New Zealand pastoral systems: a current perspective

F.R. Duder[1], R.B. Green[2], W.D. Catto[3], D.R. Woodfield[4] and B.R. Guy[5]
[1]3/19 Selwyn Ave Mission Bay Auckland 1005, email, rduder@xtra.co.nz,[2]Agricom NZ Ltd P O Box 539 Ashburton 8300, [3]Ballance AgriNutrients Ltd Private Bag 12503 Tauranga 3020,[4]AgResearch Grasslands Private Bag 11008 Palmerston North 5301, [5]Byreburn Ltd., RD 5, Aorangi Rd, Feilding 5600, New Zealand

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Introduction New Zealand's diverse grassland resource of 13.5 M ha of permanent pasture, tussock or alpine grasslands underpin an intensive pastoral industry worth NZ$13 billion in 2004. The pastoral industry involves 37,000 farmers and a service industry of about 215,000 persons. It produces 27 M prime export lambs and 180,000 t of predominantly crossbred wool from 40 M ewes; 13 B litres of milk from 5.2 M dairy cattle; 800,000 t of beef from 4.7 M beef cattle and 33,000 t of venison from 2 M deer. Pastures and forage crops, mostly non-irrigated, are grazed 'in situ' by animals through controlled grazing management. The emphasis is on optimising utilisation at each grazing without penalising feed intake, pasture regrowth or persistance. Stocking rate and feed budgeting, along with a flexible stock trading policy are used to match animal demands with seasonal fluctuations in forage supply. The timing and duration of mating are varied to match anticipated seasonal growth. In dairy farming more condensed calving patterns have assisted in extending lactation length.

Improved pastures Improved "permanent" pastures are based mainly on perennial ryegrass (*Lolium perenne*) and white clover (*Trifolium repens*) with varying levels of minor species such as red clover (*Trifolium pratense*), browntop (*Agrostis spp*), tall fescue (*Festuca arundinacea*), cocksfoot (*Dactylis glomerata*), *Paspalum dilatatum* and Kikuyu (*Pennisetum clandestinum*). All of NZs improved pasture plants originated from overseas germplasm and increasingly from adapted ecotypes such as Mangere ryegrass and Huia white clover (Stewart & Charlton, 2003). Pasture plant breeding has delivered genetic gains (> 1% per year) for target traits such as forage yield and quality, seasonal yield and improved animal health (Woodfield & Easton, 2004). The development of non-toxic endophyte strains that alleviate ryegrass staggers and fescue toxicosis has improved animal productivity of sheep and cattle in NZ. Forages with increased feed intake and nutritional value (e.g. high non-structural carbohydrate grasses, and herbs and legumes containing condensed tannins) have also improved animal performance.

Fertiliser and environment New Zealand farmers apply 3 M t of fertiliser annually, as superphosphate and nitrogen (N). Fertiliser N use has increased twofold in the past eight years but average use is still below 150kg N/ha per annum. Major changes have occurred in assessing plant nutrient demands of grazed pastures. Nutrient budgeting on an individual farm basis is a widespread tool for balancing environmental issues with economic considerations. Increased emphasis is placed on designing fertiliser programmes and farm systems that match economic goals with environmental sensitivity. In a deregulated environment, industry has developed Fertilizer Quality Assurance (Fertmark), and application (Spreadmark) schemes, a fertiliser Code of Practice (a world's first effects-based code for both fertiliser formulation and its application) and accreditation of Consultants.

Human resources The deteriorating age structure of NZ farmers, research, extension and Agribusiness personnel remains a pivotal issue facing NZ agriculture. Recent initiatives by the dairy industry and Agribusiness sector are attempting to reverse this critical shortage of younger people. A dairy industry campaign "Lets Talk Dairying" has increased public awareness while the Meat and Wool NZ monitor farms have increased community awareness of key issues and have improved uptake of new technologies, and decision making. Farm Environmental Awards (e.g. Ballance Farm Environmental Award), environmental protection initiatives by dairy industry and regional councils (e.g. Clean Streams Accord) and voluntary farmer land retirement and protection of tussock, grassland, bush and wetlands, are evidence of a renewed awareness of the guardianship role of farmers in the rural environment.

Summary and conclusions Grasslands play a major role in NZ's economic well-being. They are based on improved germplasm, low fertiliser and labour inputs and continuous *in situ* grazing, emphasising pasture utilisation. The ongoing evolution of these grasslands is driven by research and innovation but matched with environmental protection and ecological awareness of NZ's unique and scarce natural fauna and flora.

References

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