INFLUENCE OF THE METABOLISABLE ENERGY CONTENT OF HERBAGE ON MILK YIELD RESPONSES TO CONCENTRATE SUPPLEMENTS IN GRAZING DAIRY COWS

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High producing cows in early lactation will generally partition a greater proportion of any extra energy they consume towards milk production than will lower producing cows in later lactation. Cows in late lactation direct more of any extra energy to improving body condition. However, in northern Victoria, irrigated pastures change markedly throughout the year. It was hypothesised that milk responses from cows consuming concentrates will decline as the metabolisable energy concentration of the pasture eaten increases, and that this will be independent of stage of lactation.

Data from a number of experiments at Kyabram were combined in regression analyses to test the effect of the metabolisable energy content of the herbage consumed on milk responses to barley-based supplements. While stage of lactation of cows varied, they all grazed irrigated perennial pastures offered at levels of between 20 and 40 kg DM/cow/day; some cows were unsupplemented while others consumed 4 to 8 kg DM/cow/day of concentrate supplements. Milk yield, milk fat content, change in body condition and energy content of the pasture eaten were common measurements in all experiments.

The results for marginal returns of milk ($r = -0.74$) and relative changes in body condition (no effect) are presented in Figure 1. The milk responses did not occur according to the expectations normally attributed to stage of lactation, but instead were associated with the energy content of the pasture eaten. Pastures with the highest energy grow in winter/spring when most cows are in early lactation and milking at their best in northern Victoria; pastures with the lowest energy concentrations are dominated by paspalum and weeds in summer/autumn. Reasons for this result appear to be related to the balance of nutrients relative to cow requirements. I suggest the lower marginal returns in spring are associated with fibre insufficiency. Pasture is often marginal in fibre at this time, and cows tend to select leaf, which is particularly low in this nutrient. It is likely that feeding concentrates to cows in spring will result in rumen conditions in which energy is not efficiently utilised. The other clear result is that paspalum pastures in northern Victoria in summer/autumn are so low in energy that cows are, in fact, starving and will direct any additional energy straight into milk.

These results suggest that, for our pasture-based farming systems, concentrates may be most profitable after the cows peak in milk production.

Figure 1. Effects of feeding high energy supplements to lactating dairy cows and relationships with the metabolisable energy (ME) content of the herbage eaten on (a) marginal returns in milk yield, and (b) improvements in body condition (CSC) of supplemented compared with unsupplemented cows