

Automatic Milking System System Performance

by Kendra Kerrisk

Throughout 2007, FutureDairy assessed the overall 'system performance' of its automatic milking system (AMS) at Camden, NSW.

Under Australian conditions a successful AMS can be defined as operating with high pasture utilisation, high milk production and high unit utilisation.

Despite the drought, FutureDairy's AMS performance has confirmed that a pasture-based AMS can achieve very high levels of pasture utilisation with reasonable milk production and unit utilisation.

Pasture utilisation

To be profitable for Australian dairy farmers, an AMS must be able to operate efficiently and also achieve high pasture utilisation.

FutureDairy's findings demonstrate that previous industry concerns regarding pasture utilisation in an AMS were unfounded.

Pasture utilisation at the DeLaval AMS farm at Camden, NSW was 14t DM/ha on irrigated pastures and averaged 11t DM/ha across the entire farm. This was similar to the pasture utilisation for the conventional dairy system on the same property at the Elizabeth Macarthur Agricultural Institute (EMAI) and well above the district average.

It was achieved simply by following best practice: feeding pasture first and supplementing only to meet any true deficit. However, accurate pasture allocation is important in any system but even more so in an AMS. Getting pasture allocation wrong in an AMS has additional impacts on cow traffic and milking frequency as well as pasture utilisation and milk production.

Pasture made up about 60% of the cows' annual diet, with the remainder coming from a combination of

concentrate in the milking units, and a mixed ration on a feed pad post-milking.

FutureDairy's experience indicates that any farmer who is good at managing pasture in a conventional system can be equally good at pasture management in an automatic milking system.

Milk production

Despite the drought, the AMS research farm produced 915,547 litres of milk during 2007. This equated to 7,383 litres per cow and 518kg MS/cow or 1459 MS/ha. This is equivalent to 547,774L milk per unit or 32,500 kg MS per unit.

A number of system management practices have been refined to improve milk production in the future.

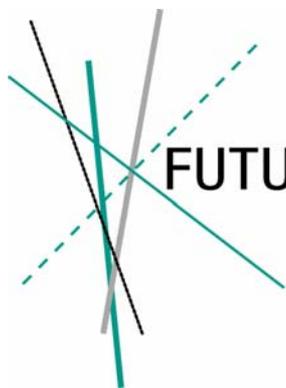
For example, we have recently introduced a heifer training program that involves minimal labour. This is expected to improve heifer milk production in early lactation by about 20%.

About half the mature cows have been under-performing particularly in terms of milking frequency which has contributed to lower production levels. Recent refinements in the incentives on offer has encouraged these cows to visit more often and their milk production is likely to improve as a result.

Grazing management practices have been refined to improve pasture utilisation and daily feed intake which should contribute to higher milk production.

Unit utilisation

Unit utilisation refers to how 'busy' each automatic milking unit is on a given day. To operate at optimum utilisation, the milking unit needs to be used fairly continuously throughout the night and day, with minimal idle time. It is influenced by the number of



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cows per milking unit, number of litres harvested per unit and the number of times cows are milked each day.

Unit utilisation is likely to be less under Australian grazing conditions than in Europe where cows are housed in doors most of the time.

Over the year, FutureDairy's AMS averaged 75 cows/unit, which is high by international standards.

FutureDairy's unit idle time was 9.25 hours, much higher than the European average of two to three hours indicating there's potential for improvement at Camden.

The amount of milk harvested by each of FutureDairy's units peaked at 1650L milk/unit/day, which is similar to European systems (1500 to 2500kg).

Throughout 2007, the herd's average milking frequency ranged from 1.6 to 1.8 milkings/cow/day. In 2008 further refinements will be made to increase the milking frequency. We will target cows in early lactation, which is usually about half the herd. It is only in the past six months that the early lactation milking frequency has held at twice per cow per day and we aim to get this average up to 2.5.

We are confident that simple refinements will improve milking frequency and unit utilisation.

Current studies during 2008

FutureDairy is evaluating a number of practices to improve unit utilisation, particularly by cows in early lactation. They include the frequency and timing of incentives (mainly pasture breaks), location of supplementary feed and heifer and cow training regimes.

We have increased the target stocking rate for 2008. If achieved, this will contribute to more efficient unit utilisation and improved milk harvesting levels.

During 2008 the focus will be on:

- increasing the proportion of pasture in the diet and machine utilisation to improve economic viability.
- economic analysis of the system.

For more information

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About FutureDairy

FutureDairy aims to help Australia's dairy farmers manage the challenges they are likely to face during the next 20 years. The challenges are expected to be related to the availability and cost of land, water and labour; and the associated lifestyle issues.

Our activities are structured around two priority areas – Precision farming (including automatic milking and innovations) and Feedbase (forages and feeding). These are the areas where there are opportunities to address the challenges related to water, land and labour resources.

For **Precision Farming** we are investigating technologies with potential to improve farm productivity, efficiency, labour management or lifestyle. FutureDairy is pioneering the development of pasture-based farming systems that use robotic milking for larger herds. Our research is conducted at Australia's first automatic milking system (AMS) research farm, at the NSW Department of Primary Industries' Elizabeth Macarthur Agricultural Institute at Camden. From mid-2009 we will be testing a new concept automatic milking system designed specifically for Australian conditions, while continuing to further develop the farming system around the milk harvesting equipment.

Our **Feedbase** goal is to develop sustainable dairying systems for the future, with the intensification of home-grown feed to enable more efficient use of land, water and grain. Our trials are being conducted at the University of Sydney's Corstorphine dairy farm and Mayfarm. The investigation is complemented with modelling and component field research in areas of forage production and utilisation.

We are investigating a complementary forage system (CFS) that involves triple cropping on 35% of the farm area and growing pasture on the remaining 65%. Our target is to produce more than 25t DM/ha/yr over the whole farm area, in a sustainable way. The three crops include:

- a bulk crop (eg maize);
- a legume for nitrogen fixation (eg clover); and
- a forage to provide a pest/disease break and to improve soil aeration (eg a brassica).

FutureDairy is now in its second phase. During the first phase, we used existing technology for automatic milking to test the feasibility of robotic milking in a pasture based system. The promising results paved the way for testing a new prototype AAMS with a larger herd during phase 2.

In the first phase, our Feedbase studies tested the feasibility of a complementary forage rotation grown on a small area, both under research and commercial conditions. Phase 1 combined technical research with social research and extension research. During phase 2 we are drawing upon that learning experience to improve our linkages with major extension groups.

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