

## McMEEKAN MEMORIAL AWARD 2006

### Dr Murray Woolford

Dr Murray Woolford can best be described as an innovator, inventor and a visionary. He is a world authority in the field of milking machine design and systems, milk harvesting and mastitis and is most well known for his work in developing the Ruakura Milk Harvester, during the 1980s. Although Murray's contribution to New Zealand Agricultural Science, in particular the dairy industry, spans over 30 years this nomination is for the ground-breaking research into pastoral automatic milking that he has lead over the past 5 years.



Early on in his career it was clear that Murray was an innovator and he now has over 12 patents to his name. He was formally trained in physics and mathematics and learnt most of his biological knowledge on-the-job. Murray worked on a number of projects while employed at the Ruakura Research Centre including the electronic measurement of grass yields before setting up and leading the programme which developed the "Ruakura Milk Harvester" milking system. He is co-inventor of a number of associated innovative features including air-milk separation at the cluster and the Ruakura Touch Tag, a completely innovative approach to automatic cow identification. The Ruakura Milk Harvester, an electronically controlled milking system with special design features that facilitated the measurement of milk yield, improved milking efficiency and provided a basis for improving milk quality, has been recognized as a major technological achievement ranking at the highest level of technical innovation within the 1980s. The innovation is featured as a case study in the recent book "Managing Innovation in New Zealand" written by Peter Winsley, Dai Gilbertson and Paul Couchman. After completing work on the Ruakura Milk Harvester Murray focused on routes of infection within the bovine mammary gland, work that lead to the development of "Teatseal®" a completely new approach to preventing dry period mastitis without the use of antibiotics.

Over the past 5 years Murray has been the driving force behind the Greenfield Project, a program of research that was initially described as a BHAG (Big Hairy Audacious Goal) but quickly became a reality under his guidance. After carefully watching the development of automated milking technology or robotic milking in Europe

over a period of 10 years Murray felt the time was right for New Zealand to embrace automatic milking in 2000. He brought together a diverse team of people including commercial and industry good organisations, overseas collaborators and local expertise in farm systems, animal behaviour and electronics. This culminated in the establishment of the worlds first pasture-based farming system to use robotic milking on a year round basis with over 90% of intake from pasture.

The concept of using robotic milking technology in New Zealand's traditionally low input farming system, it is fair to say, represented a quantum change from current practices.

Early on Murray realised that for robotic milking to be successful in NZ the ratio of cows to robots would have to be high and so took the opposite approach to what was being practiced internationally with highly intensive farming systems. He aimed to maximise the ratio of cows per robot and saw synergies with the parallel once-a-day milking research being undertaken by the Dairying Research Corporation (now Dexcel Ltd) at the time. Murray was also instrumental in the establishment of research into once-a-day milking in New Zealand. The Greenfield Project began on a small scale with just 10 cows and over the next four years grew to the size of a small commercial scale operation with a herd of 180 cows. Challenging existing knowledge and practices is a consistent theme throughout Murray's scientific career and there was ample opportunity for this when undertaking a program of research that aimed for the first time to completely automate milk harvesting on New Zealand dairy farms. A radial paddock layout was a key departure from conventional farm layouts and the lack of internal fencing another departure from the norm. Further developments included remote selection units, a key innovation in herd management, where cows are selected for milking either en route to new pasture or after drinking, thereby maximising cow throughput at the dairy and minimising the distance cows must walk. The Greenfield farming system is probably the first pastoral farming system in the world to be awarded a patent.

From its inception the Greenfield Project has attracted unprecedented exposure within the dairy industry, but also from around the world and

amongst the general public. Murray has been either author or co-author of 16 papers for national and international conferences, contributed to over 15 articles for popular farming press and featured on numerous television, radio and print press interviews. The value of the research was recognised at last years conference with the a paper presented by the Greenfield Team being awarded the New Zealand Society of Animal Production Science and Technology Award. In the view of the judges this represented "the greatest advance in science and/or technology for animal production". The interest at a national level has been such that the Prime Minister, Deputy Prime Minister, Minister of Science and Technology and Leader of the Opposition have all visited the Greenfield Project farm, along with a number of international dignitaries including the President of China.

Currently a Science Leader and Principle Senior Scientist at Dexcel Ltd, Murray's expertise has been recognised internationally and he was an elected member two IDF groups of experts: A2 (Mastitis) and A32 (Milking machines). He was

also a member of the New Zealand National Mastitis Advisory Committee and a member of the New Zealand Milking Machine Technical Committee.

In summary Murray's vision coupled with his drive and undeterred determination has opened the door for the New Zealand dairy industry to embark on a new chapter of dairy farming systems. This has implications for the lifestyle and working environment of farmers and their staff, for cow health and welfare, as well as laying the platform for the development of new technologies for the extraction of functional foods from milk and providing full product traceability. There are few genuine visionaries in New Zealand science but Murray can rightly claim to be in this class of researcher. For these reasons we feel that Dr Murray Woolford would be a very worthy recipient of the much esteemed McMeekan Memorial Award for 2005.

*Jenny Jago and Kendra Davis*