed there are a lot of commercial seed suppliers, but it is unlikely that you will be able to obtain locally collected seed through these outlets. See Appendix 5 for a list of native seed suppliers.

Quantity of seed

How much seed is required? This depends on the species you are using, the age of the seed, how well it has been stored, what seeding technique you are using, and what result you are trying to achieve. For mechanical seeding, you should work out how many lineal kilometres you are going to sow. You then need to calculate how many grams of seed you will need per kilometre. Generally around 300 grams of seed per kilometre will result in approximately one plant per metre, but the results can be highly variable. If you want to calculate the seed required in more detail, you can undertake viability tests on the seed, and there are several reports available on the number of seeds per gram of common native species.

For spot seeding, a pinch of seed between the thumb and forefinger is enough for each spot. This amount of seed weighs around 0.2 of a gram, meaning that only around 200 grams of seed is required if you are doing 1000 spots over one hectare.

Hand broadcasting areas that have been mouldboard ploughed, generally requires higher seeding rates than mechanical seeding. Between

2 and 4 kilograms of seed per hectare is likely to be required, but again the quantity of seed depends on the factors listed for mechanical seeding.

If you only have a small quantity of seed for an uncommon plant, it is probably best not to use this in direct seeding. You would be best to propagate this precious seed conventionally, and hand plant it in your direct seeded area.

Seed treatment

Some seeds such as wattles require treatment before seeding. Some of the commonly used techniques include scarification, soaking in hot water, rinsing and smoke treatment. Chapter 17 provides an overview of the treatments required for commonly used species, and Stewart and Stewart (1999) also discuss different techniques in greater detail (see References and further reading). Propagation notes for species referred to in this guide are included in Part 3. If you are using any treatments that involve water and you are running the seed through a mechanical seeder, it is important to dry the seed thoroughly to avoid blockages in the machine.

Post sowing maintenance

Besides keeping an eye on the weeds, rabbits and keeping your stock out, you need to look out for problem insects. You can expect to see seedling germination between 2 and 8 weeks after sowing, and these young seedlings are vulnerable to attack by insects such as Red-legged Earth Mites. Get down on your hands and knees and check for insect damage, and count earth mites to see if they are present in large numbers. You may need to spray to control earth mites if damage is occurring.

Planning and preparation is the key to direct seeding success

References and further reading

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