PLASMA GLUCOSE CONCENTRATIONS ARE RELATED TO AVERAGE DAILY GAIN IN GROWING EWE, WETHER AND RAM LAMBS

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Growth rates and carcass composition in growing lambs differ between sexes. In general, growth rates, and carcass weights at a given age are higher for rams than wethers, and can be higher for wethers than ewes (Thatcher et al. 1991). At slaughter, ewe lambs have a higher fat percentage than rams or wethers fed the same diet (Lee et al. 1990).

These growth and carcass composition differences may be mediated via the somatotropic axis. A probable mechanism for sex-determined modulation of the somatotropic axis involves postnatal effects of oestrogens and androgens. Resultant differences in growth hormone, insulin and IGFs may affect glucose economy - reflected in differences in plasma glucose concentration between sexes. Mahyuddin and Teleni (1988) found in wethers that protein deposition increased with increasing glucose entry rate, which was associated with higher plasma glucose concentration. Kempton and Leng (1983) also found that glucose entry rates were linearly related to the rate of bodyweight gain in growing lambs. Any differences in plasma glucose caused by oestrogen and androgen actions on the somatotropic pathway are therefore a possible mechanism for sex-related differences in growth. This experiment aimed to confirm the relationship between plasma glucose and ADG in ewe, wether and ram lambs from birth to weaning.

22 Border Leceister x Merino lambs were weighed at birth and at weekly intervals to weaning at ten weeks of age. Blood samples were taken by venepuncture at monthly intervals prior to weaning, centrifuged at 3000 rpm for 10 min and plasma collected and stored at -20°C for later analysis. Comparisons of average daily gain to weaning and plasma glucose concentration at the two sampling dates were made between ewe, ram and wether lambs.

Sample time	Regression equation	
Month 1	ADG (g/d) = 81.4 + 28.9 Glucose (mM)	R^2(adj) = 28.5%
Month 2	ADG (g/d) = -118 + 63.1 Glucose (mM)	R^2(adj) = 46.2%

Average daily gain to weaning was correlated with plasma glucose concentrations at both sampling dates in all lambs (Month 1, P=0.005; Month 2, P<0.001), and also with liveweight at sampling for Month 2 (P=0.003) but not Month 1 (P>0.1). In this experiment, limited numbers of animals did not permit identification of significant differences between sexes in ADG to weaning or plasma glucose prior to weaning. Measurement of plasma metabolite and hormonal concentrations post-weaning is continuing in order to isolate the mechanisms which result in growth and carcass composition differences between sexes in growing lambs.

KEMPTON, T.J. and LENG, R.A. (1983). Tropical Anim. Prod. 8: 244.
LEE, G.J., HARRIS, D.C., FERGUSON, B.D. and JELBART, R.A. (1990). Aust. J. Exp. Agric. 30: 743.
MAHYUDDIN,P. and TELENI,E. (1988). Proc. Nutr. Soc. Aust. 13: 106.
THATCHER, L.P., WARREN, B. and NICHOLLS, P.J. (1991). Aust. J. Exp. Agric. 31: 307.

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