FEEDING ADDITIONAL PROTEIN AND ENERGY TO EWES DURING LATE PREGNANCY AND EARLY LACTATION INCREASES SECONDARY TO PRIMARY FOLLICLE RATIO IN MERINO LAMBS

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Both wool production and wool quality (for example fibre diameter) are partly determined by follicle density and the ratio of secondary to primary follicles (S:P ratio). Follicle density and S:P ratio are determined prior to birth (Fraser and Short 1960) and are depressed by maternal undernutrition between 115 days and 135 days of gestation (Hutchinson and Mellor 1983). This study investigated whether feeding additional protein and energy to Merino ewes 4 weeks pre-partum and 1 week post-partum increases the S:P ratio of their lambs at 21 weeks of age.

Pregnant Merino ewes on dry standing pasture were supplemented with *ad libitum* oaten hay and either lupin seed at 380 g/head.day to provide 125 g crude protein/day and 4.7 MJ ME/day (maintenance diet) or 580 g/head.day of lupin seed plus 230 g/head.day of pellets containing canola meal (65%), lupin seed (24%), oat grain (10%) and calcium hydroxide (1%) to provide 260g crude protein/day and 9.7 MJ ME/day (twice maintenance diet) from 4 weeks pre-partum to 1 week post-partum: The animals from both groups were run together for the entire trial except during the 5 week supplementary feeding period. Sex and litter size were recorded at birth. Skin samples were collected from the lambs at 21 weeks of age. The S:P ratios were measured at the level of the sebaceous glands of transverse skin sections (8µm) stained with haematoxylin and eosin (Table 1). The results were analysed by a 3-way ANOVA.

Table 1. Least square means of secondary to primary follicle ratio in 21 week old weaners from ewes fed a maintenance or above maintenance diet from 4 weeks before to 1 week after parturition

		Maintenance			Twice maintenance		
		n	S:P	SEM	n	S:P	SEM
Single	Female	10	17.3	1.25	10	17.3	1.25
Single	Male	7	20.1	1.50	5	21.6	1.77
Twin	Female	8	13.1	1.40	9	18.6	1.32
Twin	Male	9	16.1	1.32	6	17.9	1.62

Overall, the mean S:P ratio of the lambs from ewes fed the twice maintenance diet was higher than that of lambs from ewes fed the maintenance diet ($P<0.05$). The mean S:P ratio was higher in the single than the twin lambs ($P<0.025$) and the males had a higher S:P ratio than the female lambs ($P<0.025$). There tended to be an interaction between diet and litter size ($P<0.10$). This suggests that the S:P ratio of twin lambs from ewes fed the twice maintenance diet increased significantly compared to twins from ewes fed the maintenance diet, while there was no difference in the S:P ratio of the single lambs from ewes fed either diet.

These results indicate that ewes fed a maintenance diet during late gestation and early lactation may produce lambs that have not reached their maximum S:P ratio. It was concluded that supplementation with additional protein and energy in late pregnancy may increase S:P ratios in lambs from twin rather than single bearing ewes. Further work will examine the lifetime productivity of these animals.

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