

## Tropical pasture establishment.

### 14. Producer establishment practices and experiences in southern inland Queensland

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#### Abstract

Establishment failure in grass pasture is common on the clay soils due to factors such as rapid soil drying, competition from weeds, depth of planting, seed quality and insects.

Sowing into a fully cultivated seedbed in mid-summer has given the most reliable results although a great variety of techniques have been used with some degree of success. Mixtures with medics or lucerne are sown in late summer or autumn and pure swards of these legumes are normally planted with a cover crop of wheat or barley. Recent innovations have been the use of grain planting machinery fitted with press wheels to sow free flowing or pelleted seeds and the use of seeders attached to heavy duty blade ploughs in run-down pastures with timber regrowth.

#### Introduction

Pastures have long been considered difficult to establish in this region, particularly on the brigalow and open downs clay soils and in the grazing areas where cultivation is neither desirable nor practical. The unreliability of establishment has significantly hindered pasture development. Failure is expensive, not only through the cost of the seed, but also through the loss in production from the paddock.

#### Climate, soils and vegetation

Rainfall in southern inland Queensland (latitude 25-28°S, longitude 147-151°E) varies from 500-700 mm with a higher proportion in summer in the north and more in winter in the south.

Soils vary from heavy clays to sandy solodics. The main agricultural soils are the brigalow-belah clays, open downs clays in the Maranoa and poplar box woodlands.

The major soils and land vegetation types have been described by Lawrence and Graham (1992).

*Brigalow — belah.* The brigalow-belah lands are scattered throughout the region and comprise a major proportion of the total area. The soils are moderately deep, grey, brown and red cracking clays, on undulating slopes (1-4%) and flat plains. Melonhole (gilgai) microrelief is a feature of much of the heavier clay soils of the Tara and Waggamba Shires. Surface soil structure varies from coarse to friable.

*Mitchell grass — coolibah plains.* The mitchell grass open downs and coolibah plains occur as rolling open downs in the Maranoa, and as alluvial flood plains throughout the region. The downs are undulating plains with slopes usually less than 3% and with moderately deep grey and brown cracking clay soils whereas the flood plains have deep grey cracking clay soils, often with coarsely structured surfaces.

*Poplar box woodlands.* The poplar box woodlands occur on various soils throughout the region. These are mainly brown to red duplex soils with surface textures varying from sands to medium clays. Most are hard-setting.

*Poplar box — mulga.* This unit comprises the mulga and fringing woodlands associated with mulga. Soils vary from shallow to deep, stony or gravelly, red earths.

*Cypress pine — bullock — ironbark forests.* These forests grow on soils with limited poten-

tial for development. The soils vary from sands to shallow duplex hard-setting clay loams.

### Development

Early pasture development involved pulling and burning the virgin timber before sowing introduced grasses into the ash seedbed. Pastures were commonly aerially sown and the main species were buffel, green panic, rhodes and *Sorghum almum*. Considerable areas, not sown to the introduced grasses, reverted to the native species. Regrowth of brigalow and associated vegetation often became a problem.

The current situation is quite different because there is virtually no standing scrub left that would give the suitable ash seedbed. Pastures today are sown into either cropping land, especially old cultivation, or grazing land, degraded through fertility decline or timber regrowth.

### Pasture species

The most suitable grasses are buffel grass (*Cenchrus ciliaris*), purple pigeon grass (*Setaria incrassata*), Bambatsi (*Panicum coloratum*), rhodes grass (*Chloris gayana*) and, to a lesser extent, green panic (*Panicum maximum*) and creeping blue grass (*Bothriochloa insculpta*). Silk sorghum (*Sorghum* spp.) and *Sorghum almum* are also sown, usually with grain planting machinery into moist soil as for a crop.

Lucerne (*Medicago sativa*) and the annual medics (*Medicago* spp.) are the most suitable legumes, especially in the southern and eastern parts of the region. Lucerne is only short-lived (3–5 years) and is well suited to short term pasture leys in rotation with grain crops.

### Methods and outcomes

Establishment methods depend on the type of pasture required (grass-legume, grass alone or legume alone), the type of enterprise (grain-grazing or grazing only), the land capability and the producer's attitude to risk. Examples range from a fully prepared seedbed (as for sowing a grain crop) to very little soil disturbance (seed on to crawler tracks while stickraking).

The normal method used for sowing a grass pasture in farming country is to fully prepare a seedbed as for a crop, distribute the seed close to or on to the soil surface and harrow lightly. Mid-summer is the preferred planting time, but where weeds are not of major concern, spring planting is not unusual. The success rate is generally high even though summer rainfall over the last decade has been well below average.

When sowing a mixed pasture of grass with medic and/or lucerne the same technique is used but sowing is delayed until late February or March. This is a compromise between late planting for the grass component and early planting for the legume. The success rate is reasonable but depends on autumn rainfall. Alternatively the medics are sown with winter cereals prior to returning the paddock to pasture. The grass component is then sown by the preferred method in mid-summer or spring.

Lucerne is used in a short-term rotation with the cereals. It is usually undersown with wheat or barley although, when sown alone, it is ready for grazing or hay-making more quickly.

Sowing with cover crops such as oats or wheat is favoured by some producers and in fact some of the best mixed pastures of medics and buffel grass in the Miles district have been sown with oats. When grasses are sown with the winter cereals, the country is not out of production for long and legumes (lucerne and/or medics) can be included in the mixture. However, failures often result and poor stands can take years to thicken up.

Precision planters and airseeders with press wheels have been used successfully for planting grasses. They are able to handle both free flowing seeds, such as purple pigeon grass, and pelleted chaffy seeds. They also have better planting depth control and the press wheel improves seed-moisture contact.

In rundown pastures with timber regrowth, the heavy duty blade plough with an attached seeder has been used widely. While the resultant "seedbed" is very rough for small grass seeds, large areas have been ploughed and sown with buffel grass, purple pigeon grass and silk sorghum with a remarkable degree of success. A large fall of rain is required to wet the disturbed soil layer which is commonly 20–30 cm deep.

There are few other options especially where major soil disturbance is not possible. Medics have been sown from the air but success depends on winter rainfall after sowing. Other low cost techniques include sowing into pits created by the paddle chain or "Conservation King", aerially sowing into a weed-free wheat crop before harvesting, and feeding buffel grass on to the track of a crawler tractor while stickraking.

### Factors affecting establishment

**Rainfall.** Rapid drying of soil around germinating seedlings and surface crusting caused by high intensity storms are major causes of establishment failure. Planting recommendations attempt to minimise the effect of unpredictable rainfall. For example, prolonged wet weather is more likely in the January–February period than in spring and seedlings germinating with stored moisture in the soil profile are more likely to survive in a dry period.

**Weeds.** Competition from weeds, particularly grass weeds such as liverseed grass (*Urochloa* spp.) and barnyard grass (*Echinochloa* spp.), can have a major effect. Sowing in mid-summer allows summer weed populations to be reduced first. Both liverseed and barnyard grasses germinate readily in spring and can be largely eliminated by a clean fallow during this period. The same strategy also helps reduce broadleaf weeds such as mintweed (*Salvia reflexa*) and the pigweeds (*Portulaca* spp. and *Trianthema* spp.). These weeds can also be controlled easily with broadleaf herbicides.

**Planting depth.** Depth of planting is critical (1–2 cm is best) and must not exceed 5 cm for most species. Problems can arise when pasture seed is sown through grain planting machinery, for example, when sowing with a cover crop or when sowing pelleted seed. When medics and lucerne are sown with winter cereals, a small seeds box or a separate operation is used to sow the seed close to the surface.

**Seed quality.** Seed quality is often overlooked especially when using "home-grown" seed or seed not obtained through normal commercial channels. Sowing fresh dormant seed, especially purple pigeon grass, has often led to failure.

**Insects.** Seed-harvesting ants are present in many of our soils but it is difficult to estimate their effect on establishment. No insecticides are registered for use on the tropical grasses. Bendiocarb (Ficam W) is registered only for the temperate species.

The following examples of experiences of individual producers were extracted from Leslighter *et al.* (1992).

### Case Study A: Establishing medics

(Ray Porter, "Rotherfield", Wandoan)

Medic was first trialled on this 1123 ha property in 1968. It has been planted in about 540 ha of cultivation and cattle have spread the seed over most of the property.

Seed is inoculated before sowing in a cement mixer and surface sown at the same time as oats. Ray prefers to plant in April–May when there is a good profile of soil moisture. Initial plantings were at 0.5 kg/ha but this has been increased to 1 kg/ha with oats.

The oats is planted through a combine and the medic is dropped from 5 litre tins attached to the back of the combine about 76 cm apart. A wire dangles through a hole in the base of the tin with an adjustable plate. The wire drags on the ground and agitates seed which falls through the hole. The plate has a range of hole sizes to allow for different planting rates. Mounted harrows cover the seed.

A variation on this method of planting medics is to fit a length of 150 mm high x 100 mm wide roof guttering to the back of the combine. To plant snail medic at about 2.5 kg/ha, 8 mm holes are drilled every 300 mm along the guttering. Curtain wire is dangled through the holes to reach the ground, causing agitation and maintaining seed flow. The diameter of the holes can be varied to adjust planting rate and accommodate different varieties of medic. Alternatively, several different sized holes can be drilled and the appropriate size selected with galvanised disk covers.

### Case Study B: Establishing Bambatsi

(Basil and Rita Rohde, "Hollymount", Weengallon)

The Rohdes were among the first commercial producers of Bambatsi seed in Australia in the early 1970s. Initially they planted Bambatsi in spring but have now changed to December–January plantings. The seed is sown into straw from a preceding cereal crop which preserves moisture.

Following the wheat or barley harvest, the area is skim-ploughed with discs after rain to kill any volunteer cereal. The straw is left partially on top of the ground and a second dry ploughing gives a good tilth. Bambatsi is then planted dry on a good profile of sub-soil moisture.

Seed is surface sown in 60 cm rows using the small seeds box of a Chamberlain combine. A sheet of 9 mm steel mesh is dragged behind the combine to cover the seed. Seeding rate is 1 kg/ha of pure, 100% germinable seed or 2 kg/ha if only 50% of seed is germinable.

### Case Study C: Establishing mixed pastures

(Phil Gurner, "Booroondoo North", Moonie)

All crops and pastures on "Booroondoo North" are established using a precision planter. This has given good establishment of pastures and allows sowing rates to be reduced. In February 1989, a mixture of purple pigeon grass (1.8 kg/ha), American buffel (1.0 kg/ha) and medic (1.0 kg/ha) was sown using a Janke precision planter. This resulted in an excellent establishment.

### Reference

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