

Beef primal cuts expressed as proportions of overall matured carcass weights (carcass balance) in Aberdeen Angus cross and Limousin cross steers and heifers

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Introduction “Carcass balance” or the proportion of overall beef carcass weight that is present in various primal cuts in both the hindquarter (HQ) and forequarter (FQ) segments has a considerable effect on the commercial value of each carcass. As part of a wide ranging study to examine animal performance and quality attributes of beef cattle, the objective of the current experiment was to quantify the proportions of various primal cuts within beef carcasses from both Aberdeen Angus cross (AAx) and Limousin cross (LIMx) steers and heifers slaughtered through a commercial abattoir.

Materials and methods Nine AAx steers and seven each of AAx heifers, LIMx steers and LIMx heifers from a range of dam types were used in this study where one side of the slaughtered carcasses were cut into a total of eleven commercial primals, vacuum packed and frozen at -20 °C. Although the 11 primals were further sub-divided for other experimental procedures, the weight (kg) of each commercial primal was then expressed as a proportion of the total matured carcass side weight (g/kg carcass weight) for the purpose of this “carcass balance” study. Nineteen of the carcasses were sourced from the Beef Research Centre at SAC, Edinburgh and the remaining eleven carcasses were sourced at the commercial abattoir as they arrived for slaughter. Animals were slaughtered in eight batches during the autumn and winter period of 2007-2008 and the cattle represented the offspring of nine AA and nine LIM sires. Data for each of the 11 primals expressed on a proportional basis were statistically analysed using the REML procedure in Genstat 11 to determine breed (B) and sex (S) effects as well as their interaction (BxS).

Results Average age at slaughter was 587 (s.e. 11.1) days (range 518 – 747) whilst average matured carcass weight was 332.5 (s.e. 5.08) kg (range 276.4 – 402.2) across all animals in the study. HQ shin, topside, rump, flank and sirloin along with the FQ flank, ribs, brisket, shin, neck and clod proportions are given in Table 1. The total hindquarter and total forequarter proportions are also shown. The main results for individual primals are as follows:- AAx animals had a lower proportion ($P<0.05$) of HQ topside compared with LIMx animals (204 vs 214 g/kg carcass weight) whilst steers had lower proportions ($P<0.05$) of HQ topside, rump and sirloin and higher proportions of FQ shin ($P<0.001$) and clod ($P<0.05$) compared with heifers.

Table 1 Primal cuts expressed as a proportion of total carcass weight (g/kg) in AAx and LIMx steers and heifers

	AAx		LIMx		Breed (B)		Sex (S)		s.e.d		Sig. of effects		
	Steer	Heifer	Steer	Heifer	AAx	LIMx	Steer	Heifer	B&S	BxS	B	S	BxS
HQ shin	50	48	50	49	49	49	50	48	1.14	1.62			
HQ topside	200 ^a	208 ^{ab}	210 ^{ab}	218 ^b	204	214	205	213	3.83	5.41	*	*	*
HQ rump	78 ^a	86 ^b	81 ^{ab}	82 ^{ab}	82	81	79	84	2.08	2.94		*	*
HQ flank	83	85	82	79	84	80	82	82	3.47	4.90			
HQ sirloin	74 ^a	80 ^b	77 ^{ab}	81 ^b	77	79	76	80	1.92	2.72		*	*
FQ flank	66	65	63	64	65	63	65	64	1.77	2.50			
FQ ribs	205	205	207	208	205	207	206	207	2.22	3.15			
FQ brisket	81	80	83	80	81	82	82	80	1.92	2.71			
FQ shin	33 ^a	30 ^b	33 ^a	30 ^b	32	31	33	30	0.73	1.03		***	*
FQ neck	66	60	59	58	63	59	63	59	2.21	3.13			
FQ clod	62 ^a	54 ^b	56 ^{ab}	52 ^b	58	54	59	53	2.36	3.34		*	*
Total hindquarter	486 ^a	507 ^c	498 ^b	509 ^c	496	504	492	508	2.67	3.78	*	***	*
Total forequarter	514 ^a	493 ^c	502 ^b	491 ^c	504	496	508	492	2.67	3.78	*	***	*
Total carcass weight (kg)	356.0 ^a	299.6 ^b	360.3 ^a	313.8 ^b	327.8	337.1	358.2	306.7	10.16	14.37		***	**

Within the BxS interaction, values not sharing common superscripts differ significantly ($P<0.05$).

Conclusion The results show that steers have a greater proportion of forequarter (shin and clod) and lower proportion of hindquarter (topside, rump and sirloin) in their carcasses compared with heifers. This may be a function of circulating hormone levels. LIMx animals have a higher proportion of hindquarter compared with AAx animals with the differences being larger between LIMx and AAx steers compared with the difference between LIMx and AAx heifers. These proportional differences amongst “carcass balance” can have a considerable effect on the overall value of animal breed types and sexes due to differential pricing of the various primals.

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