

## McMEEKAN MEMORIAL AWARD

### Stephen R Davis

BSc (Hons) Agricultural Microbiology, MSc Animal science PhD (Nottingham University)

Steve gained his PhD in “Amino acid metabolism in the mammary gland” from Nottingham University in 1975, and after Postdoctoral fellowships at Lincoln and Nottingham, was employed at MAF in Hamilton. This was followed by positions at DRC, AgResearch, ViaLactia Biosciences (NZ) Ltd. and LIC, not to mention adjunct positions at several universities and supervision of a dozen graduate students and examination of many more.

Steve’s research career focussed largely on understanding the physiology of lactation but also included dairy cow nutrition, milking management, milk composition and, ultimately, genetics in NZ dairy cattle. Early work was on the regulation of mammary metabolism, in particular, the role of amino acid supply and metabolism, and the regulation of mammary blood flow.

On arrival at MAF, Ruakura in 1977, his interests broadened to include development of methods for assessment of protein synthesis and degradation in tissues and techniques for assessment of udder growth in ruminants. From the mid-1980s, his main research topics covered the mechanism of action of growth hormone on lactation and the local, intramammary mechanism(s) causing production loss during once-daily milking. Several years of effort led to the conclusion that insulin-like growth factors were not solely responsible for mediating GH action; the question as to how GH does exert its effects on milk production still requires an answer.

The cause of the production loss during once-daily milking has not been established, but considerable progress has been made in evaluating the role of anatomical compartments of the udder, the role of autocrine inhibition, associated physiological changes, and prediction of production loss from simple parameters of yield, composition and mammary anatomy. More recent work included changes in mammary gene expression associated with involution and apoptosis of mammary epithelial cells, investigation of lactational persistency and of variation in milk calcium. Steve has also worked in mammary functional genomics and mathematical modelling of the effects of milking frequency and nutrition on milk production. Other areas of interest include milk bioactives,



particularly regulation of milk lactoferrin content.

Steve has had several senior management positions, undertaken many valuable research contracts and has several patents, including a novel method of mastitis detection. From 2003 to 2012 he was employed by ViaLactia Biosciences (a former research subsidiary of Fonterra) while based at LIC at Newstead, working on gene discovery in relation to regulation of milk composition and other key dairy traits. Since 2003 he has worked firstly part-time and since 2012 full-time as a senior scientist for LIC’s R&D in bovine genomics research. His work has been focused on bringing biology to

the gene discovery process and thus enhancing genomic selection. Steve has been pivotal in the discovery of the variations that cause heat sensitivity and heat tolerance in cattle. The heat tolerance variation is the basis of LIC breeding cattle for tropical environments.

Steve has published 124 scientific papers, 66 publications in NZSAP, 66 abstracts, five book chapters, and 24 popular articles many reaching New Zealand farmers in the Dairy Exporter. Apart from his research Steve has provided service on many committees including NZSAP. He was our Publicity Officer from 1986-88, committee member 1991-95, President 1996-97 and conference organiser for the 60<sup>th</sup> anniversary of the Society in Hamilton in 2000.

In the last five years, Steve has made a major contribution to the understanding of the dairy cow through his research in proteomics, metabolomics and the genomics of dairy cows, publishing 30 papers in major international journals many in Journal of Dairy Science and one in Nature Communications regarding the prolactin signalling pathway in hairy and slick cattle. This is an outstanding contribution to animal production, and hence, is worthy of the McMeekan Award.

*Sam Peterson  
Claire Phyn  
Richard Spelman*