

A ROLE FOR SIRATRO

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Introduction

Our grazing property is on the central Curtis Coast 70 km south east of Gladstone in the north east corner of Miriam Vale Shire (24°06'S, 151°40'E). The Australian Bureau of Statistics shows that the shire has in excess of 6000 ha of grass-legume sown pastures and nearly 1800 ha of Townsville stylo (*Stylosanthes humilis*) sown into native pastures. There has also been a natural spread of Townsville stylo since it was first recorded along the north coast railway line in the district during the 1930's.

Prior to 1960 there was a limited interest by producers in sown pastures but species available at the time rarely got beyond the trial or hobby plot stage. Townsville stylo was well known but did not receive the commercial attention it deserved until more recent years. However, it must be borne in mind that seed supplies at a reasonable price did not become available until the late 1950's.

A range of new tropical pasture species became available in the early 1960's but these required testing and seed was not readily obtainable for commercial trials. This range of species created a great deal of interest in pasture improvement but it was not until 1965 or later in the case of some species that seed price and supply gave producers the opportunity of planting areas of some significance. The 6000 ha of mixed grass/legume swards were mainly established over the last 10 years although little pasture has been planted since the collapse in beef markets. There was an initial tendency to plant shot-gun mixtures of a whole range of species. However, this was an expensive exercise and producers soon became more selective in planting those species likely to perform well in a particular locality.

Siratro (*Macroptilium atropurpureum*) was just one of the range of legumes but because of various attributes including hardiness, particularly demonstrated over the 1968-69 drought, it has become the most popular legume for mixed swards. According to surveys by the Department of Primary Industries it is the main legume component in over 80 per cent of the planted mixed swards of the Shire. It figures prominently in the current pasture program of our property and will continue to do so unless it can be shown that another legume is more productive under conditions of increasingly low inputs of phosphorus fertilizer. The place of Siratro can best be shown through a description of the property and the development programme.

Property Description

The mean rainfall is 1016 mm per annum, summer dominated to the extent of 45 per cent in the December-February period. August and September are the driest months and winters are mild with frosts an exception rather than the rule.

The total area is 24 290 ha being about equally divided between freehold and leasehold land tenure. Apart from the hilly country and waterways the property can be separated into rolling spear grass and coastal wallum.

It carries 1200 breeders and until about 2 years ago it was a pure-bred Hereford herd. Brahman bulls have now been introduced forming the basis of a cross-breeding program. The enterprise involves breeding and fattening with unfinished stock sold off as forward stores and the object is to turn fat stock off at 2½ to 3 years of age. The stock management program involves controlled mating, early weaning, dehorning, internal and external parasite control as required. The property is operated as a family unit.

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Native Pastures and their Management

About 3240 ha of the undulating spear grass country was heavily ringbarked many years ago and is now open with minimum tree vegetation. Bunch spear (*Heteropogon contortus*) dominates the areas of better drainage such as the ridge tops and slopes. On the lower slopes and flats, paspalum (*Paspalum dilatatum*) and forest blue (*Bothriochloa bladhii*) are well represented. The open spear grass country is rated at an adult equivalent carrying capacity of 0.25 beasts ha⁻¹.

The soils range from sandy to clay loams with occasional rocky outcrops, and, with adequate fertilizer plus conservation measures to guard against erosion, much of it would be regarded as useful agricultural crop land. Although phosphorus levels are low, generally below 10 ppm, and potassium is little above marginal levels, it is nevertheless very useful grazing country even with native pastures. In common with other spear grass country annual burning of native pastures is a standard management practice, although some precautions are necessary such as burning after the end of winter and also after rain.

The wallum country lies near the coast and the vegetation and lack of fertility is comparable with wallum further south. As practised by a number of graziers within Miriam Vale Shire, the wallum is used as relief country for seasonal grazing from June to December. Management also includes burning but in contrast to the spear grass area it is burnt in April or May. Stock performance in these conditions indicate fair levels of protein from the green grass shoots and cattle do well until December.

The combination of the two types of country leads to the standard practice of grazing the spear grass from November to the end of May and the wallum from June to November or December. One major advantage in such a program is the better control of ticks and worms.

Sown Pastures

Spear grass is a valuable pasture in the fattening program after the spring rains and until it reaches maturity. It has limitations after this point and reaches a very low ebb in winter and early spring. The open undulating spear grass country requires only light clearing costs and because of other favourable factors concerning soils and drainage it became a logical choice for attempts at pasture improvement. C.S.I.R.O. research at Rodds Bay showed that native pastures on similar country produced only about 22 kg ha⁻¹ liveweight gain per annum, but with the addition of superphosphate and the introduction of Townsville stylo, productivity was lifted to about 185 kg ha⁻¹. Improvements of this magnitude offer a great incentive for pasture improvement and confirm our decision to proceed with pasture improvement on the spear grass country.

A range of pasture species including Siratro was introduced on the property about 14 years ago for assessment. The land was well prepared and fertilized and the various species were planted as 'Shot-gun' mixtures. Legumes tried over the years in addition to Siratro and a number of *Stylosanthes* spp. included Greenleaf desmodium (*Desmodium intortum*), Silverleaf desmodium (*D. uncinatum*), 3 cultivars of glycine (*Glycine wightii*), Miles lotononis (*Lotononis bainesii*), Archer axillaris (*Macrotyloma axillare*), Lab lab (*Lablab purpureus*), Phasey bean (*Macroptilium lathyroides*) and Hunter River lucerne (*Medicago sativa*). Many grasses were also put under trial over four to five years with periodical intensive grazing. Assessment was based on various visual observations including survival and growth responses after grazing and dry spells.

Our first commercial sowing of pastures was based on intensive cultivation in small paddocks of 4 to 5 ha each with carefully controlled grazing. The fertilizer program included Mo superphosphate 12 at 246 kg ha⁻¹ at planting and 123 kg ha⁻¹ as an annual maintenance. Stock water supplied in troughs was also laid onto each paddock. The selected species included Siratro, lotononis, with Kazungula setaria (*Setaria anceps*) and green panic (*Panicum maximum* var. *trichoglume*).

Under these conditions carrying capacity increased to better than 1 beast ha⁻¹ representing a four-fold improvement over native pastures. Animal performance also lifted and was probably comparable with that in the Department of Primary Industries grazing trial on "Charnwood" in the Miriam Vale Shire, where weaners in 5 consecutive years showed a mean gain of 180 kg in 314 days on Siratro dominating green couch (*Cynodon dactylon*). In our case the most spectacular improvement in animal performance occurred from late summer through autumn into winter. This prolonged growing and fattening season meant that fat stock with comparable weights could be turned off 12 months younger than was the case when relying solely on native pastures.

One major problem, however, was the high cost of establishment and management of sown pastures under our intensive system. Because of the capital outlay and labour requirement it was obvious that development would be slow and that many years must elapse before the area would be large enough to have a significant impact on a property of this size.

Siratro and Kazungula setaria provided most of the feed from the sown pastures, although lotononis made a valuable contribution to the overall feed year through winter greenness and early spring growth.

We have made hay from this pasture as a requirement for weaning and it is worth recording that the Siratro and Kazungula setaria combination makes a good hay comparable in quality to a grassy lucerne product. A local contractor using this pasture mixture for a number of years emphasises the need to commence haymaking in early summer rather than wait until the pasture has matured. His method involves some risks with rain but usually 3 consecutive cuts can be taken at a time when feed is plentiful. The alternative of taking one massive cut at the end of the growing season presents mechanical problems, particularly with Siratro, and gives a lower quality product. Furthermore, the pasture has little chance of recovery before winter. In 5 years of haymaking adopting a system of starting early and finishing in time to allow some growth before winter, both Siratro and Kazungula stands have not deteriorated.

"Low Key" Pastures

In common with research findings our experience with pastures indicates that the legume is the vital component in the mixture. Consequently it was decided to revise our pasture program and simply sow a legume into the spear grass. The intention was to reduce costs so that larger areas could be improved each year. The immediate reduction was in grass seed and land preparation but it was apparent that other savings could be made by reducing clearing, fencing and labour requirements. It was also hoped that the application of superphosphate could be reduced.

Research by C.S.I.R.O. at Rodds Bay on similar but lower rainfall country indicated the feasibility of the low key approach in the case of Townsville stylo. Following this lead we planted 80 ha of Townsville stylo but in recent years have concentrated on sowing Siratro into spear grass. Preference was given to Siratro because it is a perennial and will make a contribution to the pasture possibly 6 weeks ahead of Townsville stylo. In fact under our conditions of negligible frost it will make a little growth in winter and spring. It has of course other well known attributes including drought tolerance, rapid response to low rainfall, and efficiency in fixation of nitrogen.

There is evidence that Siratro requires more careful management than Townsville stylo or possibly other stylos with spear grass. A "low key" pasture trial currently in progress by the Department of Primary Industries on similar country within the Shire could well have direct application to our program. In this trial, which combines different types of land preparation and a range of Mo superphosphate levels, Siratro seed with 80 per cent germination was planted at 2.2 kg ha⁻¹.

Some salient points from results to date (Adams, personal communication) are recorded below:

- a Poor establishment can be expected when Siratro seed is broadcasted over unprepared hard setting soils. Minimum preparation, even if only a superficial scratching

- of the surface, makes all the difference providing conditions for an effective stand in the first year.
- b Where superphosphate was applied at less than 123 kg ha⁻¹ down to nil, Siratro made poor growth, had small leaves and did not flower in the first year. It is noteworthy that growth from Siratro even without maintenance fertilizer was considerably better in the second year and it may well produce seed in the third summer.
 - c In the first 12 months there was a strong legume growth response from the basal application of superphosphate at 246 kg ha⁻¹ but no significant difference between 246 and 492 kg ha⁻¹ in total productivity including grass plus legume.
 - d At 492 kg ha⁻¹ there has been an almost total dominance of spear grass by Siratro and an invasion of weeds in the second year at the expense of grass.

Our Siratro/spear grass pastures established with 246 kg ha⁻¹ of Mo superphosphate have an estimated carrying capacity of 0.75 beast ha⁻¹. Cattle performance is comparable with results from the "high key" pastures, again providing the opportunity of turning off a higher percentage of fat stock. The collapse in the beef market brought a halt to the pasture program but the current margin in value between stores and fats has provided the necessary impetus to restart this year. Mo superphosphate for establishment has now been reduced to 123 kg ha⁻¹ partly as a pasture management strategy but mainly as an economic consideration of the rising cost of fertilizer.

The Future of Siratro

Siratro has been given a very important role in pasture improvement on this property. Initially it was chosen from a range of legumes and 120 ha was planted with *Kazungula setaria*. In a low key approach 200 ha have been sown into spear grass and with careful management practices we believe that a reasonably stable pasture can be maintained.

If Siratro becomes totally dominant to the exclusion of spear grass we will then re-prepare the land and sow a grass, possibly *Kazungula setaria*. On the other hand if Siratro fails to perform effectively because of extremely low levels of phosphorus forced on us by economic circumstances, we will then give consideration to *Stylosanthes* spp. At present we have *Stylosanthes hamata* cv. Verano under trial although we still have confidence in Siratro as the major legume on this property.

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