Milk Production Potential of Different Dairy Pasture Types in Southern Australia

J. Tharmaraj
University of Melbourne, Australia

D. F. Chapman
University of Melbourne, Australia

Z. N. Nie
Department of Primary Industries, Australia

A. P. Lane
University of Melbourne, Australia

The XX International Grassland Congress took place in Ireland and the UK in June-July 2005. The main congress took place in Dublin from 26 June to 1 July and was followed by post congress satellite workshops in Aberystwyth, Belfast, Cork, Glasgow and Oxford. The meeting was hosted by the Irish Grassland Association and the British Grassland Society.

Proceedings Editor: D. A. McGilloway

Publisher: Wageningen Academic Publishers, The Netherlands

Milk production potential of different dairy pasture types in southern Australia

J. Tharmaraj[1], D.F. Chapman[1], Z.N. Nie[2] and A.P. Lane[1]
[1]The University of Melbourne, Parkville, Victoria, Australia 3010, Email: jthar@unimelb.edu.au, [2]Department of Primary Industries, Hamilton, Victoria, Australia 3300

Keywords: pasture types, pasture quality, milk production, dairy systems

Introduction The growth rate of traditional perennial ryegrass-based pastures commonly fails to meet herd feed requirements through winter and summer in non-irrigated dairy systems in southern Australia. Alternative pasture species can improve seasonal feed supply in this region (Tharmaraj & Chapman, 2005). However, the feeding value and milk production of these pastures must at least match perennial ryegrass if they are to be adopted successfully on dairy farms. This paper reports results of a comparison of the milk production potential of pasture types similar to those investigated by Tharmaraj & Chapman (2005) for their agronomic performance.

Materials and methods The experiment was conducted at Glenormiston College, southwest Victoria (38°09'S, 142°58'E). Four pasture types were established in April 2002 in two replicate blocks in paddocks of 1.2-1.9 ha: 1) short-term winter active (STW), based on Italian ryegrass; 2) long-term winter active (LTW), based on Mediterranean tall fescue; 3) long-term summer active (LTS), based on Continental tall fescue plus chicory and red clover; and 4) perennial ryegrass (Control). Pastures were grazed in spring 2002 and in summer, autumn and winter 2003 by small herds (n=3) of cows balanced for age, liveweight and stage of lactation. The LTW treatment was not included in spring because of slow pasture establishment, and STW was not included in autumn because the pasture contained only dead matter. A chicory and white clover treatment, established at the same time as the other pastures, was included in summer only. Each experimental run lasted 10 d and was preceded by a 7-d uniformity period when animals grazed on a common ryegrass pasture. Pasture allowance was 45-60 kg DM/cow per d, and animals received no supplements. Pre-grazing pasture mass was in the range 2200-2600 kg DM/ha. Cows were on average 124, 227, 234 and 64 d into lactation for the spring, summer, autumn and winter runs, respectively. Milk yield (kg/cow) was measured daily, and milk fat and protein content was measured on days 6, 8 and 10. Data for milk solids production per cow (mean of 3 cows/ group) were analysed in three ways. Firstly, treatments (pasture types) 1-4 and all seasons were included in a split-plot ANOVA with treatment as main plot and season as sub-plot using missing values for LTW in spring and STW in autumn. Secondly, treatments 1-4 were included in a balanced split-plot ANOVA design using only summer and winter data. Finally treatments 1-4 plus the chicory treatment were analysed for summer only, using one-way ANOVA.

Results and discussion When all treatments and seasons were included in the ANOVA, the main effect of treatment and the season x treatment interaction were not significant. When the milk yield of cows grazing treatments 1-4 was analysed for summer and winter only, there was a significant treatment x season interaction, due to a greater difference between seasons for the control treatment compared to all other treatments (Table 1). This was a result of factors such as limited ability of animals to select a diet high in energy and protein in summer on ryegrass and possible sub-clinical effects of endophyte alkaloids on animals grazing ryegrass in summer. When all five treatments were analysed in summer only, the main effect of treatment was significant ($P<0.05$); the chicory pasture resulted in substantially greater milk solids (1.40 kg/cow per d) production than all other treatments (Table 1) due to its much higher digestibility and protein content.

Table 1 Effects of pasture type on milk fat plus protein yield (kg/cow per d) in summer and winter

	Pasture type			
	STW	LTW	LTS	Control
Summer	0.92	0.93	1.04	0.80
Winter	1.89	1.87	1.93	2.00

Season x pasture interaction: $P<0.05$; s.e.d =0.011

Conclusions When managed so that green leaf content is maximised within the limits of environmental constraints, pastures based on alternative species such as tall fescue can result in milk yields that are at least similar to perennial ryegrass-based pastures and less variable between summer and winter – the seasons when pasture feed deficits commonly occur. The feeding value of chicory is very high and this plant should be able to play a role in improving milk production in southern Australia dairy systems, especially in summer.

Reference

Tharmaraj, J., D.F. Chapman & Z.N. Nie (2005). Seasonal herbage accumulation of different dairy pasture types in southern Australia. *XX International Grassland Congress - offered papers* (in press).