POST-WEANING PERFORMANCE OF PIEDMONTESE-HEREFORD AND WAGYU-HEREFORD STEERS FOLLOWING HIGH OR LOW NUTRITION *IN UTERO* AND PREWEANING

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It is believed that the development of cells within tissues can be altered by nutritional restriction early in an animal's life, thus affecting body composition at market weights. This paper presents effects of level of nutrition *in utero* and preweaning on postweaning growth and body composition of Piedmontese-Hereford (PxH, high muscling) and Wagyu-Hereford (WxH, high marbling) steers from a major research project within the Cattle and Beef Quality CRC.

Eighty steers born at Grafton in 2001 were selected for their divergence in birth weight and preweaning growth following either high or low nutrition *in utero* and preweaning, in a cross-over design: high nutrition *in utero* and preweaning (HH), high nutrition *in utero*, low nutrition preweaning (HL), low nutrition *in utero*, high nutrition preweaning (LH), low nutrition *in utero* and preweaning (LL). After weaning in April 2002, steers grazed temperate pastures at Glen Innes until November 2003 (26 months of age). Due to drought conditions, grain based pellets were fed as required to help achieve a feedlot entry weight of 550 kg. Cattle were weighed monthly, and on feedlot entry, eye muscle area (EMA), fat depth at the rib and rump P8 sites, and intramuscular fat (IMF) were estimated using real time ultrasound scanning. Data were analysed using Linear Mixed Models in Genstat.

Results are presented in Table 1. There was a trend ($P<0.1$) for PxH to be heavier and have greater postweaning weight gains than WxH. Steers from low preweaning nutrition grew faster than those from high preweaning nutrition, irrespective of *in utero* nutrition. In spite of this compensatory gain, the ranking of weights at 26 months remained the same as at weaning (HH>LH>HL>LL, Cafe *et al*., these proceedings). In relation to body composition, PxH had greater EMA, and lower P8 and rib fat and IMF%, than WxH. Steers from HH were fattest, followed by LH then HL, with LL being leanest. Early life nutrition did not affect IMF%. Irrespective of *in utero* nutrition, steers with high preweaning nutrition had larger EMA than those with low preweaning nutrition.

Table 1. Effects of early life nutrition on liveweight, postweaning growth and body composition of Piedmontese x Hereford (PxH) and Wagyu x Hereford (WxH) steers at 26 months of age (mean ± av sed).

Genotype (G) and nutrition[A] (N)	Liveweight (kg)	Postwean growth to 26 m (g/d)	P8 rump fat (mm)	Rib fat (mm)	Eye muscle area (cm^2)	Intra muscular fat %
PxH	539 ± 8	619 ± 11	5.2 ± 0.44	3.6 ± 0.33	72.7 ± 1.4	3.0 ± 0.14
WxH	525 ± 8	601 ± 11	8.6 ± 0.44	5.9 ± 0.33	67.8 ± 1.4	4.8 ± 0.14
HH	578 ± 11	602 ± 16	8.3 ± 0.61	5.7 ± 0.45	73.4 ± 2	3.9 ± 0.2
LH	544 ± 11	580 ± 16	7.5 ± 0.61	5.1 ± 0.45	72.3 ± 2	4.0 ± 0.2
HL	510 ± 11	629 ± 16	6.5 ± 0.61	4.4 ± 0.45	67.9 ± 2	3.8 ± 0.2
LL	495 ± 11	629 ± 16	5.4 ± 0.61	3.8 ± 0.45	67.6 ± 2	4.0 ± 0.2
Signif. factors	N	N	G, N	G, N, LW[B]	G, N, LW[B]	G

[A] HH, high nutrition *in utero* and preweaning; HL, high nutrition *in utero,* low preweaning; LH, low nutrition *in utero*, high preweaning; LL, low nutrition *in utero* and preweaning. [B] Live weight at 26 m as covariate.

The results of this study demonstrate substantial differences at 26 months of age in liveweight, growth, and distribution of body tissues between extreme sire-breed types, and for cattle that have experienced divergent early life nutrition. It remains to be seen whether differences are evident following feedlot finishing, and whether altered cellular characteristics within muscle at birth (P.L. Greenwood *et al*., unpublished results) in low and high birth weight half sibs of these animals persist.

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