

# Future Ready Dairy Systems

## Fertiliser Management Field Day

John & Wendy Wilson, Beaufield

### Background

John and Wendy purchased Beaufield in 2008. The property consists of 209ha, 166 of which is considered to be the milking area, with 88ha irrigated. The farm is currently milking 318 cows this season, budgeted to produce approximately 176,000kg MS.

The Beaufield property is situated near Deloraine, and had a number of challenges when John and Wendy bought the farm, which they have been working through since. The main challenges were:

- Laneways
- Drainage
- Milking infrastructure
- Pasture quality and weeds

As a result of these challenges, John and Wendy have made significant improvements to laneways and the dairy in order to make them functional, as these were considered areas of priority.



### Key Points

- Production system aims to achieve high levels of production per cow, and high levels of pasture utilisation
- Fertiliser applications separated into maintenance and capital
- Benefits of calculating soil fertility and nutrient requirements to management
- Nitrogen used as a supplementary feed as opposed to a fertiliser

### Farm Profile - Beaufield

Farm owners: John and Wendy Wilson

Herd: 318

Cow size: Average 550kg

Farm size: 209ha - 166 ha milking, 88 ha irrigated

Production: 550kg MS per cow; 1100kg MS per ha



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## Production System

John and Wendy also have a farm at Mella in the Circular Head region. Since moving to Tasmania from New Zealand, they have developed a successful production system on the farm at Mella, and the aim was to replicate that system on Beaufield. The production system employed has two main aspects:

1. High levels of production per cow
2. High levels of pasture utilisation

These two aspects often have conflicting outcomes, and consequently need to be closely managed for success. The key to achieving these goals is to ensure cows are very well fed, and that a significant proportion of that feed is pasture.

## Pasture Utilisation

Currently, the main limitation to pasture utilisation is soil fertility, pasture quality and stocking rate. The number of cows milked is limited by the dairy infrastructure, and as a result the young stock are used to lift stocking rate.

If production targets for the season are met, pasture utilisation will be in the order of 11 tonnes DM/ha, representing 60-65% of the cows' diet. To aid pasture growth, approximately 200–250kg N is applied per hectare per annum.

Nitrogen is used as a supplementary feed, as opposed to a fertiliser. It is utilised when pasture growth is predicted to slow, rather than to generate additional feed that may then end up as silage. In reality nitrogen is applied in each grazing rotation throughout the season but at varying rates.



## Soil fertility & fertiliser applications

One of the key determinants of pasture growth on the property is soil fertility. Table 1 shows the movement over time and the targets that have been set to improve pasture growth, quality and availability throughout the season.

Table 1: Soil fertility on Beaufield

	pH	Phosphorous	Potassium	Sulphur
2008	5.9-6	9-12	30-50	4-7
2012	5.9-6	18-22	80-120	10-12
Target	5.5-6	25-30	200-250	12+

Fertiliser applications are separated into two categories:

1. Maintenance
2. Capital

The maintenance requirements of the property are those that are required on an annual basis to replace the nutrients removed in milk and growth. Maintenance is an important calculation, particularly on farms that are approaching target levels. The reason for this is that there is no economic benefit from having fertility levels above this, and doing so can actually result in an increased loss of nutrients from the farm.

Capital fertiliser is fertiliser applied over and above that required to replace nutrients removed annually. The application of capital fertiliser will increase the amount of available nutrients in the soil that plants can utilise for growth. The higher the level, the more growth that occurs until a biological optimum or peak is achieved. This biological optimum varies with soil type.

## Soil fertility & fertiliser application

The maintenance fertiliser requirements for Beaufield are given in Table 2. They are calculated both with and without the consideration of nutrients brought onto the farm in purchased feed, and at 300 and 400 cows.

Table 2: Nutrient requirements for Beaufield

	Phosphorous	Potassium	Sulphur
300 cows	35	46	18
300 cows plus inputs	26	34	10
400 cows	39	54	19
400 cows plus inputs	27	39	9

Table 2 illustrates the benefit of calculating the nutrient requirements of a farm based on the level of production and the amount of purchased or brought in feed. In the case of Beaufield, any surplus fertiliser that may have been applied as maintenance can go to increasing soil fertility.

From the calculations of fertiliser including feed inputs fertiliser application per hectare could be reduced by 10kg phosphorous and 12kg potassium per hectare. This represents a savings of approximately \$9,000 per year for the farm as it currently stands at 318 cows, or \$12,000 per year as herd size increases to 400 cows.

## Summary

- Fertiliser is a significant cost in dairy production systems
- As systems move towards utilising higher levels of purchased feed, it is critical to factor this into nutrient calculations on an annual basis
- Once soil fertility targets are achieved, farmers should be confident to reduce fertiliser inputs in line with requirements based on the removal of nutrients from the system.

## CONTACT

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