

Carcass quality of crossbred lambs expressing the *callipyge* phenotype born to Romanov purebred and crossbred ewes

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Abstract

Carcass quality was evaluated in 35 male and 41 female lambs, 38 expressing the *callipyge* phenotype (Cg) and 38 controls expressing the normal phenotype (N). Lambs were from Romanov and Suffolk × Romanov ewes mated to two rams heterozygous for the *callipyge* locus and slaughtered at approximately 44 kg live weight. The Cg lambs reached slaughter weight at 163 days of age, 13 days younger, and had a dressing proportion 0.524, 0.029 points higher. Also they had more leg (341 v. 308 g/kg), less loin (315 v. 328 g/kg) and less shoulder (340 v. 360 g/kg) than the N lambs. The leg, loin and shoulder wholesale cuts and half the carcass of Cg lambs had 81, 113, 77, and 92 g/kg more lean and 52, 98, 59, and 72 g/kg less fat than N lambs, respectively. The Cg lambs also had larger loin-eye area (18.5 v. 13.1 cm²), less backfat at the C (4.1 v. 6.1 mm) and at the GR locations (11.0 v. 15.2 mm) and less internal fat (202 v. 339 g) than the N lambs. Dissection of the 12th rib indicated that Cg lambs had more muscle (574 v. 462 g/kg), less fat (276 v. 358 g/kg) (both $P < 0.001$) and similar ($P > 0.05$) bone (155 v. 165 g/kg) to N lambs. Colour of the longissimus muscle was significantly paler in Cg lambs. Intramuscular fat and dry matter of longissimus muscle were significantly lower (49 v. 120 and 247 v. 253 g/kg) in Cg than in N lambs. Cg lambs were significantly different ($P < 0.05$) from N lambs for all traits studied except age at slaughter, tissues at the GR location, proportion of bone in the 12th rib and the L* colour of the longissimus muscle. Breed type effect was significant only for age at slaughter, whereas the effect of sex was significant for all traits except for proportion of lean in the leg, b* colour and intramuscular fat content of the longissimus muscle. No interactions were significant except phenotype × breed type on fat thickness over the longissimus muscle. Post-mortem ageing of the longissimus muscle for 9 or 15 days caused a significant reduction in muscle toughness in Cg lambs compared with those aged for 3 days (113 v. 98 Newtons) but the muscle was still tougher than that from N lambs (with a shear force of 64 and 51 Newtons at 3 and 9 or 15 days post mortem). The principle component analysis including carcass conformation and composition traits as well as meat quality traits was indicative of a distinctly different carcass of Cg compared with N lambs. The first two principal components explained 0.70 of the total variation.

Keywords: *callipyge* gene, carcass composition, meat quality, Romanov.

Introduction

The superior prolificacy of Romanov and Romanov crosses has made them popular in commercial enterprises that produce market lambs. Surprisingly, however, few research studies have investigated the causes for the relatively inferior quality of Romanov (and to a lesser extent Romanov crossbred) lamb carcasses, especially intact males, resulting from the greater proportion of carcass weight in the forequarter (Fahmy *et al.*, 1992) and none has suggested remedies. In their reviews of French

research with the Romanov, Ricordeau *et al.* (1988 and 1990) referred to the inferior quality of the Romanov carcasses but reported no work in France conducted to improve the situation.

The mutant allele of the *callipyge* gene affects carcass composition favourably through an exceptional effect on the degree of muscling and particularly on specific muscles in the loin and leg (*longissimus*, *triceps brachii*, *biceps femoris*, *semimembranosus*, and *semitendinosus*), thus improving the most valuable