FUTUREDAIRY information sheet

Automation innovations

by Dr Kendra Kerrisk

The Australian dairy industry is abuzz with talk of robotic or automatic milking. But many other dairy farming tasks have the potential to be automated. And you won't necessarily need a robotic milking unit to take advantage of some of these innovations.

Automation innovations generally fall within three main areas:

1. Automation of some or all of milking-related tasks.
2. Monitoring the cow's body to make more accurate decisions about nutrition and health.
3. Automation of feeding systems and tasks involving heavy labour.

The benefits offered by automation are far reaching: improved profitability, milk quality, lifestyle and animal welfare.

Obviously automation saves time, but it also has the potential to provide information that we haven't had in the past. This information will enable dairy managers to be proactive rather than reactive, especially in terms of nutrition, reproduction and animal health.

Imagine a dairy farm where technology takes care of heat detection, mastitis prevention and detection, milking duties, body condition scoring and monitoring of heat stress and pregnancy.

The following products are already on the market overseas or on trial prior to commercial release:

- Automatic gates that can be set to open and shut or draft in different directions and at pre-set times, using many different criteria such as number of cows already drafted, day of the week or individual cow's milking history.
- Robotic fencing that moves break fences at pre-set times and pre-set distances.
- A robot that accurately applies teat spray on rotary platforms, either pre or post milking or both.
- Portable milking robots that can be moved around the farm, saving the cows from walking to the dairy.
- A robotic milking unit that takes daily milk samples which can be analysed on-site to identify cows losing body condition, on heat, pregnant, with anoestrus, mastitis infections, cystic ovaries, or other illnesses.
- Sensors in the cow's rumen that monitor feed intake, energy balance (affecting liveweight changes), heat stress levels and other indicators of nutritional or health status; with an automatic message sent to a computer to alert when treatments are required or the ration needs adjusting.
- a GPS device attached to cows' collars that monitors activity as an indicator of oestrus.
- Remote monitoring of farm performance, cow health, milk production and composition to allow you to alert farm staff to potential problems early, even when you are absent from the property.
- Robots that perform tasks previously involving strenuous labour or heavy lifting.
- A sensor that monitors silage fermentation process to track feed quality.
- Milking machines that automatically advise the service company of faults and parts needed and when repairs and maintenance are due.

Welcome to the world of precision farming! The term refers to innovations that allow more precise farming without the need for more labour.

Some of the innovations listed will be 'add ons' to automatic milking systems but others will be suited to conventional farms.

And looking way out to the future, one day it might be possible to have a system that automatically monitors pasture intake by individual cows and adjusts rations to optimise cow efficiency and the economic return on investment in supplements.

It's a big ask, but it may be possible – perhaps using rumination devises and monitoring biting or chewing activity.

For more information

Dr Kendra Kerrisk

Research Fellow, Automatic Milking

ph 0428 101 372

email kendrad@usyd.edu.au

FUTUREDAIRY information sheet

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 Elizabeth Macarthur Agricultural Institute at Camden. Since mid-2009 we have been 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/y rover 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.

Contact us

Project leader:	Dr Sergio (Yani) Garcia ph (02) 9351-1621 email: sgarcia@usyd.edu.au
Precision Farming leader	Dr Kendra Kerrisk ph 0428 101 372 email kendrad@usyd.edu.au