

## McMEEKAN MEMORIAL AWARD

### Christopher A Morris

Chris Morris has had a long and productive association with New Zealand animal genetics research. Chris was born and educated in England. He then undertook a post-doctoral fellowship at Guelph, Canada before joining the Ruakura Genetics Section as a National Research Advisory Council (NRAC) Fellow from 1975 to 1978 followed by two years at the University of New England, Armidale, NSW, Australia. Since 1980 he has worked on the AgResearch, Ruakura campus. For the first 15 years, most of his work involved establishing many of the genetic parameters that our breeders now take for granted.

A particular interest has been disease resistance. Chris undertook the genetic analysis of lines of sheep resistant, and susceptible, to internal parasites and lines of sheep resistant, and susceptible, to facial eczema (FE). He then developed lines of sheep relatively more or less resistant to ryegrass staggers and showed that his FE resistant sheep were also resistant, to some extent, to ryegrass staggers. Other interests and involvements included cattle parasites, dairy goats and the efficacy of zinc for FE control.

Another passion has been twinning in cattle. His work in this area commenced in the early 1980s by screening industry cows which had produced at least two sets of twins in their lifetime. This work culminated this year with the joint publication, with a Unites States collaborator, on the discovery of a novel region on cattle chromosome 10 that has a very large effect on bovine ovulation rate. Selection for onset of puberty in cattle started in 1985 and has achieved a difference of 69 days, between selection lines.

Since 1997 Chris has been responsible for a very large experimental cross and backcross experiment using Jersey and Limousin cattle. The trial was designed to identify regions of chromosomes, and eventually the genes themselves, responsible for traits affecting carcass composition and meat quality traits of beef cattle. As is typical of Chris he used the opportunity of this large and expensive experiment to leverage information on as many other relevant production traits as possible. This trial has also contributed information on, gestation length, nematode parasite burdens, facial eczema resistance, temperament, hide strength and thickness, and trace element deposition, in addition to very detailed measurements of carcass conformation and meat quality attributes including marbling, fatty acid composition, fat colour, pH and tenderness.



The first major find from this study was the discovery that certain alleles of the CAPN1 gene on cattle chromosome 29 were responsible for a significant increase in meat tenderness. This finding is now included as part of the GeneSTAR test. The finding was further validated by a large Australian study in both *Bos taurus* and *B. indicus* breeds. He also discovered that an allele of the myostatin gene, previously thought to have no effect on meat yield, did in fact, increase meat yield.

The second major finding was that alleles of the BC02 gene ( $\beta$ -Bcarotene-9', 10'-dioxygenase) affected fat colour. This allele induces a stop codon to occur prematurely, such that the protein does not translate completely resulting in the fat and milk being more yellow in colour. An endopeptidase gene and small heat shock protein were shown to be implicated in the control of ultimate pH. The genome regions for over 40 other quantitative trait loci (QTL) of genome-wide significance were also identified.

Chris's most recent innovation has been related to selection for resistance to facial eczema (FE) in dairy cattle. The cost of sporidesmin dosing of dairy cattle is prohibitively expensive. Chris has made use of the natural challenge to dairy herds when FE spores are at naturally at high levels and sampled many thousands of dairy cows. He then tested a blood sample for an enzyme GGT which is indicative of liver damage. Using this information and the herd pedigree records Chris assigned, for the first time, breeding values for FE resistance in sires routinely used for artificial insemination (AI).

All of Chris's work has been well documented and published with 14 book chapters and 172 refereed publications to his credit. He had been a very strong supporter of the New Zealand Society for Animal Production as a member since 1976 with 77 papers in our Proceedings and a further 130 presentations in other conference proceedings. Chris Morris is a very worthy recipient of the New Zealand Society of Animal Production McMeekan Award.

*Allan Crawford and John McEwan*