Improving native pastures

Most native pastures are moderately productive when managed well; some, such as Mitchell grass, provide as good feed as any other species under the same conditions of soil and climate. The nutritive value of a grass depends greatly on the soil in which it grows.

On most northern soils, young palatable native grass is good feed for only 4-6 weeks after the start of the wet—until the plant runs out of nitrogen and phosphorus because of the infertile soil.

The concentration of nitrogen in the plant becomes diluted from about the middle of February; by mid-March, available soil nitrogen has run out and, although the leaf is still green, there is no new growth. Even green kangaroo grass may not provide enough protein or minerals for cattle to grow well. Quality begins to drop further once flowering is initiated.

Quality of grazing can be improved and extended into autumn if legumes can be sown into the existing pasture.

What are the main benefits from sowing legumes?

The animals benefit through improved diet from higher levels of protein and minerals, and from the better digestibility of the legume leaf. Steers can gain an extra 40 kg a year, and stocking rates can be increased.

An area of improved pasture gives the manager more flexibility. Calves can be weaned earlier and different markets may be available.

What is the main risk from sowing legumes?

The main risk is legume dominance and loss of the 3P grasses, but this is usually a result of inappropriate management rather than due to the legume itself.

Many managers increase their stock numbers on the improved paddocks because the animals will still grow well even when the legume becomes dominant. Old trials near Katherine showed that stock could still grow well in improved paddocks when stocking rates were increased 10-20 fold—from the very low base level.

The desirable 3P native grasses cannot stand these high grazing pressures; they are soon eliminated and replaced by unpalatable perennial or annual grasses, or an almost pure stand of legume. If the legumes increase soil nitrogen, broad-leaved weeds, such as hyptis (Hyptis sauveolens) and Sida, invade.

As stock prefer to eat grass in the early wet season (when it is most susceptible to grazing) even moderate stocking can lead to legume dominance if no introduced grass is sown.
Which are the best legumes for my country?
You need well-adapted species that will naturalise and spread over your paddocks; pasture specialists recommend different legumes for different soil types, so seek local advice.

The most widely adapted legumes for the light soils of the north are the Caribbean stylos (Verano and Amiga) and the shrubby stylos (Seca and Siran), with Wynn cassia in the higher rainfall regions.

There are good stands of Verano along the table drains of many roads across the Top End, even as far south as Halls Creek. However, there seems to be little in the adjacent paddocks. This could be because of the better roadside moisture or because cattle have little or no access and hence cannot spread the seed in their dung.

The shrub legume, leucaena, may have a place as a permanent high-quality fodder on specifically managed sites with deeper, more fertile soils, but these must have good drainage during the wet. Leucaena needs special care during establishment, and should be planted, and managed, like the valuable crop that it is.

How useful are the native legumes?
There are many native legumes growing throughout different pastures; a couple are illustrated here, others can be identified using local plant identification books.

The most common species (native glycines, rhynchosia, and desmodiums) are eaten by stock and are probably beneficial. However some may contain alkaloids—Birdsville indigo (Indigofera linnaei) can cause Birdsville disease in horses.

Pea bush (Sesbania cannabina) is a common annual on black soils in higher rainfall areas; it is unpalatable but fixes nitrogen actively through its root nodules.

Native legumes rarely comprise more than about 10% of the total herbage, but may form a higher proportion of the diet during the late part of the growing season.

Which country should I improve first?
Improve your best country first. 'Better country' for oversowing legumes has soil with a loose surface and at least 4 ppm of available soil phosphorus.

What area should I sow?
Most paddocks are very large. Scattering a few seeds of stylo over thousands of hectares is unlikely to give much visual effect on pasture or stock for many years, and you may feel there is little economic benefit for your dollars.
A fully prepared pilot area increases the chance of successful establishment and later spread of legumes.

Cattle spread stylo seed in their dung.

Spear-trap gates into an improved block can facilitate mustering.

An alternative system is to sow ‘pilot’ or ‘mother’ plots on part of the paddock. Put all your money, seed and effort into a smaller area so that you can see the improvement.

**How do I plant a ‘pilot’ area?**

Fence off a corner of a paddock to enclose a few hundred hectares. Clean up any woody weeds and cultivate (with discs or chisel plough) to check the existing native grasses and to provide a better seedbed for both legume and sown grass.

Apply some phosphate fertiliser (5-10 kg/ha P) if the soils are very deficient (below 4-6 ppm).

Sow your chosen legume seed (Verano, Seca, etc) at a good seed rate (2-3 kg/ha) and add 10% by weight of seed of a suitable improved grass, such as Sabi, just before the rains.

Keep stock out until the legumes and sown grasses are well established (that is, for most of that wet season) to allow them to set seed.

Put in stock when the legume seed is set but leave the gate open so that animals can wander back into the main paddock to spread seed in their dung. Although only 30% of the seed in dung is viable, there will be a large amount of seed to spread.

**What other advantage does the ‘pilot’ paddock have?**

Stock are always going to prefer to graze the improved area especially if some phosphorus has been applied. Putting in spear-trap gates allows for self-mustering of stock.

**How should I sow the legume seed?**

Oversowing after a burn generally gives reliable establishment of legumes on soils with a loose surface. Some form of cultivation is needed on hard-setting soils and when sowing an introduced grass.

If planting early (October–November), sow hard seed, but have it scarified if planting after the wet has started.

Do not destock oversown paddocks as grazing will reduce competition from the existing native grasses. This is different from managing a new pasture of legume and introduced grass sown into a cultivated seedbed where the native grasses have been ploughed out.

**What about feeding legume seed to stock?**

Putting a few kg of seed in molasses-based supplements can be a waste of time. At that time of year, most of it ends in cattle camps when and where seedlings cannot survive. And it’s a very slow way of making any improvement.
Do I need fertiliser?

Extensive areas and long transport distances make fertiliser much too expensive to use on a broad scale. However, it is worth applying some phosphorus in pilot plots where the soil phosphorus levels are below 4 ppm.

The hardy legumes may not need fertiliser to establish and survive, but will grow more vigorously and set more seed with it, and so will spread more quickly.

If the soil phosphorus levels are between 4 and 8 ppm, the legumes will grow well and will provide the animals with protein. However, phosphorus levels may still be too low for the animals.

If the soil is above 8 ppm, there is enough phosphorus for both plant and animal.

What about feeding phosphate supplement?

Feeding supplement P is the only practical way to supply phosphorus on extensive properties with large paddocks, and is now done routinely on many of those properties.

Phosphorus feeding systems are well described in the DPI book *Phosphorus nutrition of beef cattle in northern Australia*, or in advisory leaflets from other agricultural departments.

When should supplements be fed?

Cattle on low P soils need extra phosphorus during the wet season when they are growing, and when there is adequate nitrogen in their diet from grass or sown legumes. The supplement is usually left in the paddock throughout the year as it is often impossible to put it out during the wet.

During the dry season, stock need less phosphorus, but more nitrogen so that they can use standing dry herbage. This nitrogen may be fed as non-protein-nitrogen (urea) or in protein form as, for example, cotton seed.

What problems arise from dry season supplements?

Dry season supplements are now part of routine stock management in the region although they may be needed less with early weaning or lower stocking rates.

Dry season supplements allow an animal to increase its intake by 30–40% over the dry season, and so effectively to increase the stocking rate. This could put excessive pressure on the native pasture.
Seca stylo can recover from the stem or from seed after a burn.

Leucaena is highly productive, but grows well only on cropping-type soils.

Drought-resistant buffel grass can be planted on better soils.

**Will fire damage my sown legumes?**

New plantings of legumes must be allowed to drop good seed before the first fire.

After this, stands of most hardy legumes can be rejuvenated by a fire, even if the top growth is lost. Seca and Verano stylo and Wynn cassia can drop masses of seed; the hard-seed is cracked by the heat of the fire, and new seedlings establish. The legumes may also shoot from the base or crown if burnt after early storms.

Sensibly used, fire can help maintain a good balance of grass and legume. Over-optimistic stocking rates and lack of fire could lead to legume dominance and lower pasture stability.

**What about fodder crops?**

Forage sorghum can give a great bulk of feed, though generally at the same time as the native pasture. Forages can be grown for special purposes, maybe for baling to feed yarded weaners or other stock. These forages should be planted only on good soils.

(Note that Silk sorghum is prohibited in WA.)

**What about fully sown pastures?**

Buffel grass has been sown on soils with reasonable levels of phosphorus. It is drought-hardy and persistent but the area has to be cultivated before sowing seed.

A ‘pilot’ legume plot with its sown grasses becomes a fully sown pasture. Urochloa and buffel grasses are the most commonly planted species, but the recently released Jarra and Strickland digit grass have shown promise on poor country.

Fully sown pastures with improved grasses and legumes are outside the scope of this short book on native pastures, so seek local advice.

A permit is required before exotic pasture species can be planted on pastoral leases in WA.

**Should I make hay?**

Hay is made in the north from both native and improved pasture.

Native pasture hay for bulk is made from pastures on the black soils—Mitchell/Flinders grass or bluegrass. Yields are high, but cutting and baling over the hummocky ground is hard on machinery.

Purchasers of Mitchell grass hay from the Kimberley region should check on the presence of the fungal bodies that can cause ‘black soil blindness’ and death of stock.

Good quality hay for weaners and horses is produced by specialised growers from irrigated farming land.
Species used for hay include Rhodes grass, forage sorghum, Cavalcade centro and butterfly pea.

**Are any other species useful?**

Cattle can eat as much as 40% of forbs (non-woody broad-leaved plants) in their diet. These forbs can have higher levels of protein and minerals than the surrounding grass.

One forb introduced as dry season feed is the kapok bush (*Aerva javanica*).

**How good is kapok bush?**

Kapok bush has high protein levels in its leaves—much higher than the local grasses. It thrives on poor red soils in open pasture along with bottlewashers and spinifex—country too poor to be invaded by buffel. Kapok bush cannot stand much competition from vigorous pasture, but has spread along many disturbed roadides in the Mt Isa Highlands and can be seen throughout the north.

Kapok bush is drought-tolerant and holds its leaf during the dry season. It is not very palatable, but once cattle acquire the taste, they do eat it during the dry.

Kapok bush is unlikely to become an environmental weed because it is not aggressive and cannot stand competition.