

Prepartum protein supplementation improves milk production, milk composition and lamb growth rates

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Ewes have increased requirements for metabolisable protein and metabolisable energy during pregnancy and lactation (Freer *et al.* 1997). Increased requirements are greatest for metabolisable protein and often exceed the supply of metabolisable protein arising from ruminal fermentation of ingested pasture. Grazing periparturient ewes often suffer a metabolisable protein deficit, and show a favourable increase in colostrum and milk production in response to prepartum protein supplementation (Treacher 1983). It is likely that poor colostrum and milk production underpin the high rate of annual neonatal mortality (10–25%) experienced in the Australian sheep flock (Murphy *et al.* 1996). This experiment tested the hypothesis that prepartum protein supplementation of Merino ewes would improve milk production and composition and preweaning lamb growth.

The experiment was conducted on a commercial property near Guyra, NSW (30.25 S, 151.01 E) and was designed as a 2 x 2 factorial with two grazing management and two prepartum supplementation regimes. Average total herbage mass during the experimental period was 2000 kg DM/ha. Results from the grazing regimes are not presented in this paper. Eighty mixed-age, single-bearing Merino ewes were fed either nil or 200 g/d of pelleted cottonseed meal (CSM; 445 g crude protein/kg DM; 45% rumen undegradable dietary protein) three times a week for a 6-week period prior to lambing. All lambs were born in a two week period. Milk production was estimated 2 and 6 weeks post mean lambing date by machine milking following an intravenous injection of oxytocin (McCance 1959). Milk fat and protein were determined with a MilkoscanTM (Foss Electric, Denmark). Lambs were weighed at birth and two and six weeks post mean lambing date. Data were analysed (SAS 1990) and least square means (\pm se) are presented.

Prepartum protein supplementation significantly increased milk yield ($P \leq 0.05$) and milk fat ($P \leq 0.01$) and protein ($P \leq 0.01$) output at 6-weeks post lambing (Table 1). Lambs born to ewes that received prepartum supplementation had significantly greater growth rates to two ($P \leq 0.05$) and six ($P \leq 0.01$) weeks post lambing (Table 1). Lamb growth rates from birth to six weeks of age were 158 ± 6.5 and 187 ± 5.3 g/d from nil and supplemented ewes, respectively. These results illustrate that prepartum protein supplementation improves milk production and composition and subsequently pre-weaning growth rates. They also strongly suggest that prepartum protein supplementation will have a positive impact on lamb survival.

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Table 1 Effect of supplementation on milk production and composition (lsmean \pm se).

Treatment	Milk production at 2 wks (ml/d)	Milk production at 6 wks (ml/d)	Milk fat output at 6 wks (g/d)	Milk protein output at 6 wks (g/d)
Nil CSM	726 \pm 52.2 ^a	742 \pm 40.1 ^a	50 \pm 2.8 ^a	34 \pm 1.9 ^a
CSM	837 \pm 41.1 ^a	850 \pm 31.5 ^b	61 \pm 2.3 ^b	42 \pm 1.6 ^b

^{a,b}Means within columns with different superscripts are statistically significant ($P < 0.05$)