PROCEEDINGS

PASTURE SYSTEMS IN THE BEAUDESERT AREA

FIELD MEETING AUGUST 31, 1984

The meeting was held in the hills and irrigated valleys near Tamrookum in the Beaudesert area. It examined some very successful low key development of native pastures using tropical legumes and some highly intensive pasture systems based on temperate grasses and clovers with irrigation.

INTRODUCTION TO THE DISTRICT

G. M. HAWLEY

Department of Primary Industries, Beaudesert

The topography of the Beaudesert Shire consists of extensive alluvial flats, the basaltic uplands, the Marburg sandstone to the west of the Logan River and the plateau areas of Tamborine and Beechmont. The main agricultural enterprises are beef on the upland areas, dairying and cropping on the river flats, horticulture, broilers and beef on the sandstone country, and horticulture and dairying on the high plateaux. Rural production for the shire totalled $M36–40 with large inputs from crop, beef and dairy. The main soils of the Shire are black earth and lighter alluvia of the flats and the brown clay loams of the basaltic uplands. These soils are all relatively high in phosphorus and marginal to low in sulphur. The Marburg sandstones are mainly duplex soils with low phosphorus and medium to high sulphur levels.

Here at "Glenapp" we are on the brown clay loam soils in the basaltic uplands, which in earlier times were commonly fertilized with superphosphate. However, we now know that pasture response was primarily due to the sulphur in the super and consequently only sulphur fertilizer is now applied. Sulphur (Canadian bright 99% S) is flown on at 40 kg/ha every second year. The annual rainfall at "Glenapp" is 1067 mm per year somewhat higher than at Beaudesert (890 mm per year).

PROPERTY INFORMATION AND PASTURE ON THE STEEP HILLS

W. DRYNAN

"Glenapp", Beaudesert

The property of 890 ha comprises dairy, beef and grain production. A Freisian herd of 190 milking cows is run on 260 ha with 65 ha of irrigated flats, 50 ha of dryland cultivation for grain and the remainder hill country. Feed for the dairy herd on the irrigated flats is provided by a variety of pastures:

(a) Clare clover and ryegrass with Ladino clover undersown which is grazed closely in winter to allow Ladino to predominate in spring
(b) ryegrass + nitrogen fertilizer
(c) lucerne
(d) some lablab and soybean areas

These pastures provide good feed for winter, spring and early summer. The feed gap in late summer/autumn is helped by the hill pastures of tropical legumes.

The pasture on this steep hillside on which we are now standing is 8 years old, it is an area of 40 ha which was aerially sown with 1 kg each of the legumes Siratro and Tinaroo glycine. The best time to oversow is in early spring after a burn. The seed was sown with 200 kg superphosphate ha^{-1} and recently has only been fertilized with 40 kg sulphur ha^{-1} every second year at an annual cost of $19 ha^{-1}. The pasture has improved every year since sowing and in summer is waist deep. Glycine dominates in early summer and siratro in late summer/autumn. We recommend keeping this type of

pasture development to the steeper hillsides and its success has been so good that we have sown another 160 ha in the last three years. The rocky, very broken surface of these hillsides provides many suitable crevices in which seed may lodge and germinate with some protection and this has contributed substantially to the success of aerial sowing.

The 190 dairy cattle are grazed on the flats with access to the steep hillsides as night paddocks if they so choose. However, during spring and early summer they graze these areas very little because better pasture is available on the flats, the tropical legumes are relatively unpalatable at this time, and the hot weather reduces the cattles enthusiasm for climbing the steep hills.

This is an advantage which allows a large bulk of legume to accumulate on the hillsides over summer and in the cooler weather of autumn and early winter the cattle choose to graze these areas heavily. The fertility of the soil has been built up so much that we get strong weed invasion at times. Oversowing with an improved grass may overcome this but has not been successful as yet. Timber cover on this area was light originally and was further reduced three years after sowing by herbicide treatment. The more recent area was sown with full timber cover which did not interfere with pasture establishment, then several years later the trees were tordon-treated.

MILK PRODUCTION FROM NITROGEN FERTILIZED CALLIDE RHODES GRASS

R. T. COWAN

Department of Primary Industries, Mutdapilly Research Station

From January until May the milk yield of cows on most Queensland dairy farms steadily declines. Where a sufficient area of land is available the tropical legume based pastures are well suited to providing high quality feed during this period. However the majority of dairy farms do not have sufficient area to maintain these legume pastures which require lenient grazing and must adopt more intensive pasture systems, notably nitrogen fertilized grass pastures. This project aims to measure the response in milk yield to level of urea applied to an unirrigated tropical grass pasture at the Mutdapilly Research Station.

Eighteen hectares were planted to Callide Rhodes grass at 3 kg seed ha^{-1} in November 1982. From October 1983 this pasture has been stocked with Holstein-Friesian heifers and cows at 2 and 3 head ha^{-1}. Animals calved in spring 1983. Nitrogen is applied as urea in three equal dressings in September, December and March at the rates of 0, 150, 300, 450 and 600 kg N ha^{-1} $year^{-1}$. Rhodes grass is grazed on a two weeks grazing, two weeks spelling rotation. Cows are maintained on pastures all year and in addition to Rhodes grass each cow receives 0.4 ha grazing oats, 800 kg rolled grain and 0.5 t maize silage.

Average milk yields per cow and pasture yields on offer over the first lactation are shown below. There was an approximately linear increase in each with level of nitrogen.

Stocking rate (cows ha)		N level (kg N ha^{-1} yr^{-1}) 0	150	300	450	600
2	Milk (t cow^{-1})	2.1	2.6	2.7	3.0	3.6
	Pasture (t ha^{-1})	1.8	2.0	4.0	5.5	5.3
3	Milk (t cow^{-1})	—	2.4	2.6	—	2.8
	Pasture (t ha^{-1})	—	2.1	1.8	—	5.5

It is of interest to note that most of the response in milk yield in this trial was due to pasture stoodover from summer into autumn. The differences in milk yield among levels of nitrogen occurred almost totally in the months May to July inclusive.

However, over this period pastures grew at only 6 kg DM ha^{-1} day^{-1}, and cows were consuming pasture grown in the earlier months of November to February inclusive.

A cutting trial is being done concurrently to provide some link with the numerous cutting trials done throughout south-east Queensland over the past 30 years. The responses are shown below and are very consistent with previous data.

	N level (kg N ha^{-1} yr^{-1})				
	0	150	300	450	600
Dry matter (t ha^{-1})	2.2	5.8	8.4	9.4	12.5
Efficiency (kg DM kg^{-1} N)	—	24	21	16	17

Data being collected on nine farms throughout south-east Queensland show dry matter responses to nitrogen similar to those measured at Mutdapilly.

RYEGRASS AND HIGH DENSITY CLOVER SYSTEMS

L. BISCHOFF

"Taminnis", Beaudesert

The property is 175 ha of mostly river flat with 80 ha of irrigated cultivation comprising 35 ha lucerne, 28 ha high density ryegrass, 8 ha Ladino clover, 4 ha Clare clover and 5 ha lucerne + ryegrass. The property milks 230 cows all year with average daily production of about 17 litres per cow. We have three travelling irrigators and can cover up to 8 ha each day.

The main pasture inspected was a clover/ryegrass sward sown with 20 kg Clare clover, 5 kg Ladino clover, 5 kg red clover and 5 kg 'Ellett' ryegrass per hectare in late March. Two bags of nitrogen plus 4 bags of super are given per hectare at planting and then 4 bags super ha^{-1} each year. Because Clare has a large seed and is a quick grower, the pasture is nearly as quick to establish as ryegrass + nitrogen and the first grazing is obtained towards the end of May. Our interest in the clover-based development is to try and cut back on the high cost of N fertilizer associated with straight ryegrass pastures. [However, ryegrass + N is still the top pasture for high bulk of feed in mid-winter.] The clover pasture is managed with one month between grazings and lasts in good condition for about 4 years. The Clare clover lasts only until October-November of the first year, and in subsequent years Ladino clover gives the main spring to early summer feed. The red clover component was very strong last year but it does not last in any bulk into the second year. If the ryegrass weakens in two years however it can be easily re-introduced by oversowing. To keep good clover growth it is essential especially in summer to keep up the irrigations, perhaps as frequently as every 7 days in very hot weather. At certain times of the year such as now on the pasture we are looking at it is essential to spray with antibloat. This clover/ryegrass pasture system provides good quantities of high quality feed throughout most of the year. An important unanswered question is whether so much superphosphate is required or whether some dressings can be replaced by sulphur fertilizer only.

However, in my opinion the cheapest quality feed is lucerne which we fertilize with 4 bags superphosphate ha^{-1} $year^{-1}$. Lucerne in our environment even provides some feed in winter and survives much better in the hot summer weather with fewer irrigations.

ZERO-TILL RYEGRASS AND INSPECTION OF HARVESTORE

D. DENNIS

"Dalarna", Beaudesert

The 150 ha property has 75 ha cultivation comprising 25 ha lucerne, 25 ha ryegrass and 25 ha permanent pasture. Cattle carried are 220 milking cows, 10 springers, 100 heifers and 65 bullocks. The cows are currently producing 3500 litres per day.

The permanent pastures are based on Whittet kikuyu and these rundown in vigour quite dramatically within about 5 years, largely as a result of 'kikuyu yellows' fungal disease. A new kikuyu Noonan from northern NSW is more resistant to 'yellows' disease and may be promising for future use.

To revitalise these pastures and increase their productivity we introduce ryegrass and clover into the pasture every year about the first week of May. This is done simply by broadcasting the seed (40 kg ha^{-1} ryegrass and 2 kg ha^{-1} Ladino clover) with a fertilizer spreader, no cultivation is used.

Grazing of the renovated pasture starts about 6 weeks from sowing and 2–3 bags of urea ha^{-1} are given after each grazing. Superphosphate at 200 kg ha^{-1} is applied each year.

Viewing of the zero-till ryegrass pastures was followed by an inspection of the 500 tonne capacity 'Harvestore' and a demonstration of the 60 m long feed-out system. Maize and lucerne grown on the property are used in the Harvestore and the total yearly consumption of haylage by the cows is about 1000 tonnes.

The cows are not rationed, each day as much haylage is fed-out as they will eat. The Harvestore system has replaced the making of 8000–9000 bales of hay each year on our property.

RYEGRASS AND CLOVER TRIALS AT MUTDAPILLY RESEARCH STATION

K. F. Lowe

Department of Primary Industries, Ipswich

Two irrigated trials are being conducted at Mutdapilly Research Station to investigate ryegrass and ryegrass/clover production for use by dairy cows.

Ryegrass + N pasture vs clover-based pasture for milk production

This trial compares annually sown ryegrass + nitrogen system and a high density clover based pasture. These feeds are compared at two stocking rates and grazed in conjunction with native pastures at two stocking rates. The milking animals are also supplemented with 3 kg molasses per cow per day. Animals are grazed on the native pastures during the day and on ryegrass or clover at night.

Both pastures are sown each year, the ryegrass pasture at 40 kg of Tama seed per ha, and the clover pasture as a mixture of 5 kg Tama ryegrass, 20 kg Clare sub-clover, 5 kg Ladino white clover, 5 kg NZ Cowgrass red clover and 1 kg of shaftal clover per hectare. In the three years the trial has run, the pastures have been sown in mid March into fully prepared seedbeds and rolled.

Feed on offer has varied from 1.6 tonnes ha^{-1} on ryegrass in 1982 to 2.5 tonnes ha^{-1} in 1983 (seasonal averages). Comparative figures for the clover based pastures were 1.1 and 1.6 tonnes ha^{-1} respectively. Stocking rate also influenced feed on offer with 1.6 and 2.3 tonnes ha^{-1} on offer in the low stocking rate treatments of 5 cows ha^{-1} in 1982 and 1983 and 1.1 and 1.8 tonnes ha^{-1} in the high stocking rate experiments.

The requirement has shown that both pastures have strengths and weaknesses. Ryegrass + N gives best per cow production at the high stocking rate, with clover being best at the lower stocking rate. There has been only a slight advantage to ryegrass over the late autumn/winter period in all three years. The results in 1982 and 1983 have differed in the spring and summer periods. In 1982, there was an advantage from clover in both spring and summer, but in 1983 there was no substantial difference between the pastures. These differences can be attributed to variation in the white clover component. In 1983, waterlogged conditions earlier on and shading in winter from shaftal clover resulted in poor establishment and performance of the white clover. This left the clover-based pasture with no carryover species into the summer after the ryegrass, Clare subclover and shaftal clovers had matured and seeded.

There was a considerable performance difference in per cow milk production in response to stocking rate differences in the irrigated pastures. The effects were greatest

in 1982, because in 1983 very wet conditions resulted in animals having to be removed from the irrigated areas for about $\frac{1}{3}$ of their lactation. This reduced the effective stocking rate on both treatments, allowing excess feed even on the high stocking rate treatment. So far in 1982, the stocking rate differences are similar to 1982.

Animal liveweight was also substantially affected by stocking rate in 1982 with the animals on the high stocking rates losing 24 kg while those on the low stocking rate gained 42 kg. The differences were not so great in 1983 but still were biased to the low stocking rate.

Milk production was virtually unaffected by stocking rate on the native pasture areas. This was despite substantial differences in the feed on offer in the paddocks. The reason for this is the calving pattern of the animals used on the trial. Calving in autumn means that the animals are at the end of their lactation before the pastures have any substantial feed value and their responses would therefore be small. The other reason is the relative differences in terms of feed value at any time between the two feed sources, with the high quality of the temperate species overriding any small advantages from the native pastures. A new trial will commence next year to look at the influence of better quality summer feed in association with temperate pastures, using a different calving pattern.

Summary of the trial

1. There is not much difference in milk production per cow from the two pasture systems.
2. Ryegrass + N gave better results at the highest stocking but at the lowest stocking rate, the clover-based pasture was superior.
3. Ryegrass + N always yielded more feed than clover-based pastures, but this was compensated for by better quality of the clover pasture especially in the later spring/summer period.
4. There was very little effect on animal performance as a result of the two stocking rates on the native pasture area.
5. In cost of production, there is an advantage to clover-based pastures. In 1983, the relative costs were \$400–\$440 for ryegrass + N and \$290–\$370 for clover-based pastures.
6. Bloat is a potential problem with the clover-based system, but with the use of bloat oil we experienced no problems at Mutdapilly.

Midmar vs Tama ryegrass for milk production

This experiment compares two ryegrass cultivars with different overall yields, different growth rhythms and disease resistances. It was commenced to determine animal production responses as a follow-up to a series of cutting experiments carried out in the sub-coastal areas of southeastern Queensland. In the cutting experiments Midmar, a diploid, Italian ryegrass type selected for production in subtropical areas, was 17 to 20% higher yielding than Grasslands Tama, the most widely used annual ryegrass in the area. The experiment then, had the dual purpose of assessing the performance of Midmar ryegrass and the validation of cutting trials as a means of determining relative animal performance potential of ryegrass cultivars.

Animals graze ryegrass for 24 hours each day and are not supplemented. On Midmar, there are 3 stocking rates of 4, 7 and 10 beasts ha^{-1} while on Tama, only the 4 and 7 beast ha^{-1} treatments are used. The pastures are grazed on a 1 week on 3 weeks off basis and are fertilized with 50 kg N ha^{-1} after each grazing.

Average feed on offer in 1983 varied from 1.7 t ha^{-1} at the beginning of the season to 2.3 t ha^{-1} at the end for Tama, and 1.8 t ha^{-1} to 3.3 t ha^{-1} for Midmar. The greatest difference between the cultivars came in spring which was predictable from the cutting trials. Over the season, there was a 1.5 litre cow^{-1} day^{-1} advantage in milk production from Midmar, the major differences occurring in spring when feed on offer was greatest. It also occurred at the time when rust infection differences were greatest.

In 1984, there has been little difference between Tama and Midmar in terms of feed on offer to date. However, there is currently an advantage to Midmar of 1 litre $cow^{-1}\ day^{-1}$ in milk yield. This has been an accumulated advantage over the 3 cycles so far conducted. An explanation for this could be associated with the higher moisture content of Tama which has 2–3% less dry matter in its foliage than Midmar. In the early stages of growth, when Tama has a very high moisture content (only 8 to 9% dry matter in the foliage), and where the animals have access to no roughage, this difference may be enough to result in a different passage time of the feed through the rumen.

Summary of results

1. Midmar is up to 10% better than Tama in milk production per cow (and about 7% better per hectare).
2. Cutting trials give a relatively good idea of the milk production potential of ryegrass cultivars.
3. At low to moderate stocking rates, not all the extra feed was utilized from an improved cultivar and, for maximum benefit some management changes may be required to increase utilization.

Cutting trials at Mutdapilly

A number of cutting experiments have been conducted at Mutdapilly also. One experiment investigated the value of a number of new cultivars of legume for the clover-based system. In the wet year of 1983, the best producing legumes were Berseem clover and shaftal clover. Sub-clovers, white clovers and red clovers were inferior and this is probably the result of excessive waterlogging on the heavy soils.

A second experiment investigated variable sowing dates of temperate clover-based pastures. Again, the waterlogging in 1983 resulted in establishment problems, but the results suggested that early sowings (early March) could be successful. However, early and late sowings resulted in somewhat different pasture compositions. Ladino was favoured by early sowings, and was better in association with Berseem clover, rather than Clare subclover. There was no yield advantage in including ryegrass in the clover-based mixture, but if included, it suppressed the herbaceous weed component of the total yield.