COMBINING GENETICS AND GROWTH RATE TO PRODUCE HIGH QUALITY BEEF IN SOUTH EASTERN AUSTRALIA

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The study reported here is part of a series within the CRC for Cattle and Beef Quality, designed to determine the best "Regional Combinations" of genotype and growth rate to produce beef with high rates of compliance to market and quality specifications (live and carcass). This site is situated near Griffith (southern NSW), with others covering a wide range of environments throughout Australia. The studies will examine the effects (on production and meat quality) of different rates of growth of steers to feedlot entry weights, within different sire and breed types chosen on carcass traits.

The design has 2 growth treatments (each with 2 replicates), applied across 5 "carcass types" (sires chosen on carcass traits). The carcass traits cover extremes in retail beef yield (RBY) – represented by sires of European breeds (4 sires each of Charolais and Limousin), to extremes in intramuscular fat (IMF or "marbling") – represented by Wagyu sires (4 each of Black and Red Wagyu). The remaining 3 carcass types are drawn from Angus sires chosen on EBV for high RBY or for high IMF, or both. There are 8 sires within each carcass type (total 40). All matings are by AI to Hereford dams of a common genetic background. The differential (fast or slow) growth treatments are applied to the steer progeny from weaning to feedlot entry weight of 400 kg. The faster groups will aim to reach the target weight at approximately 13 months (requiring 0.9 – 1.0 kg/d gain) using high quality pasture, and the slower groups at 18 to 20 months (0.6 - 0.7 kg/d) using lower quality pasture. For valid comparison of fast and slow growth groups, they must reach target weights, feedlot finishing and slaughter all at the same time. This will be achieved by aligning the slow growth group from one calving with the fast growth group from the next (2 calvings/yr). There will be 4 feedlot intakes (total 600-700). The effects of the growth and genotype treatments will be assessed on compliance to specifications for feedlot entry and for carcass characteristics and meat quality at slaughter. The first of 5 matings was in August 2000, with the first weaning in January 2002 and the final in February 2004. The following data (Table 1) are presented as a progress report only (first weaning) – group means unadjusted for differences in age or weight at weaning - trends only suggested at this stage. Two of the 5 carcass types described above in the design have been further subdivided for this summary, as described in the table header.

Table 1. Least squares means, male progeny (data unadjusted for weight or age, except weaning weight). "Carcase types" 1, 2 and 3 (respectively) are progeny of Angus sires chosen on EBV for high meat yield, high marbling or both. Types 4 (Charolais) and 5 (Limousin) represent high yielding European cattle, while types 6 (Black Wagyu) and 7 (Red Wagyu) represent cattle purpose-bred for high marbling.

Least squares means	"Carcase type" of sire							Overall, n=121
(AOV)	1	2	3	4	5	6	7	(approx. lsd)
Birth wt (kg)	36.4	37.8	35.8	40.0	35.9	32.3	35.1	36.2 (3.0)
Wean age (d)	226	228	230	225	228	222	221	226 (6)
Age adj. wean wt (kg)	209	231	220	233	222	218	221	222 (21)
[1]P8 fat (mm)	1.38	1.83	1.42	1.25	1.28	2.00	1.87	1.58 (0.71)
[1]E.M.A. (cm^2)	38	40	40	47	48	41	39	42 (4)
[2]Muscle score	7.4	7.0	7.1	10.8	8.9	6.8	8.4	8.0 (1.1)

[1]P8 fat depth and eye muscle area (E.M.A.) determined by ultrasound imaging.
[2]Muscle score scale 1 (= E-) to 15 (= A+), ie 3 increments per National Livestock Language unit (E to A).

The highest mean birth weight was found in the Charolais (4) progeny and the lowest in the Black Wagyu (6). Liveweight gain from birth to weaning (not shown) averaged 0.82 kg/d overall. P8 fat depth in types selected for highest marbling potential (2, 6 and 7) all exceeded the overall mean, while the high yield types (1, 4 and 5) were all below. The European high yield types (4 and 5) had considerably higher E.M.A. than all others, which was also reflected in their muscle scores. The above trends are consistent with expected final carcass differences, suggesting body composition at weaning may be a reliable predictor of subsequent outcome.

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