

## Tropical pasture establishment.

### 13. Producer establishment practices and experiences in near-coastal southern Queensland

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#### Abstract

Factors considered by producers in establishing pastures are: overall cost, effectiveness and persistence. A range of establishment practices are used in southern Queensland and, although establishment is not usually a problem, factors that can contribute to poor establishment are: species selection, seed quality, land preparation, covering/inoculation, weather conditions and first-year management.

Most producers sow into a fully prepared seedbed but some innovators are using new techniques which include: lotononis “Tupperware” seeder, hammermilling *Seca stylo* seed, brush harrows, mixing trace elements, rhodes with winter cereals, pasture undersown with lupins, pangola with seeded pastures and bluegrass mixtures with rhodes grass.

Four case studies of producer experiences with sown pastures are documented: (a) Coastal — low-key pastures for breeders; (b) Coastal — pastures for finishing; (c) Inland — old cultivation returning to pasture; and (d) Inland — native pasture to fully improved.

#### Introduction

Near-coastal southern Queensland is defined as the region from Miriam Vale south to the Queensland/New South Wales border and roughly 125 km inland, bordered in the west by Monto, Mundubbera, Dulong and Toowoomba.

Most graziers do most things right to establish pastures. Their success or failure depends on which bits they miss out (or the weather in inland areas). The ones with successful establishments continue to plant improved pastures, while those with failures often do not have another go, despite the fact that some of their neighbours may have been successful.

Most graziers work under the assumption that improved pastures are good, or the way to go, without considering the real return from their investment.

The critical questions must be:

- Why do I want the pasture?
- Which situation do I improve first?
- How does this relate to my whole property management?

The answers to these questions will be many and varied, as are the methods used to establish and manage improved pastures.

#### Factors considered in establishing pastures

##### *Overall cost*

The cost of pasture improvement may include clearing, fencing, watering facilities for stock, seed, fertiliser, machinery and additional cattle. These costs should be met from revenue earned, not through borrowings.

##### *Effectiveness*

Will pastures increase net income and/or achieve what the producer's objectives are? The area of

improved pasture has to be a significant percentage of the property to increase cash flow.

### *Persistence*

Producers want improved pastures to maintain their productivity over time. While most first-year pastures look good, the majority of pasture species released over the last 25–30 years have not persisted under the full range of management conditions imposed. More species that are tolerant of adverse seasons and periodic heavy stocking are required.

### *Establishment practices*

The following issues are considered important in this region to maximise likelihood of a successful establishment:

- Adequately prepared seedbeds for the particular establishment technique.
- Buying good quality seed.
- Using fertiliser when needed.
- Harrowing and rolling after planting in inland areas, but *not* harrowing in coastal areas.
- Deferring grazing until after seeding or until winter (based on a spring/early summer sowing).

### **Pasture establishment problems**

Pasture establishment is not normally a problem in the coastal and near coastal areas, compared with the inland areas of southern Queensland where rainfall is neither as reliable nor as high. Former cultivation paddocks suffer from pasture establishment problems in both coastal and inland areas.

Factors contributing to poor establishment are:

### *Species selection*

Choosing the right pasture for the particular situation and purpose is important. Most graziers make the right decisions, but occasionally mistakes are made, for example, planting medics in November.

### *Seed quality*

Poor quality seed reduces the chance of a successful establishment. Some producers buy low

quality seed because of its lower cost. They fail to obtain germination and purity figures. It is advisable to seek this information when buying seed.

### *Land preparation*

Adequate land preparation is critical to good establishment. The right implements must be used and some producers do not appreciate what is required in a seedbed.

### *Covering/inoculation*

Surface sowing is required as we are dealing with comparatively fine seeds (0.3–4.0 million seeds/kg). Covering the seed with soil is not required in higher rainfall areas, but a very light covering is preferred in inland areas. Rolling is needed on loose and/or fluffy seedbeds, sometimes even before sowing. A minority of producers do not understand the requirements of delicate grass and legume seeds and the inoculation requirements for legumes. Seed agents should be encouraged to remind buyers of the importance of inoculation with the appropriate strains of rhizobia.

### *Weather*

Plant early or plant late is a good rule of thumb to remember. Avoid the hot months of November and December. If pasture establishment is attempted at this time of year, the risk will be reduced when there is a good reserve of subsoil moisture. However, if no other reason for poor establishment can be found, the weather is blamed.

### *First-year management*

This is particularly critical for the legume component. Initial stocking rates are often too light so legumes are smothered by grass growth, or too heavy and legumes are eaten out and fail to persist. 'Crash grazing' (very high stocking rates) for a very short period may be necessary in the early stages, especially where lotononis and other prostrate legumes are included. Spelling or light stocking may be necessary to allow all species to set seed and build up a seed bank in the soil.

Adequate fertiliser (usually phosphorus) is necessary for successful establishment.

### Alternative techniques

Fully prepared seedbeds are the most common, but a number of alternative techniques are used. Producers are receptive to new ideas but are slow to adopt new techniques, particularly if extra costs are involved in buying specialised equipment. Many have tried pasture plantings and have had failures for various reasons.

Alternative techniques that are used include aerial seeding, planting pasture strips, band-seeding and renovation/oversowing with legumes. Some highly successful aerial seeding using very low rates of lotononis and fine-stem stylo has been carried out on broken country along the range in the Killivan district. However, such low seeding rates may take up to 10 years to produce uniform and dense legume stands.

### Innovative techniques

Australians have gained a reputation over the years for being innovators. This ability to improve and improve basic machinery and techniques is common in the grazing and farming community.

Examples of innovative techniques are:

#### *Lotononis "Tupperware" seeder*

This involves the use of a "Tupperware" salt or pepper shaker containing inoculated lotononis seed, which is suspended from the tractor mud-guard. The motion of the tractor causes seed to be shaken out behind the rear tractor wheel. This is an ideal, firm seedbed, with the tyre tread pattern holding water to assist germination.

#### *Hammermilling Seca stylo seed*

Seco stylo, like most stylos, is hardseeded. This hardness cannot be broken successfully using the revolving, heated cylinder at Brian Pastures Research Station. It can be broken using hot water, but the logistics of treating large quantities of seed create another problem. J. Hopkinson (personal communication) found that

Seca could be treated successfully using a hammermill. The advantages of this technique are that it is quick and cheap and works well. The objective is to dehull about 50% of the seed without cracking the seed. The disadvantages are that every brand and/or type of hammermill requires a different setting, and therefore the operator's expertise is critical.

#### *"Brush harrows"*

This describes the use of light bushes or heads of wattle (*Acacia* spp.) trees dragged behind the planter to lightly cover the seed with soil at planting. It has the effect of brushing the seed into the surface soil spaces, and is a low-cost alternative to using a tyre-roller.

#### *Mixing trace elements*

Virgin soils in the coastal lowlands or wallum require the trace elements copper, zinc and molybdenum for pasture establishment. Producers have found it cheaper and more effective to mix these trace elements themselves with the muriate of potash, rather than purchase premixed trace elements in superphosphate. However, where molybdenum only is required, the inclusion of Mo in the legume seed pellet is the most effective method.

#### *Rhodes with winter cereals*

Some producers in the South Burnett and Mary Valley have found that rhodes grass can be successfully established by planting with winter cereals. The cereal is sown at a lower rate than is normal and protects the rhodes grass seedlings from frost. The pasture grows away in early summer following the harvesting of the cereal crop. Clovers or medics can also be undersown with the rhodes grass seed.

#### *Pasture with lupins*

Some producers around Maryborough have successfully undersown lupins with their normal pasture mixture when renovating rundown pastures. The lupins provide protection from frosts and the pasture grows away following harvesting of the lupins in October. Additional benefits from this technique are the cash flow

from the sale of the lupin grain, and the N-fixation benefit from the lupins to the young pasture.

#### *Pangola with seeded pastures*

Some producers around Maryborough have used this technique to establish pangola without the loss of production associated with the conventional methods of establishing this grass on a fully prepared seedbed. The technique is to plant a grass/legume mixture from seed and when soil moisture is adequate, plant pangola runners by hand in rows 5–20 m apart with 1.5 m between the plants in the row. Depending upon the density of planting, the pangola may take 3–5 years to dominate the pasture. This technique could also be used to establish runners of *Arachis* spp. into new pasture plantings.

#### *Hatch/Bissett creeping bluegrass mixtures with rhodes grass*

This technique is used to establish Hatch or Bissett creeping bluegrass at a reduced cost into new pastures. It involves mixing the bluegrass at  $\frac{1}{3}$ – $\frac{1}{2}$  the normal rate with rhodes at  $\frac{1}{2}$ – $\frac{2}{3}$  the normal rate. The bluegrass will dominate the pasture within a few years and will persist longer than the rhodes grass.

#### **Case Study A: Coastal — Low-key pastures for breeders**

(W.M. and P.G. Campbell, “Nine Mile”, Gin Gin)

Total area of spear grass country	5866 ha
Irrigated block at Mundubbera	115 ha
Area of low-key pastures	160 ha
Proposed plantings over next 2 years	385 ha

#### *Soils*

The soils are hard-setting loam or sandy clay loams overlying yellow or red moderately heavy clays. The sulphur levels are extremely low (<3 mg/kg) and the phosphorus levels range from 4–15 mg/kg.

#### *Enterprise*

“Nine Mile” is used for breeding and store production for fattening on irrigated pastures (high-N rye grass) on “Argyle” at Mundubbera. These finished cattle meet Japanese market requirements. Cull cows and heifers are also finished at “Argyle” on sown pastures.

#### *Development procedure and grazing management*

The original area of low-key pasture was sown at 1.2 kg/ha Wynn cassia in October 1984 following a single chisel ploughing. The area was used as a grazing demonstration area until June 1990, comparing liveweight production of yearling steers from native pastures, native pastures oversown with cassia and native pastures oversown with cassia and fertilised at planting and then every second year.

Breeders were grazed on the area following the completion of the grazing demonstration. During 1991, 120 yearling heifers grazed the area at a stocking rate of 0.8 head/ha. Prior to the introduction of Wynn cassia only 45 cull cows (0.3 head/ha) were carried on this area.

No supplementary feeding was necessary during the 1991 drought. The yearling heifers came out of the drought in forward store condition.

Other areas of grass/legume pastures were originally planted to fatten cull cows and to run steers on. Since 1987, all sale cattle have been finished on a property at Mundubbera using irrigated rye grass for bullocks and Callide rhodes grass for cull cows.

This has allowed the original areas to be used by other types of cattle including breeders and/or weaners and yearlings.

The majority of breeders are still running on native pastures which are predominantly black speargrass with some degradation to blue couch. It is the intention of the property owner to introduce Wynn cassia into the speargrass to improve breeder performance and weaner weights.

The easiest paddocks will be developed first and the development procedure will be as follows:

- Push any dead timber plus regrowth, windrow and burn.

- Chisel plough and drop 0.5 kg/ha Wynn cassia in October/November from a "Forsyth" seeder trailed behind the chisel plough.
- Maintain the same stocking rates during the first year to allow the cassia to establish and seed.
- Increase stocking rates marginally from year 2 on and burn to control woody weeds and to maintain a strong black speargrass stand.

**Case Study B: Coastal — Pastures for finishing**  
(P.V. and B. Geissler, "Highstone", Biggenden)

Total area of property	2800 ha
Improved pastures	1250 ha
Unimproved pastures	1550 ha

*Soils*

The soils on "Highstone" range from infertile, white granitic sands to brown clay-loams of higher fertility. The soils are phosphorus deficient and levels range from 4–8 mg/kg.

*Enterprise*

"Highstone" breeds and fattens. Development of sown pastures has taken place over the last 25 years and has had a significant impact on the profitability of the property. Sown pastures are used for finishing and growing cattle. The best pastures are used for finishing bullocks for the Japanese market. Steers are grown-out on the slightly lower quality pastures and breeders utilise those sown pasture paddocks that are further down the scale.

*Development procedure and grazing management*

Woody regrowth usually determines which paddocks are developed for sown pastures. Once animal production has started to drop significantly because of woody weeds the area is cleared and stick-raked in April–June. Paddock size is usually 120 ha which will carry 100 adult equivalents.

*Land preparation and planting*

Land preparation consists of three chisel ploughings commencing in June–July, with the final working just prior to fertilising and planting in September–early October. However adverse weather conditions can cause a delay in planting until late December. Superphosphate is applied at planting at 200 kg/ha, and ideally maintenance applications of 125 kg/ha are applied every second year.

Planting is done by towing 2 "Forsyth" roller drum seeders behind each other. One is used to plant the grasses and the other to plant the legumes. Very even seed placement has resulted from separating the grass and legume seeds when compared to the conventional method of mixing them together. No rolling or seed covering is practised.

Pasture species used and planting rates are:

Callide rhodes	1.7 kg/ha
Hatch bluegrass	0.6 kg/ha (hammermilled to remove the awns)
Seca stylo	0.6–1.1 kg/ha (hammermilled to reduce hard seed%)
Fine stem stylo	0.6 kg/ha (depends on paddock)
Wynn cassia	0.3 kg/ha
Lotononis	0.3 kg/ha (inoculated)

In the first year paddocks are 'crash grazed' to assist legume establishment, destocked until late summer, 'crash grazed' again, destocked until the grasses set seed and then stocked normally (continuously).

**Case Study C: Inland — Old cultivation returning to pasture**

(R. and G. Brown, "Pakaderinga", Corndale)

Total area of property	730 ha
Area of pastures	200 ha

*Soils*

The soils are light sandy loams over a clay sub-soil. The phosphorus levels are 10–15 mg/kg.

*Enterprise*

Under a previous owner, the property was used for crops (peanuts and sorghum). As the sandy loam forest soils were marginal for cropping, all areas had degenerated to broadleaf weeds and green couch grass when cropping ceased. The property is being progressively developed with sown pastures for cattle by the Browns who have owned it for 10 years.

“Pakaderinga” is now used to breed and finish steers for the local domestic trade.

*Development procedure and grazing management*

Land preparation consists of 3 discings and chisel ploughings to kill the green couch. The couch has been the major problem in returning the old cultivation land to pasture. It has been difficult to kill by ploughing. The light sandy soil wears out implements quickly and the Browns have considered using herbicides to control couch after the initial cultivation.

The seed is mixed with 125 kg/ha super-phosphate, sown through a combine on to the soil surface, harrowed lightly and rolled. The legume seed is lime-pelleted.

Planting takes place either in October or February.

Species used and planting rates are:

Callide rhodes	2.5 kg/ha
Lotononis	0.2 kg/ha
Wynn cassia	0.9 kg/ha

In the first paddocks to be improved, planting rates of lotononis and Wynn cassia were much lower at 125 g/ha and 300 g/ha, respectively. With experience these seeding rates have been increased to their present level.

Hatch creeping bluegrass was tried one season but failed to establish and has not been tried again.

Late summer plantings are not stocked until after the Callide has seeded, and then according to the available feed. The early plantings are lightly grazed and then destocked and allowed to seed in late summer.

All pastures are grazed during the winter but generally are not stocked heavily during that first year. Grazing is on a rotational basis.

Grazing management allows each paddock to seed strongly every second year.

**Case Study D: Inland — Native pasture to fully improved**

(B. and J. Fleischfresser, “Wellcamp”, Johnstown West)

Total area of property	1000 ha
Area of sown pastures	52 ha
Area of cultivation	25 ha

*Soils*

The soils are light clays over a heavier clay subsoil. The phosphorus levels are 15–20 mg/kg.

*Enterprise*

“Wellcamp” is used to breed and finish cattle for the local domestic and Japanese markets. Breeders are run mainly on native pasture and forage-cropped areas. Forage-cropping is being phased out in favour of lucerne and improved pastures. Without improved pastures only 150 breeders could be carried safely. With 52 ha of improved pastures, 200 breeders can be run and this could increase to 225 breeders with another 40 ha.

*Development procedure and grazing management*

Land preparation consists of several chisel ploughings to produce a fine seedbed.

The grass seed is mixed with the fertiliser (60 kg/ha DAP) and sown with a combine, with the legume seed planted through the small seed box. The seedbed is then harrowed and rolled.

Planting is usually carried out in January.

Species planted and planting rates are:

Katambora rhodes	2 kg/ha
Silk sorghum	2.5 kg/ha
Wynn cassia	2 kg/ha
Sequel lucerne	2 kg/ha

Other species have been tried including Bam-batsi, Callide and purple pigeon grasses, siratro, barrel medic and woolly pod vetch. A poor strike of purple pigeon was due to planting dormant seed without realising this is a feature of purple pigeon seed.

Grazing in the first year depends on seasonal conditions and the type of pasture planted.

Often all species will be allowed to seed and then grazed heavily over winter for 3 months. The pastures might then be slashed, destocked and then lightly grazed on a rotational basis.