Pastures for prosperity — Dairy forum. 3. Perennial ryegrass and clover pasture management in northern NSW

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Introduction

This year, it is with great pride that our dairy cooperative, Norco, is celebrating 100 years of operation. However, despite the length of dairying history, it is difficult to define a typical system of dairy production in the Northern Rivers area. Other districts appear to have one system which is used, with only slight modification, by most farms. I feel that this idiosyncrasy of our district is attributable to the change in market orientation, which has occurred.

The area was traditionally a cream-producing one, due in part to the distance from markets. Production was based on clover and the summer grasses to support the winter–spring calving herds.

In the early 1970s, access to the Sydney milk market was granted and farmers changed their systems to cope with year-round production.

In the early 1980s, Norco altered their payment scheme for manufacturing milk. This autumn–winter incentive was an attempt, in part, to improve their utilisation of plant and staff by improving milk supply at what had traditionally been the time of lowest milk production.

So, in fact, the parameters to which the farmers are supplying have been in place for about 15 years.

A perennial ryegrass system based on Ellet started to evolve in the 1980s. The management was based on Victorian and New Zealand experience.

The years 1988–1991 were periods of prolonged wet weather and a cause of much dissatisfaction and high costs. Whole herds were averaging 5 l/cow in some situations. The production systems that had been evolving were severely challenged, and in most cases, were found wanting.

Farmers reacted differently to these challenges. Some moved district. Some opted for intensive feedlot-type enterprises in an attempt to regain some control over feed supply.

Others, like ourselves, accepted that our farms were suitable for pasture production most of the time and endeavoured to re-examine pasture-based management to cover the flaws which had become so apparent.

Another factor in our decision to continue with pasture-based production was the price fluctuations we had experienced during our short foray into dairying. The quotas initially allocated were low. The low manufacturing prices coincided with high interest rates. So, for a young couple with a large debt and a farm requiring a large amount of development, we became vitally interested in the costs of production. This awareness was what helped us through those years.

I have difficulty forecasting what the repercussions of industry de-regulation will be, but anticipate that part of the change will be more aggressive marketing. Our strategy for the future is to use a pasture-based system in which we have some flexibility over the level and costs of production.

We must also be aware of the environmental influences of our industry and the perception that this has on the marketing of food products. Our own cooperative proudly advertises — "NORCO — Naturally Australian".

The package concept

A major break-through in our thinking occurred when we realised that successful pasture farming in our area, is in fact, a package deal. There are 5 components and they are all important. They are as follows:

- Irrigation;
- Pasture conservation;

- Soil drainage;
- Attention to agronomic detail; and
- Ability to handle cows off pasture.

Irrigation

The importance of irrigation is 3-fold.

Timeliness of planting. The ability to plant at the correct times has been demonstrated clearly to be a major factor in the achievement of high yields.

Achieving optimum growth rates. Work at Wollongbar has shown the improvements that can be achieved by watering at 4–5 day intervals, as opposed to the flooding, drying regime provided by an over-committed irrigation system.

Ability to generate a feed surplus. Spring is traditionally a dry time and yet it is a period when very high growth rates are achievable from rye and clover pastures. We consider this sufficiently important to have installed a second irrigation system, in order to maximise the amount of feed available for conservation in spring.

The type of irrigation system is not important, as long as it achieves the stated aims, is cost effective, and is compatible with the farm and farmer.

Pasture conservation

The importance of this facet is a recognition that there are times when it is unsuitable for cattle to be grazing on pasture.

This may be due to excessively wet conditions, in which pugging and pasture damage would result from grazing.

Grazing of ryegrass pastures before the 3–leaf stage has been shown to have a detrimental effect on the total dry matter yield and the longevity of perennial pastures.

The fundamental change we had to make was to realise that plants had to be grazed from a plant's point of view and not from that of a cow. So, unless one is prepared to accept a drop in production, some form of fodder supplementation is necessary.

We use round bale silage and hay. There may be cheaper forms of conservation, but the availability of contractors, the ability to conserve small amounts of feed and the low cost of capital investment required vindicate this decision at this stage.

Grain is also fed at a rate of 1200 kg per lactation. It is bought in bulk and milled on farm. The composition of the mix varies throughout the year to counter the variation in pasture composition and availability.

Soil drainage

As our soil is a heavy, slow-draining clay, this is a most important feature of the pasture package on our farm. The natural soil conformation is melon holes or gilgais.

Our approach to drainage has been, with the help of the Irrigation Management Service, to draw a complete contour map of the farm using an Electronic Distance Measurer. A system of drains was planned, taking regard of existing fences, laneways and patterns of cow flow. The drains were installed using excavators and scrapers, at a cost of about $\$1/m^3$ of dirt moved.

This was a major step forward, but the gilgai formation of the soil meant that these drains alone did not achieve adequate drainage. The use of laser levelling has resolved this issue. Fortunately, there is a natural slope to the land, so it is a matter of working with this to minimise the earthworks. Typical falls achieved vary from 1:600 to 1:1000. This is costing about \$400/hectare. It may increase in the future as the equipment is working locally on tea tree development and so the freight component is minimised.

Experience is limited, but it would appear relasering after about 5 years may be necessary to minimise the reformation of the gilgais.

This work is normally done in spring–early summer, as it provides a period of dry weather, coupled with feed surplus from the ryegrass-dominant pasture system.

If there is a large amount of earthworks, the soil structure does appear to be damaged. A legume rotation of Shaftal clover and soybeans, for a number of years, appears to improve the soil in readiness for ryegrass mixtures.

To a farmer, on well-drained soils, all of this may seem a bit extreme. However, the wet years of the late 1980s, when we planted ryegrass in September at the earliest, taught us a lesson. The memories of cows grazing to water level, provided sufficient incentive for us to continue this drainage work throughout the last 4 drought years.

Once the soil profile is shaped for drainage, this work is guarded fiercely. Tractors and cattle are banned in wet weather. Formal cultivation is kept to an absolute minimum, and broadcasting

and direct drilling after chemical suppression are used to change crops.

Some areas have been double-cropped since 1987, without any cultivation. We believe that the soil structure, earthworm population and internal drainage of soil, have improved dramatically. This has not been achieved at the expense of productivity.

Attention to agronomic detail

Fertiliser. In recognition of the intensity of dairying, maintenance fertilisers are applied. Superphosphate (250kg/ha) and muriate of potash (80kg/ha) are applied to the temperate pastures in February. Potash is re-applied in August and it may be also necessary to use gypsum, if a sulphur shortage is suspected.

Nitrogen, in the form of urea, is used in times of feed shortages, or if it is felt necessary to modify the composition of a mixed pasture.

The soils have a pH of 4.6 (in water) in their untouched state. Local trial work has shown improvements in yields of 20%, with the application of lime. The normal rate of application is 3.75–5 t/ha, at a cost of $60/t (spread). This needs to be repeated at intervals of about 4 years.

Planting. Preparation of the first-year ryegrass pastures begins in spring, with the summer crop. If the land is to be lasered, it is worked with a disc plough and offset disc harrows; otherwise a chemically suppressed seedbed is used. If possible, at least 2 crops of weeds are killed prior to planting.

We use a Tye triple-disc direct drill. It appears to be a good, all-purpose machine, but does, in our hands, have some problems with the larger seeds such as lablab.

With the ryegrass-clover pastures, we use 2 species of ryegrass, Roper and Yatsyn, planted opposite ways. The combined planting rate is about 28 kg/ha. The red clover and Haifa white clover are each planted at a rate of 5.5 kg/ha using a Vicon spreader.

The drilling of the seed appears to give a better germination as the seed is in contact with the soil and the irrigation scheduling is not quite as critical as with broadcast seed. The presence of the ryegrass in rows means that the clover is in the inter-row spaces and seems to create a more even pasture. Delayed grazing of a broadcast rye-clover mix can result in the clover being shaded and losing its dominance.

Early pasture management. If we have sufficient feed, nitrogen may not be used on newly established ryegrass-clover pastures. A preceding legume crop can assist in achieving this. It is easy for the ryegrass to become too dominant. One could plant at lower ryegrass rates, but trial work indicates that, over a 3-year period, this can result in lower yield and greater invasion by summer grasses.

It seems that the pastures have to go through a period of 'looking a bit ordinary', before the clover becomes sufficiently developed to provide the nitrogen for the pasture.

Grazing management. In recognition of the importance of the root energy reserves to the ryegrass plant, pastures are grazed at the 3-leaf stage, unless lodging or shading of the clover is a problem.

Cows have access to a strip of feed for a maximum of 48 hours. Dry cows and heifers are used to apply sufficient grazing pressure to ensure good utilisation. Backing fences are used religiously.

The basic principle is to graze hard at the right time and then remove all cattle. The severity of grazing may be tempered under very dry or cold conditions.

Bloat control. The utilisation of ryegrass-clover pastures can create problems with bloat. We use a repertoire of techniques:

- Rumensin in the grain mix;
- Ruakura system of 0.5 hour on feed, 1 hour off feed, followed by on feed for the rest of the day; and
- pasture spraying with bloat oil.

It is also important for us to have some straight ryegrass pastures. This can allow safe night grazing and some peace of mind, if one has to leave the farm for the day.

Over summer. What constitutes the best management during the summer months is an area of current research and uncertainty.

Nitrogen deficiency and water stress have been shown to be detrimental to the survival of ryegrass-clover pastures over summer.

A strong dense stand appears to withstand summer grass invasion best.

Grazing can be regarded as opportunity harvesting, with the 'graze hard then leave alone' philosophy being applicable. If irrigation is not limited, grazing throughout the whole year is possible, although some palatability problems may be encountered in late summer.

Cyclonic weather can cause rapid deterioration of perennial ryegrass-clover pastures due to invasion by summer grasses.

At this stage, we have set an upper limit of 4 years as the working life of this type of pasture.

Ability to handle cows off pasture

For optimal management, there are times when cows should not be on pasture. We use a concrete slab of 9 m x 52 m for 120 cows. Silage is fed in round bale rings with all-day access. This system has limitations, and after a period, young and timid cows show a loss of condition. Without a major capital expenditure in machinery, herd splitting and a second feeding area would probably be the cheapest solution.

Summary

I believe, in our environment, it is possible to dairy profitably using a perennial ryegrass-clover-based pasture system. It is necessary to recognise the limitations and advantages of the system and that the 5 components discussed are inter-related and essential. The importance of the various factors may vary between farms.

This pasture system is compatible with responsible land use. It utilises the district advantages of large amounts of sunlight and reasonably reliable rainfall.

Provided that the system is compatible with the skills and management style of the farmer, it can provide a pleasant and rewarding way of life.

Costs and Returns 1993–94

Income ($)	
Calf sales	6 871
Cow sales	8 416
Gross milk	311 291
Rebates	3 161
Total farm income	329 739
Milk production (l)	860 218

Item	Value ($)	% Milk income	% Farm income
Fixed costs	23 685	7.6	7.2
Variable costs	149 022	47.8	45
Wages	42 790	13.7	12.9
Manager's salary	25 000		
Total wages	67 790	21.7	20.5
Total costs	240 497	77	72.9
Net income before tax		70 794	89 242
Average income (c/l)		36.18	38.33
Average net income before tax (c/l)		8.23	10.37
Return on capital (%)		5.4	6.8

Variable cost details	Value ($)	% Variable costs	% Farm income
Calf feed	1 897		
Chemicals	2 091		
Dairy req	3 227		
Dog feed	522		
Electricity	16 189	10.8	4.9
Purchased feed	50 855	34.0	15.4
Fertiliser	20 292	13.6	6.2
Fuel and oil	3 561		
Herd improvement	4 343		
Cartage and levies (milk)	31 733	21.2	9.6
Seed	8 099		
Cartage and levies	535		
Veterinary	5 673		
Total	**149 022**		

Capital investment in property

Item	Value ($)		% Capital investment
Land			
100 ha @ $5000/ha		500 000	38.0
Milk quota			
428996 l @ $0.50/l		214 498	16.0
Cattle			
12 0–6 mths @ $250/hd	3 000		
18 6–15 mths @ $460/hd	8 280		
18 16–24 mths @ $700/hd	12 600		
130 cows @ $800/hd	104 000	127 880	9.7
Machinery			
Tractors	40 000		
Utility	6 000		
Motorbike	500		
Trailer	1 000		
Disc plough	800		
Offsets	4 000		
Spreader	1 200		
Direct drill	8 000		
Cultivator	2 000		
Slasher	5 000		
Boom spray	1 500		
Hay rake	3 500	73 500	5.6
Irrigation and water			
Pump and motor	4 500		
Irrigator	8 000		
Spray line	4 000		
Troughs	14 000		
Water pump	3 000		
Windmill/bore	10 000		
Electricity	9 000	52 500	4.0
Dairy related			
Milk machines/vats	30 000		
Ice bank	20 000		
Roller mill/mixer	6 500		
Yards	4 000		
Silos	20 000		
Pumps	4 000		
Molasses tanks	3 000		
Troughs	1 000		
Manure pump/sump	3 500	88 500	6.7
Workshop			
Tools	3 000		
Welder	200	3 200	0.2
Buildings			
Houses × 2	160 000		
Machinery shed	15 000		
Feed shed	10 000		
Hay shed	12 000		
Dairy	30 000		
Garages	6 000		
Old buildings	4 000		
Feed slab	10 000		
Stock yards	4 000	251 000	19.0
Underground mains and laser levelling included in land price			
Total capital investment		**1 311 078**	**100**