

FIELD MEETING AT CROWS NEST ON MARCH 19, 1976**PASTURES AND STABLE LAND USE**

The field meeting was held in conjunction with a meeting of the Crows Nest Show Society on farms in the vicinity of Crows Nest, near Toowoomba, south-east Queensland. The morning was spent on the farm of R. & E. MacDonald, Crows Nest, and during the afternoon pastures on a number of other farms in the vicinity were inspected. These pastures had been entered in the Show Society's pasture competition, which attracted 36 entries, and the high standard of pasture management was clearly evident. Approximately two hundred members of the two societies, and visitors, were present.

The area is very interesting from a pasture viewpoint as it is intermediate in terms of climate between the areas of temperate and tropical pasture adaptation. The altitude is approximately 700 m, and rainfall about 900 mm, some of which falls in winter and spring; as a result temperate grasses and legumes are well adapted. Some tropical grasses are grown or have become naturalized, but the relatively short summer season precludes the use of most of the tropical legumes.

PROPERTY OF R. & E. MACDONALD**(i) Introduction by R. MacDonald**

This 162 ha property has been farmed by the present owners since 1948, prior to which it had been six separate blocks which had been under cultivation since the turn of the century. Ploughing without respect to contour on this undulating land had resulted in severe gullying and erosion. In the early 1950's contour banking and a change from arable to permanent pasture resulted in a reduction in soil erosion to insignificant levels.

(ii) The Whole Farm Concept—K. Best, Dairy Advisor, Department of Primary Industries*The Farm*

The owner of the farm has been co-operating with various extension officers in the Department of Primary Industries, and the farm is one of a number of demonstration farm projects on the Darling Downs. The co-ordination of the expertise of advisors and the experience of the farmer has resulted in rapid improvement in the productivity of the farm and profit to the owner.

Soils are for the most part relatively infertile light forest soils with a pH of 5.4 to 5.9, and with rather poor moisture retention in the surface layer. The farm is split into 28 paddocks of which 16 (68 ha) are improved. Five paddocks (14 ha) are under lucerne, eight under improved permanent pasture (40 ha) and three (14 ha) are arable and sown to winter oats. The remaining 93 ha is mainly natural pasture.

Prior to 1970 the farm supplied cream. A dual purpose Red Poll bull was used on A.I.S. cows to gain more benefit from bobby calves and vealers, and the Red Poll × A.I.S. milked fairly well. With the closure of the Crows Nest Butter Factory in 1969 and the offer of bulk manufactured milk a three unit walk through type dairy was purchased enabling two operators to milk 50-60 cows per hour. About this time Mr. MacDonald decided to reduce his crop area (barley, oats and maize) and grow more pasture and lucerne.

In 1971-72 improved paddocks consisted of 6.5 ha lucerne, 25 ha improved pasture and 30 ha crops. Production of the 55 cow herd had risen from 6,500 lbs to 10,200 lbs butter fat, much of the extra output coming from eight ha of cowpeas and millet overcoming the autumn protein gap. Grain was fed in the bails at a flat rate of about two kg per day. A fear of bloat prevented full utilisation of lucerne and legume dominant pastures, but this problem has since been overcome (see below).

Objectives

The prime objectives of the advisory committee, which started operating in 1970, were to increase the milking herd and to increase butter fat production. This has been achieved through:

- (a) *Conditioning of cows at calving*—Springers are run with the milking cows for one month before calving, to provide them with better quality grazing and a grain ration similar to that of the milkers.
- (b) *Fresh cow supplements*—Rather than a flat rate of 2 kg per day fresh cows are provided with 3 kg of grain during the first three months of the lactation, then dropping to one kg.
- (c) *Supplement of urea and MAP with grain*—In dry periods protein intake is increased by sprinkling urea molasses over hay.
- (d) *Better grazing management*—a grazing system was introduced whereby milkers grazed off the best fresh paddocks, followed by the grazing stock; if necessary the paddocks are then slashed before shutting up for regrowth.
- (e) *Urea molasses roller drums*—are used for dry stock in dry periods or low protein areas.
- (f) *Production records*—were started in 1972 to identify:
- (i) Top producers for breeding replacements
 - (ii) Low producers for culling.

Average butter fat production was as follows:

Breed	Number of Animals	kg butter fat
Jersey	14	146
A.I.S.	24	123
Red Poll × A.I.S.	14	111

(g) *More emphasis on improved pastures and lucerne*—Growth of grain crops was discontinued and the paddocks sown to pasture, lucerne and some oats.

(h) *Oats*—Are planted in three paddocks, two early and one late to spread period of utilisation. Fertilizer applied is 125 kg superphosphate and 65 kg urea per ha.

(i) *Spring growth*—of clovers is promoted as required by top dressing with 125 kg superphosphate per ha, in early autumn.

(j) *Slashing*—of rank pastures following grazing is carried out in order to promote clover growth and to improve evenness of grazing; also the resulting mulch on the ground is believed to improve moisture retention.

(k) *Bloat*—on lucerne and pastures with a high legume content is prevented by grazing stock on mature oats or pasture for one or two hours before introducing them to bloat prone pasture or lucerne for a four to six hour grazing period.

(l) *Artificial Insemination*—the change in emphasis to whole milk supply required a change in breed to maximize whole milk production, for example A.I.S., Friesian, Friesian × Jersey. Months of calving are changed to maximize production during the period when prices paid for market milk are greatest, that is May to July. Quality winter feed for the extra numbers is provided by increased pasture and lucerne plantings.

Results

Increase in stock numbers from 1971-76 have been as follows:

	1971	1976
Cows	46	57
Heifers	17	41
Fostercows	0	4
Bulls	1	0
Steers	9	21
Total	<u>73</u>	<u>123</u>

In 1976 there should be a further increase in the milking herd to nearly 70.

In terms of production improvement over the five year period, assessed in terms of butterfat, increased from 4,500 to 6,800 kg. Income has more than doubled, and costs, as a proportion of total income decreased from more than half to about one third. Income should increase further with the change in herd type to higher milk producing stock, and change in calving pattern to increase profits from the lucrative winter milk supply.

Because of the high cost of grain, average consumption per milking cow has been reduced from 2.0 to 1.6 kg per day during her 300 days with the milking herd.

Future

There are still considerable areas of native grassland which have potential for improvement. With the present dairy it would be possible to milk 80 cows, but if the milking herd was increased beyond 80 it may pay to convert to a herringbone dairy.

Winter milk production could be increased by feeding higher levels of grain. However, at the present level of production and with current grain prices, the amount of grain necessary for that extra gallon of milk reduces the profit margin greatly. It could be more profitable to milk a few extra cows at a lower level of production on pastures, lucerne and oats than to raise the level of grain feeding.

(iii) *Soil Conservation*—D. Begby, Soil Conservation Service

Slopes of 12-14 percent, as commonly encountered in this area, can only be stabilized with permanent plant cover. The serious erosion which had occurred on this property has now been completely arrested with the planting of permanent pasture and provision of contour banks.

From a soil conservation viewpoint a further reduction in area sown to oats would be desirable. Renovation of old pastures should be undertaken without leaving the soil bare for long periods and sod seeding is suggested as an alternative technique to ploughing and re-sowing.

(iv) *Management and Productivity of Pastures and Crops*—J. K. Cull, District Adviser in Agriculture, Department of Primary Industries.

This property currently consists of:

Good lucerne	8.4 ha
Grassy lucerne	9.2 ha
Temperate based pasture	10.0 ha
Newly sown temperate pasture	7.2 ha
Oats	13.8 ha
Paspalum, kikuyu, white clover, annually top-dressed with superphosphate	26.4 ha
Unimproved paspalum and native grassland	85.0 ha

With year round dairy production as the major enterprise the overall aim of this whole farm demonstration has been to provide an adequate quantity of high quality feed throughout the year.

Quality feed is obtained from:

- (a) pure lucerne and older grassy lucerne stands.
- (b) sown pastures based on Demeter fescue, Kangaroo Valley ryegrass, Australian Phalaris, lucerne, Montgomery red clover and Louisiana and Ladino white clovers.
- (c) Paspalum and white clover pastures top dressed annually with 125 kg per ha superphosphate.
- (d) Oats sown with urea (65 kg per ha) and superphosphate (125 kg per ha). Fertilizing with urea resulted in a fifty percent increase in yield of the oat crop.

Grazing records for 1975 show that grazing was available from lucerne and grassy lucerne paddocks, and night-time grazing from three paspalum-white clover

paddocks in every month of the year. The temperate grass paddocks provided grazing in all months except July and October, but with more area sown in 1975 this type of pasture should also provide year round grazing.

Oats provided up to an estimated 25 percent of total daily intake from June to mid November. In spring the oats is used as a filler before cows are put on to the bloat-prone pastures.

Farming Programme

Oats

Oats are sown in three paddocks between mid February and the end of March. The varieties used are the faster growing Minhafer and slower growing Camellia. Urea is applied before sowing and superphosphate is applied with the seed through the combine.

Temperate Pasture

Why do we sow temperate type pastures instead of tropical or sub-tropical species such as kikuyu, Rhodes grass or green panic? The reasons are:

- (a) There is adequate grass growth in summer on existing pastures of paspalum, kikuyu and native grasses.
- (b) There is a shortage of quality feed in autumn, winter and spring which is partly overcome by temperate pastures.
- (c) Over a period of from three to seven years sown temperate pastures are gradually invaded by paspalum and kikuyu to give a final mixture of these two grasses and white clover.

Dry years and droughts

Although the last two years have been good, this area is subject to droughts. Lucerne hay is made when possible, and Mr. MacDonald has 100 tonnes of fair to good quality hay on hand.

In drought periods hay is fed with extra grain and with urea and molasses roller drums to help the cattle to utilize dry roughage.

Lucerne

Lucerne is an important part of the animal diet on this farm. A small proportion of lucerne is still evident in pastures sown as long ago as 1957.

In parts of some paddocks lucerne fails to persist because of water-logging in wet periods or because of unsuitable soil type —too acid or deficient in P or K.

One of the largest problems of forward planning on farms in this area is that lucerne will never grow as well when planted on the same area a second time. The extent and degree of this decline in lucerne growth is unknown. (Discussion later in the day suggested this could be due to a phytotoxic effect of the lucerne, or, alternatively due to accumulation of disease organisms.)

Fertilizer Use

The basic programme of topdressing pasture and lucerne areas annually with 125 kg superphosphate per ha is considered to have produced worthwhile growth responses. Clover and lucerne growth have improved and grasses have better growth and a better colour.

At current landed price of \$66 per tonne, cost per ha of applying super is \$8.38, or \$7.95 per head of the 57 milking cows on the property.

Comparative costing of oats, grain and pasture as feed

(a) *Oats*: Current costs per ha for growing oats are estimated as follows:

Cultivation	\$17.50
Seed	6.25
Superphosphate	8.38
Urea	9.68
Total	<u>\$41.81</u>
Cost per cow	10.12

(b) *Grain*: During 1974-5 each cow received 0.514 tonnes of grain. At \$80 per tonne cost per cow per year is \$41.12.

(c) *Pasture*: Cost per ha of sowing pasture is estimated as follows:

Cultivation	\$17.50
4 kg Demeter fescue	2.80
1 kg Australian Phalaris	1.60
2 kg Lucerne	3.70
1 kg Montgomery red clover	2.10
1 kg New Zealand white clover	2.50
250 kg Mo Super 24	18.00
65 kg urea	9.80
Total	\$58.00

If the life of the pasture is assumed to be five years, the cost of establishment may be spread over the five year period to give an annual cost of \$11.60. Total annual cost including annual topdressing with 125 kg superphosphate per ha, will then be \$18.24. This is less than half the cost of sowing oats each year, but the temperate pasture provides 50 percent more feed.

Grazing Records

Grazing records over the last three years have provided comparative stocking rates on the different pasture types, and indicated periods when different pastures are utilized.

Results show that cumulative feeding time per ha per year obtained by one cow from the feeds is as below. Results are also expressed in terms of ha per cow.

	Months per cow per ha	ha per cow
Oats	5	2.4
Temperate pasture	7.5	1.6
Lucerne	8.25	1.4
Paspalum and white clover	10.00	1.2

Of interest is that the best paspalum and white clover pasture in the 1974 year carried the equivalent of a cow to 0.6 ha for the whole year.

INSPECTION OF FARM PASTURES IN THE CROWS NEST AREA

Three pastures were inspected on the farm of Mr. MacDonald. The first was sown in 1967 at the following rates per ha:

- 2 kg lucerne
- 1 kg Australian Phalaris
- 3 kg Kangaroo Valley ryegrass
- 1 kg Ladino white clover

pH of the soil was 5.8-6.0. The pastures have been topdressed annually with 100 kg per ha superphosphate, and slashed when needed.

The second pasture was sown on a soil of pH 5.7-5.9 in 1971 to the following mixture:

- 2 kg Kangaroo Valley ryegrass
- 2 kg Demeter fescue
- 1 kg Australian Phalaris
- 2 kg lucerne
- 0.5 kg Ladino white clover
- 1 kg Jemalong medic
- 1 kg snail medic
- 200 kg Mo Super 24 plus 200 kg Superphosphate
- 50 kg Nitram

All legume seed was inoculated and lime pelleted. The paddock was oversown in May 1972 with 2 kg Louisiana white clover and 2 kg Montgomery red clover with 200 kg superphosphate per ha.

The third pasture inspected was a young pasture planted on a soil of pH 5.5-6.1 to:

- 2 kg Kangaroo Valley ryegrass
- 4 kg Demeter fescue
- 1 kg Australian Phalaris
- 3 kg lucerne
- 1 kg Louisiana white clover
- 300 kg Mo Super 24 plus 200 kg lime
- 50 kg urea

Legume seed was inoculated and lime pelleted and the pasture is topdressed annually with superphosphate at 100 kg per ha in autumn.

In all these pastures there was a good balance between grass and clover and lucerne made a useful contribution. There was no evidence of medics in the second pasture.

Topdressing the third pasture in July 1975 with 50 kg per ha urea resulted in an apparent response by the lucerne but not by the fescue.

A pasture on the farm of Mr. R. Gleeson was given the championship award by the Crows Nest Show Society. The area was originally ironbark-red-gum woodland with the predominant grass being kangaroo grass (*Themeda australis*). Trees were rung in 1909 and stumped in 1959. After cropping once it was sown to lucerne and white clover and since then has received annual dressings of superphosphate. The good balance between clover and grasses (mainly paspalum and Rhodes grass) is believed to have come about as a result of the rotational grazing system employed. The three paddock rotation provides for 10-14 days grazing and about 28 days rest. Topping or haying favours lucerne by reducing effectiveness of grass competition. Application of superphosphate provides sulphur, which could be deficient in this area; nearby green panic pastures have responded to sulphur. On a total area of 58 ha Mr. Gleeson carries 50 steers in winter and up to 100 in summer.

A tropical-temperate species mixture was sown by Mr. B. Gillies on an area formerly under scrub in May 1974. The soil is a heavy black clay, and difficult to prepare. The mixture sown per ha was as follows:

- 2 kg Rhodes grass
- 2 kg Kazungula setaria
- 0.5 kg Phalaris
- 2 kg Montgomery red clover
- 2 kg Ladino white clover
- 2 kg lucerne
- 400 kg Mo super
- 50 kg urea

Lucerne has disappeared from this pasture but there is a good combination of Rhodes grass, setaria and clovers. Red clover, a species not widely used in southern Queensland, seeds and persists here for at least six years.

The last pasture seen was on the farm of Mr. B. Kahler. This formerly forest area was pushed in 1973, windrowed and burnt, and sown in April, 1974, to:

- 4 kg Demeter fescue
- 2 kg Kangaroo Valley ryegrass
- 0.2 kg Whittet kikuyu
- 2 kg lucerne
- 1 kg Ladino white clover
- 1 kg Montgomery red clover
- 400 kg Mo Super 24

In December, 1974, the paddock was topdressed with 300 kg super per ha.

Windrowing before burning has resulted in an uneven distribution of nitrogen and potassium in the soil and failure of lucerne and white clover in some areas is attributed to deficiency in one or other of these elements.