

PLACENTAL SIZE AND FOETAL GROWTH IN RELATION TO MATERNAL
UNDERNUTRITION DURING MID-PREGNANCY

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Growth of the ovine placenta is completed during the first 100 days of gestation (Cloete 1939), and can be influenced by the level of maternal nutrition during this period (Everitt 1964). The fresh weight of the placenta is correlated with foetal weight over to last 50 days of gestation (Alexander 1964), and it is believed that this indicates placental restriction, due to substrate limitation, on foetal growth during this time (Mellor 1983). The objective of this field study was to test the ability of a 'smaller placenta' to supply adequate nutrients to a close-to-term foetus.

Comeback ewes (four and five years old) were synchronized (Repromap, Upjohn) and joined to harnessed Merino rams in January 1986. Day of mating was recorded. Two groups of ewes were selected according to live weight, condition score (2.0-2.5) and day of joining. Baled pasture hay (8.6 MJ metabolizable energy and 14.1g N per kg DM) was fed at either requirement level (control, C) or 0.8xMaintenance (restricted, R) from day 30 to 100 of gestation (MAFF 1984). From day 100 to term all ewes were fed as a group with the pasture hay, restricted to a level of 5 MJ/ewe/day, plus whole grain lupins (13.6 MJ metabolizable energy and 44.6g N per kg DM), to provide MAFF (1984) requirements. Single bearing ewes were slaughtered and uterine dissections carried out at days 96 and 142 of gestation.

Weight, Crown-rump length and Girth of Foetus and Weight of Placenta

Group	n	Day	Placenta (g)	Foetus (g)	Crown-rump (mm)	Girth (mm)
R	5	96	398±33.4a	654± 62.8a	313±2.3a	174±3.0a
C	4	96	516±21.5b	756± 36.4a	326±6.4a	180±2.5a
R	5	142	388±43.5ac	3881±255.6b	534±4.9b	317±5.5b
C	5	142	442±43.5abc	4196±250.7b	539±5.3b	336±7.3b

Treatment means (±SEM) followed by different letters are significantly different (P<0.05)

The period of undernutrition resulted in a smaller placenta at day 96 of gestation, but no difference was detected (P<0.05) in fresh weight or dimensions of the foetus. In this study the placenta was the more sensitive component of the gravid uterus to maternal undernutrition. The significant difference (P<0.05) in placental weight at day 96 (between C and R) did not persist to day 142 of gestation, and was associated with a larger decline in mean placental mass, from day 96 to 142, in C (74g) than R (10g). It is concluded that there was no cost to foetal growth in ewes that were fed below maintenance, from day 30 to 100, provided that the level of nutrition during the final 50 days of gestation was adequate.

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