

The impact of the level of feed-on-offer available to Merino ewes during winter-spring on the wool production of their progeny as adults

C. Oldham¹, M. Ferguson², B. Paganoni¹, A. Thompson², G. Kearney² and M.A. van Burgel¹

¹Department of Agriculture, Locked Bag No. 4, Bentley Delivery Centre, Western Australia, Australia 6983, Email: coldham@agric.wa.gov.au, ²Department of Primary Industries, Hamilton, Private Bag 105, Hamilton, Victoria 3300, Australia

Keywords: maternal nutrition, feed-on-offer, progeny, wool, dose-response

Introduction New opportunities for developing optimum ewe management systems, based on achieving liveweight and body condition score (CS) targets at critical stages of the reproductive cycle, have emerged from the acceptance that nutrition during pregnancy can have substantial impacts on the lifetime wool performance of the progeny (Kelly *et al.*, 1996). However, most studies of the impacts of nutrition on foetal growth and development tended to focus on late pregnancy and have also only considered extreme nutritional regimes often outside the boundaries of commercial reality. Hence, the 'Lifetime Wool' team (Thompson & Oldham, 2004) conducted dose-response experiments to determine the levels of feed-on-offer (FOO; kg dry matter/ha; Hyder *et al.*, 2004) needed at different stages of the reproductive cycle to optimise both wool and meat production per ha in the short term and the lifetime performance of the progeny in the long term. This paper reports the response in the first two years of the experiment of clean fleece weight (CFW) and fibre diameter (FD) of the progeny as adults to the level of FOO available to their mother in late pregnancy and lactation.

Materials and methods Research sites were located at Coleraine, Victoria (36°58'S, 141°17'E) and Kendenup, Western Australia (34°27'S, 117°35'E). Following artificial insemination (day 0), ewes at each site were fed to maintain or lose weight in early and mid-pregnancy (CS 2 or 3 by day 90). Ewes were then grazed at five different levels of FOO (from a low of 900 to a high target of 3000 kg dry matter (DM)/ha; Hyder *et al.*, 2004) in late pregnancy and lactation (design = 2 CS x 5 FOO x 2 or 3 replicates of 20-30 pregnant ewes in each of 2 years). After weaning, all progeny grazed in common and were shorn as lambs and then again after 12 m. Linear mixed models (REML; Genstat 7, VSN International Limited) were fitted to the CFW and FD data with fixed effects and significant two-way interactions of site, year, CS, FOO, sex, rear type of lamb and ram source.

Results

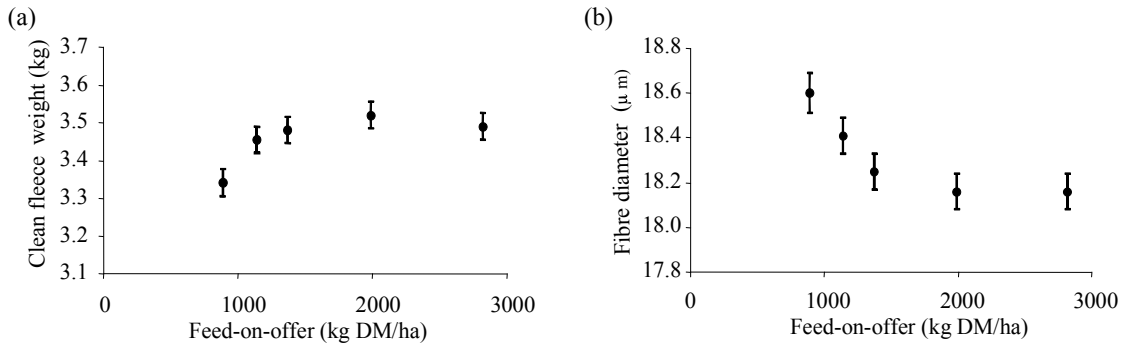


Figure 1 Effect of the average feed-on-offer (kg DM/ha) available to ewes during late pregnancy and lactation on (a) clean fleece weight ($p = 0.001$) and (b) mean fibre diameter ($p < 0.001$) of their progeny at first adult shearing (REML predicted means \pm sem at each level of FOO with significance tested by chi-sq)

Conclusions The difference between the extremes is similar for CFW but much greater for FD than previously reported (Kelly *et al.*, 1996). In practical terms the 'Lifetime Wool' project aims to produce nutritional guidelines for the optimum management of ewes by coupling these results with response curves for wool production from the ewes, survival of the lambs and carry over effects on the CS of the ewes at their next mating.

References

- Hyder, M.W., D.J. Gordon & K. Tanaka (2004). Lifetime wool. Pasture growth, utilisation and ewe stocking rates. *Animal Production in Australia* 25, 265, www.publish.csiro.au.
- Kelly, R.W., I. Macleod P. Hynd & J. Greeff (1996). Nutrition during fetal life alters annual wool production and quality in young merino sheep. *Australian Journal of Experimental Agriculture*, 36, 259-267.
- Thompson, A.N. & C.M. Oldham (2004). Lifetime wool. Project overview. *Animal Production in Australia*. 25, 326. www.publish.csiro.au