DIRECT SEEDING

13. BROADSCALE DIRECT SEEDING ON ESTABLISHED FARMLAND IN THE W.A. WHEATBELT

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Through closely monitored field trials and specifically designed glasshouse experiments over the past two years we have been developing methods of broadscale direct seeding for use on established farmland in the W.A. Wheatbelt (400-700mm rainfall in zone). Many of our results complement those found by J. Venning in South Australia and the techniques used by farmers such as Geoff Grewer at Esperance. The following article briefly summarises the current recommendations arising from our experience and trial results over the past two years. Writing up of results is in progress and will be submitted for publication by the end of the year.

Weed Control

The elimination of competition from weeds is the most important factor in establishing trees by direct seeding. The aim is to have the ground to be sown absolutely weed free prior to sowing and to control all weeds at least into the first summer after sowing.

This is best achieved on medium and heavy soils by multiple cultivation using a scarifier. This will need to be repeated at least three times so that successive germination from the weed seed bank are killed. On sandy surfaced soils this continued cultivation will leave the prepared land susceptible to erosion. The risk can be lessened by sowing rows of a suitable cover crop to protect the seeded area.

Scalping off the top 5-7cm of soil with a blade or road grader just prior to direct seeding provides very effective weed control into the first summer by removing the weed seed bank altogether. Do not scalp shallow duplex soils where clay will be exposed once the overlying sand is removed, as very poor results have been achieved on exposed heavy soil types.

Chemical Weed Control - Cultivation or scalping can be supplemented with applications of contact herbicides such as glyphosate or paraquat/diquat PRIOR to sowing. All residual herbicides appear to have a detrimental effect on thee germination of tree seed.

Late germinating grasses can be, and must be, controlled with a selective grass herbicide (such as "Fusilade" or "Sertin"), sprayed at the recommended rates, over the top of germinating tree seedlings. Keep a close watch on grass weeds, particularly during the first eight weeks after sowing, and spray as soon as the problem is noticed.

Difficult Sites

It is advisable to begin with the sites which are easiest to establish i.e. well drained, sand or loam soils which are not salt affected. The following site types are currently NOT recommended for direct seeding, at least until further research is carried out:

* Sites with late germinating, aggressive broadleaf weeds. Scalping can be used on such sites prior to sowing to remove the seed store, however, cultivation and chemical weed control have not proven successful. Fortunately, however, on most sites broadleaf weeds germinate early and can be controlled prior to sowing.
* Heavy textured soils - due to 'surface-sealing' of clay soils, direct seeding has proven very poor.
* Deep sands - Seedlings must be protected from strong winds and species selections are crutial. Non-wetting sands present additional problems and these sands must be scalped off prior to sowing.
* Waterlogged/saline sites - not recommended.

Sowing

Established farmland should be seeded when good weed control has been achieved usually in June or July. Trials have shown Spring sowing (August or September) results in very poor germination. Most eucalypt seed will germinate two to six weeks after sowing. However during Winter the small seedlings will remain dormant until soil temperatures increase, so seedlings often remain unobserved until as late as October or November.

Seed should be sown at 350g/ha for new land and between 500 and 1000 g/ha for old country. This is mixed with super in a combine and applied at rate of 150-200 kg/ha going over the area twice to ensure complete coverage. Other 'bulking-up' agents used have been Grade 2 vermiculite, graded sand, bran flakes and chicken pellets. The area to be sown must be scarified prior to sowing. When sowing the combine tynes are set just above ground level so the seed drops onto the rough ground surface and the hoses should preferably be disconnected from the boots.

For small seeded species such as most eucalypts, melaleucas and casuarinas the seed may be either left uncovered on the soil surface or very lightly covered by dragging wheat bags, a chain, brush or even a piece of carpet behind the combine. If the seed is buried even 1cm below the surface, germination is severely affected. However, large seeded species such as Marri *(E. calophylla)*, Coastal Blackbutt *(E. todtiana)* and all legume species (acacias, native pea flowers, tagasaste) germinate best when buried to a depth of about 1cm below the soil surface. This can be achieved by pulling harrows behind the combine. If a mix of both small and large seeded species are to be sown on the one site we suggest either they are sown separately (the large seeded species sown first) or if sown together the best compromise would be surface sowing and lightly covering the seed using wheat bags or a chain pulled behind the combine.

Sometimes vibration will separate the seed and super, so it is advisable to have someone agitating the mix during sowing.

Germination can be significantly improved on sandy textured soils by compacting the site with the tractor tyres or a roller, immediately after sowing . Heavy textured soils should not be compacted.

Seedlings must be protected from stock, wind and rabbits.

Observation Plots

Due to the small seedling size of many of our native species we suggest 'observation plots' be established i.e. two to three 50cm square plots per site be permanently pegged, seeded by hand and carefully observed for germination seedlings. Regular and close observations of the observation plots will enable identification of seeded species and of pest problems such as red legged earth mite, lucerne flea, rutherglen bugs or grasshoppers. Seeded areas should be sprayed with insecticide when the pests are seen in large numbers.

Species Selection

Use a mixture of at least 4 or 5 species to create a mixed windbreak of trees of various forms. Select species native to the area, soil type and topographic position that are growing well in your district. If you wish to extend the range choose species from similar soil types and the same or lower rainfall. Understorey plants as well as trees may be sown, however, all seed should be germination tested prior to sowing.

14.DIRECT SEEDING TRIALS OF NATIVE PLANTS IN GIPPSLAND

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Following the completion of the Gippsland tree seeder in October 1987 a series of trial seedlings were carried out at 5 sites in the Yarram Woodside area, 3 sites in the Walkerville area and one site at Lang Lang.

In the Yarram area sites had been prepared by cultivation many times through the winter. One site had had gypsum incorporated into the light sandy loam. All were shelter belts from 6-10 m wide and 0.5 to 2 km long. All seed was coated with "Austrasorb" and finely divided clay after mixing with mucilage. The eucalypts, acacias,

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