

# Perennial pastures for the Darling Downs

## Benefits of perennial pastures

Low ground cover and continuous cropping has reduced the productive capacity of many soils in the Darling Downs. This has occurred through depletion of soil nitrogen and organic matter, damage to soil structure and the biological health of soils, and increased soil erosion and water runoff.

Incorporating long term pastures with a perennial legume reverses the declining biological and economic health of the system by:

- Improving soil fertility through N-fixation by perennial legumes
- Improving soil physical and biological health through organic carbon accumulation
- Reducing erosion and improving infiltration through better ground cover
- Reducing deep drainage losses
- Minimising the change of herbicide-resistant weeds occurring
- Providing high quality forage to sustain a profitable grazing enterprise
- Providing economic benefit from paddocks that can no longer be profitably farmed because of low prices, unreliable rainfall or marginal suitability.

Short term legume phases in cropping systems will improve soil N and help with weed and disease control. However it's the extensive root system and above ground biomass of pasture grasses together with the nitrogen fixation by perennial legumes that build soil organic matter and increase ground cover which reduces soil erosion and water runoff.



## How to establish pastures

Successful establishment is the key to productive and profitable permanent pasture. View the pasture as a small-seeded crop needing the same care and attention that goes into sowing grain crops. Factors important to successful pasture establishment include:

- **Selecting appropriate species:** Poor establishment and short persistence will occur if species selected are not matched to soil type and climate. Tables 2 and 3 summarise grass and legume suitability to common soil types in the region.
- **Purchasing high quality seed:** Check current seed germination and purity tests; poor seed quality generally leads to establishment failure. Grass seed maybe dormant after harvest and should be allowed to mature for about 6 months before sowing; some legume seeds have hard waterproof seedcoats that should be scarified to allow rapid germination.
- **Avoiding residual herbicides:** Residual herbicides can either stop germination or kill seedlings-especially sulfonylureas on legumes and atrazine on grasses. Make sure that minimum plant back periods are exceeded.
- **Controlling weeds:** Grass weeds such as Liverseed can quickly smother slower-germinating sown grass seedlings. Cultivate or spraying will reduce weed populations.

- **Applying appropriate fertiliser before planting:** Some starter fertilisers such as DAP may boost grass and perennial legume seedlings on run-down soils.
- **Fallowing to accumulate soil water:** As with a crop, check that there is 30-60cm profile of soil water before planting. Ensure seedlings have enough soil moisture to grow through the establishment phase in-case of no rainfall.
- **Inoculating legume seed before sowing:** Inoculate the legume seed with the correct *Rhizobium* immediately before sowing.
- **Applying an anticide:** to pasture seed if ants are a problem.
- **Sowing at the optimum time:**
  - For summer growing grasses and legumes, January-February is best. During summer, rainfall should be more reliable and high evaporation must be offset by accumulating a good profile of soil moisture during spring and early summer. Establishment is best when there is a week of showery weather after sowing, and 4 day-weather forecasts can advise the chance of this.
  - Although early and late spring might seem suitable, October-November heatwaves and spring weeds can be serious problems.
  - Winter growing legumes are best sown between April and early June when evaporation is lower and the surface soil remains moist for longer. Low temperatures late in autumn and into early winter slow the growth of establishing plants.
  - Self-regenerating annual winter legumes particularly the medics, can be undersown with winter crops, with the grass in the following summer. Reduce the crop planting rate to a maximum of 20kg/ha when undersowing a pasture legume.
- **Sowing enough seed:** Sow pasture seed at the recommended rates. With lower rates establishment will be thin, early production low and time to first grazing extended. Pelleted or coated seed is generally 60-80 % coat and only 20-40 % seed. Coated seed or low-germination seed should be sown at a rate sufficient to obtain 1kg/ha of pure live seed applied.
- **Not burying seed:** Seedlings of most grasses and some perennial legumes are small, and cannot emerge if planted more than 1cm deep. Spread the seed on the surface and lightly harrow or roll in (non-crusting soils). If the surface is furrowed, do not drag harrows as seed may be buried too

deep. Only lablab, cowpea, lucerne, silk sorghum and purple pigeon grass can be drilled into moist soil but no deeper than 5 cm. Establishment is generally enhanced by preparing a firm seedbed.

- **Firming the seed bed after sowing:** Press wheels or rollers provide better contact between seed and soil particles. When the soil is wet, press wheels may seal the surface of loamy soils.

## Managing the Pasture

In the establishment year:

- Graze only after the plants have well developed crowns and secondary roots.
- Allow all pasture species sown to set seed.
- Graze self regenerating legumes (eg medics) early, then reduce grazing pressure to ensure seed set.
- Control palatable weeds by timely grazing.



In established pasture, over-grazing will lead to decreased productivity and a need for costly renovation or re-sowing. Graze pastures leniently and retain a proportion of leaf and stem whenever possible (even if it is difficult in dry times). This will encourage a large root system allowing the plant to access more water and nutrients, and grow quickly after rain. Rotational grazing can allow more even utilisation and better budgeting of the feed supply. Irrespective of the grazing system, destock the pasture to prevent overgrazing if the feed supply becomes limiting.

## Animal performance

Well-managed grass-legume pastures can be highly productive for many years. Table 1 lists the options for integrating pastures and forage crops into a feed-year program to grow livestock to the target market quickly.

**Table 1. Beef cattle production from well-managed pastures in the Darling Downs**

<b>Forage</b>	<b>Feeding period</b>	<b>Carrying Capacity ha/adult equivalent</b>	<b>Daily Gain Kg/head</b>
Native pasture	October-May + dry feed in winter	2.0-4.0	0.2-0.6
Sown tropical grass	October-May + dry feed in winter	1.5-2.5	0.4-0.8
Lucerne	September-May + some winter feed	1.5-2.2	0.8-1.2
Sown medics	May-October	1.2-2.0	0.6-1.0
Lab Lab	December-May	0.5-1.5	0.7-1.0
Burgundy Bean	December-April	1.0-2.0	0.8-1.0
Oats	May-October	0.5-1.0	0.8-1.2
Barley	May-September	0.6-1.2	0.8-1.0
Forage sorghum	December-May	0.4-1.0	0.5-1.0
Hybrid millet	December-May	0.6-1.0	0.6-1.0
Barley stubble	October-February	2.0-4.0	0.1-0.4
Sorghum stubble	February-August	1.5-3.0	0.1-0.5





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**Table 2. Pasture Grasses**

Land and vegetation types		Angleton grass	Creeping blue grass	Green panic	Rhodes grass	Silk sorghum	Bambatsi panic	Digit grass	Forest blue grass	Gatton panic	Purple Pigeon	Tall finger grass	Indian blue grass	Buffel
		Floren	Bisset Hatch	Petrie	Katambora Finecut	Silk Jaffa	Bambatsi	Premier	Swann	Gatton	Inverell	Strickland	Medway	Biloela American Gayndah
		> 550 mm	> 550 mm	> 550 mm	> 550 mm	> 550 mm	> 450 mm	> 450 mm	> 450 mm	> 450 mm	> 450 mm	> 450 mm	> 400 mm	> 350 mm
Eastern Uplands	Black earths	✓✓	✓		✓✓	✓✓	✓✓	✓		✓✓	✓✓	✓		
	Soft Loams	✓	✓✓	✓	✓✓	✓	✓	✓✓		✓✓	✓	✓		
	Friable							✓✓				✓✓		
Eastern black soil plains		✓✓	✓		✓	✓✓	✓✓				✓✓			
Brigalow belah	Friable clays	✓	✓	✓✓	✓	✓✓	✓✓	✓		✓✓	✓	✓		✓✓
	Coarse	✓	✓			✓✓	✓✓				✓✓			
Coolibah		✓			✓	✓✓	✓✓				✓✓			
Poplar box woodlands	Clay loams		✓✓	✓	✓	✓	✓	✓✓	✓	✓	✓	✓	✓	✓✓
	Hard loams		✓		✓	✓		✓	✓			✓✓	✓✓	✓✓
	Earths		✓		✓	✓		✓✓				✓✓	✓	✓✓
Cypress/ bulloak	Friable				✓✓			✓✓				✓✓		✓
	Shallow				✓			✓				✓		
Flooded soils		✓					✓✓							
Saline Soils					✓✓	✓	✓✓	✓				✓		✓

✓✓	Highly suited
✓	Suited but establishment difficult or persistence short
	Unsuited

**Table 3. Pasture Legumes**

Land and vegetation types		Burgundy bean	Caatinga stylo	Desmanthus	Lucerne	Snail medic	Barrel medic	Burr medic	Strand x disc medic	Woolly pod vetch	Cowpea	Lablab
		Cadarga Juanita Mixture	Unica Primar	Marc Marc Plus	Pegasis UQL 1 etc	Sava Silver Essex	Caliph Jester Paraggio	Scimitar Cavalier	Toreador	Namoi	Caloona Ebony	Highworth Rongai Endurance
		>550 mm	>550 mm	>550 mm	>550 mm	>550 mm	>450 mm	>450 mm	>450 mm	>450 mm	Fallow	Fallow
Eastern Uplands	Black earths	✓✓			✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
	Soft Loams	✓✓			✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
	Friable sands				✓					✓✓	✓	✓
Eastern black soil plains		✓✓		✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓	✓✓	✓✓
Brigalow belah	Friable clays	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓	✓	✓✓
	Coarse clays	✓✓		✓	✓✓	✓✓	✓✓	✓✓	✓		✓	✓✓
Coolibah		✓✓	✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓		✓	✓✓
Poplar box woodlands	Clay loams	✓	✓✓	✓	✓✓	✓	✓✓	✓✓	✓✓	✓	✓	✓✓
	Hard loams				✓		✓	✓	✓✓	✓	✓	✓
	Earths		✓		✓		✓✓	✓	✓	✓	✓	✓✓
Cypress/ bulloak	Friable sands									✓	✓	✓
	Shallow loams											
Flooded soils												
Saline Soils					✓							
Soil pH		6-8.5	6-8	6.5-8.5	6-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	5-8.5	5-8.5	6-8.5

✓✓	Highly suited
✓	Suited but establishment difficult or persistence short
	Unsuited