# Animal performance characteristics in suckler-bred steers and heifers finished at 16-20 months of age on a grass silage and barley-based concentrate ration offered as a complete diet

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**Introduction** Due to an increasingly discerning consumer demand, the eating quality of beef has become a major focus of research effort for the beef supply chain and some pricing schemes currently reward Aberdeen Angus sired animals over animals sired by other breeds. However, the animal performance characteristics of beef cattle at a farm level must also be examined in studies on beef eating quality since they will remain an integral part of primary producer returns for the foreseeable future. As part of a wider beef eating quality project, the objective of the current study was to assess the on-farm and carcass animal performance characteristics in suckler-bred steers and heifers during the finishing phase.

**Materials and methods** A total of 100 steers and heifers were used in a continuous factorial design experiment where two breed types (B) and two sexes (S) of suckler-bred finishing cattle were compared. The two breed types were either Aberdeen Angus x Limousin (AAx) or Limousin x Aberdeen Angus (LIMx) derived from the reciprocal crossing programme within the main SAC beef herd. There were 27 AAx steers, 31 LIMx steers, 21 AAx heifers and 21 LIMx heifers allocated to 3 pens per sex on the basis of initial LW and days of age. All animals were fed the same finishing diet consisting of 1st cut grass silage and a barley based concentrate (50:50 DM basis) which was offered as a completely mixed ration on a daily basis (DM: 383 g/kg, ME: 12.2 MJ/kg DM, CP: 140 g/kg DM). All animals remained on the diet for a minimum of eight weeks after which they were selected for slaughter according to standard commercial practice (target grades R4L or better). Animal liveweight (LW) was recorded weekly throughout and daily liveweight gain (DLWG) figures determined by linear regression. Carcass weight was estimated at the start of the experiment (Keady & Kilpatrick, 2005) and cold carcass weight gains (CCWG) determined as the difference between initial CCW and CCW at slaughter. Fat and conformation gradings were also recorded at slaughter and converted to a 1-15 point score for statistical analysis. Killing out proportion (KO prop) was also calculated from LW and CCW at slaughter. Data was analysed for the fixed B, S and BxS effects and the random within S pen effect using the REML facility in Genstat 8.

**Results** Adjusted means for the animal performance characteristics (age at slaughter, LW at the start of the experiment and at slaughter, DLWG, CCW at the start of the experiment and at slaughter, daily CCWG, KO prop, fat and conformation numerical scores) are given in Table 1. Breed type and animal sex along with their inter-action were all significant effects in all parameters except age at slaughter where only the BxS inter-action was significant. Only the breed type and its inter-action with sex were a significant effect for conformation score. In general, LIMx animals grew faster, had a higher KO proportion and produced heavier carcasses with a higher conformation and lower fat scores compared to AAx animals. Similarly, steers generally grew faster, had a higher KO proportion and produced heavier carcasses with a lower fat score compared to heifers. AAx animals achieved a commercial price premium averaging 4.6 pence/kg CCW but due to the carcass characteristics listed above, overall carcass value was £28.90 per head less compared with the LIMx animals.

**Table 1** Animal performance characteristics during the finishing phase and at slaughter in suckler-bred steers and heifers

| Performance characteristic | AAx | | LIMx | | Breed (B) | | Sex (S) | | sed's | | | Sig of effects | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | St's | St's | St's | Hf's | AAx | LIMx | St's | Hf's | B | S | BxS | B | S | BxS |
| Age @ slaughter (days) | 544$^{ab}$ | 549$^{ab}$ | 536$^{a}$ | 551$^{b}$ | 546 | 544 | 540 | 550 | 5.5 | 5.1 | 6.7 | | | * |
| LW @ start (kg) | 481$^{b}$ | 462$^{c}$ | 506$^{a}$ | 474$^{bc}$ | 472 | 490 | 494 | 468 | 4.1 | 6.9 | 7.5 | *** | *** | * |
| LW @ slaughter (kg) | 601$^{b}$ | 563$^{c}$ | 631$^{a}$ | 588$^{b}$ | 582 | 609 | 616 | 575 | 4 | 7.9 | 8.3 | *** | *** | ** |
| DLWG (kg/d) | 1.56$^{a}$ | 1.25$^{b}$ | 1.57$^{a}$ | 1.46$^{a}$ | 1.4 | 1.52 | 1.57 | 1.36 | 0.04 | 0.065 | 0.072 | ** | ** | ** |
| CCW @ start (kg) | 258$^{b}$ | 246$^{c}$ | 272$^{a}$ | 253$^{bc}$ | 252 | 263 | 265 | 250 | 2.4 | 4.1 | 4.4 | *** | *** | * |
| CCW @ slaughter (kg) | 331$^{b}$ | 303$^{c}$ | 357$^{a}$ | 323$^{b}$ | 317 | 340 | 344 | 313 | 2.6 | 5.5 | 5.7 | *** | *** | *** |
| CCWG (kg/d) | 0.93$^{ab}$ | 0.65$^{c}$ | 0.99$^{a}$ | 0.86$^{b}$ | 0.79 | 0.93 | 0.96 | 0.76 | 0.01 | 0.036 | 0.04 | *** | *** | ** |
| KO prop (g/kg CCW) | 554$^{ab}$ | 537$^{c}$ | 565$^{a}$ | 551$^{b}$ | 546 | 558 | 560 | 544 | 3.8 | 3.8 | 5.3 | ** | *** | * |
| Fat score (1-15) | 9.10$^{b}$ | 10.76$^{a}$ | 8.46$^{b}$ | 8.90$^{b}$ | 9.93 | 8.68 | 8.78 | 9.83 | 0.24 | 0.341 | 0.39 | *** | *** | *** |
| Conf score (1-15) | 8.00$^{a}$ | 7.98$^{a}$ | 8.78$^{ab}$ | 8.89$^{b}$ | 7.99 | 8.84 | 8.39 | 8.44 | 0.29 | 0.359 | 0.425 | ** | | * |

**Conclusions** These results show that LIMx animals had higher carcass gains and produced heavier, better conformed carcasses compared to AAx animals. Whilst AAx animals did achieve higher prices per kg carcass weight, their basic animal performance characteristics resulted in lower financial values overall. These fundamental commercial performance characteristics should be taken into account when considering the economic sustainability of future beef production systems where pricing structures may be further developed to reward beef eating quality parameters.

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**Reference** Keady, T.W.J. and Kilpatrick, D.J. 2005. Proceedings of BSAS winter meeting. p179.