PLACENTAL AND FOETAL SIZE IN EWES SEVERELY UNDERFED FOR THE FIRST SEVENTY DAYS OF PREGNANCY

G.J. McCRABB, D.I. KRAUSGRILL*, A.R.* EGAN* and **N.M. TULLOH**

Undernutrition of ewes during mid-pregnancy may reduce (Everitt 1964) *or* increase (Faichney 1981) maximum placental size, reached by about day 90 of pregnancy (Cloete 1939; Barcroft 1946). The consequences of altering placental growth on its functional capacity have been reviewed (Bell 1984). The aim of this experiment was to evaluate effects of severe maternal undernutrition during the first 70 days of pregnancy on growth of the placenta and foetus.

Six-year-old Merino ewes *were* joined to Dorset rams, and the day of mating recorded. The control (C) group was fed pasture hay (8.6 MJ ME/kg DM, 1.4% N) *ad libitum* plus 800-1000 g/ewe/d of pellets (Barastoc Products, Packenham, 3810) (12.1 MJ ME/kg DM, 2.7% N) in a small barn. The under-fed (R) ewes were housed in individual pens and fed hay (160 g DM/ewe/d) plus pellets to lose 8 kg live weight (110 g/d) during the first 70 days of pregnancy. From day 71 of pregnancy all ewes were held under grazing conditions, and fed until slaughter with hay (ad *libitum)* plus 200-300 g/ewe/day of pellets. Ewes were slaughtered at four stages (day 60, 70, 102 and 140) of pregnancy.

Table 1 Mean (s.e.) fasted live weight (kg), condition score, foetal (g) and placental weight (g) and cotyledon number of single bearing ewes

Group	n	Day	Fasted live weight	Condition score	Foetal weight	Placental weight	Cotyledon number
C	5	60	51.1(0.78)c	2.5(0.29)b	58(2.0)a	426(36.1)a	66(6.0)a
C	5	70	55.2(1.64)d	3.1(0.10)c	148(5.9)b	666(79.8)c	73(5.7)a
R	5	71	36.8(1.55)a	1.8(0.16)a	142(3.6)b	656(58.1)c	69(5.6)a
C	5	102	54.3(1.63)d	2.8(0.12)bc	1106(43.9)c	616(39.4)c	70(3.9)a
R	5	102	42.2(0.34)b	1.8(0.16)a	1056(45.4)c	636(40.5)c	77(5.5)a
C	6	141	59.8(2.89)e	2.4(0.17)b	4780(134.4)d	514(24.0)b	76(3.1)a
R	7	140	55.7(1.39)d	2.4(0.18)b	4955(258.6)d	590(32.8)bc	79(5.1)a

Different letters within columns indicate significant ($P<0.05$) difference.

The nutritional treatment resulted in the live weight and condition *score* of group C ewes being higher ($P<0.05$) than for their group R counterparts. Undernutrition had no significant effect on either placental *or* foetal weight.

Placental size at about day 70 was as great as that at about day 100; and at day 140 was less, particularly in those ewes better fed to day 70. Other unpublished serial slaughter experiments are consistent with this observation (A.W. Bell pers. comm.). The severity of the period of undernutrition in this experiment was as extreme as that reported by Everitt (1964). The ewes in the present experiment had more body reserves, acting as an endogenous buffer of nutrients for conceptus growth, than those in Everitt's (1964) experiment.

BARCROFT, J. (1946). "Researches in Prenatal Life". (Blackwell: Oxford).
BELL, A.W. (1984). In "Reproduction in Sheep", p.146, editors D.R. Lindsay and D.T. Pearce (Australian Academy of Science: Canberra).
CLOETE, J.H.L. (1939). Onderstepoort J. Vet. Sci. Anim. Ind. 13:417.
EVERITT, G.C. (1964). Nature, Lond. 201:1341.
FAICHNEY, G.J. (1981). Proc. Nutr. Soc. Aust. 6:48.

* *School of Agriculture and Forestry, University of Melbourne, Vic.* 3052.