A comparison of lamb growth rate and lean carcass gain within and among farm flocks

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ABSTRACT

Lines of 40 ram lambs of a variety of breeds from 22 farms in Canterbury, and initially weighing between 32 and 40 kg live weight, were assembled on a farm and compared for growth rate and lean carcass gain during 12 weeks. High quality legume dominant pastures were used and changes in carcass measurements obtained from samples of lambs slaughtered at the start and end of the trial.

Average growth rates and rates of lean carcass gain among lines ranged from 143 to 252 g/d and 27 to 53 g/d respectively. Lines of specialist meat and short-wool breeds (Suffolk-cross, Perendale and Dorset) had higher average gains than long-wool breeds (Corriedale, Coopworth and Romney). The long-wool breeds showed greater variation in fat measurement GR (S.D. ± 4.07 mm) than specialist meat and short-wool breeds (S.D. ± 3.25 mm) at the final slaughter when carcass weights ranged from 22 to 27 kg among lines and around 70% of all carcasses graded trimmer or overfat.

Keywords Sheep; lamb growth; carcass qualities; sheep breeds.

INTRODUCTION

Fast growing lambs with lean carcasses are required for maximum economic returns to farmers. Therefore, the genetic potential for lean growth, both within and between breeds, is important. The present study compared the rate of gain in carcass lean of lines representing a variety of breeds of ram lambs, from 22 farms in Canterbury, under optimum pasture feeding and management.

MATERIALS AND METHODS

Lines each of 40 ram lambs from 22 farms, with an average live weight between 32 and 40 kg, were assembled on a farm near Lincoln in mid-February 1986. Six of the lines were specialist meat breeds (mainly Suffolk crossed with long-wool breeds) and the remainder were predominantly Corriedale, Coopworth, Romney, Perendale or Dorset. A representative sample of 10 lambs from each line were slaughtered initially at a local meat works and live weight, carcass weight, eye muscle (*longissimus dorsi*) depth and width, and subcutaneous fat depth (GR) were recorded. The remaining lambs grazed high quality white clover (*Trifolium repens*) dominant pastures for 12 weeks with a shift interval of 5 to 8 d and a subjectively estimated post-grazing pasture mass of 1000 to 1200 kg DM/ha. The lambs were treated initially for external parasites and every 3 weeks for internal parasites. At the end of the 12 week period a further sample of 10 lambs from each line were slaughtered and the same measurements outlined above made.

Lean meat content in carcasses at the start and finish of the trial was predicted using the following equation based on dissection data (R.W. Purchas, pers. comm.):

Muscle content (%) = 48.5 − 0.60GR + 0.16 (A + B)

where GR = Fat measurement GR (mm), A = eye muscle depth (mm) and B = Eye muscle width (mm).

Rate of lean gain was taken as the difference in predicted carcass lean at the start and end of the trial.

RESULTS AND DISCUSSION

Average live weight, carcass weight, carcass muscle (%) and fat measurements GR at the start and end of the trial, and gains in live weight, carcass lean and measurement GR, are given in Table 1. Ranges in mean values among individual lines are also given. The average lamb growth rate of 198 g/d was well above the average of 106 g/d in a survey of 25 South

TABLE 1 Mean values and ranges among lines for lamb live weight, carcass components and gains during the 12 week trial period.

	Measurement	Mean	Pooled S.D.	Range among lines
Start	Live weight (kg)	35.6	1.54	32.0 – 40.4
	Carcass weight (kg)	16.0	0.85	14.7 – 18.3
	Muscle content (%)	54.1	1.38	51.7 – 55.8
	GR (mm)	6.0	1.91	3.6 – 8.5
Finish	Live weight (kg)	52.4	3.33	47.1 – 58.9
	Carcass weight (kg)	24.2	1.72	21.9 – 27.6
	Muscle content (%)	49.4	2.43	47.0 – 51.8
	GR (mm)	15.4	3.75	12.1 – 19.2
Overall	Liveweight gain (g/d)	198	—	143 – 252
	Carcass lean gain (g/d)	39	—	27 – 53
	GR increase (mm)	9.3	—	6.2 – 11.9

Island farms (Everest and Scales, 1983) and the highest average value of 252 g/d compares favourably with the best results in some experiments in Canterbury (Geenty, 1980). The outstanding growth rates in the present trial indicate high growth potential which can be realised with good feeding and management and the necessary animal health measures.

Estimated rate of carcass lean gain showed large variation among lines (Table 1), with Suffolk-cross, Perendale and Dorset (42-53 g/d) ranking 1 to 9 above the long-wool breeds (27-41 g/d). Superiority of the specialist meat and short-wool breeds over the long-wool breeds was due mainly to higher average growth rate (220 g/d v 180 g/d); carcass muscle content and fat measurement GR were on average similar for each grouping of breeds.

Variation in carcass weight and muscle and fat content within lines was greater for the final than the initial slaughter group. The standard deviation for fat measurement GR showed most variability between lines at the final slaughter (1.45 to 5.52 mm)

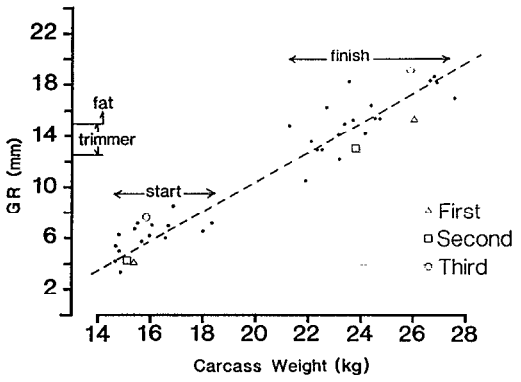

FIG. 1 The relationship between fat measurement GR and carcass weight showing averages for each line at the start and finish of the trial and positions of first, second and third ranked lines based on rate of lean carcass gain.

and was greater on average for the long-wool breeds (4.07 mm) than the specialist meat and short-wool breeds (3.25 mm). This indicates that about 30% of the lambs within a line would grade trimmer or overfat (GR > 13 mm) at an average GR measurement of 9 mm for long-wool and 10 mm for specialist meat and short-wool breeds.

Associated with the rapid growth rates and heavy carcass weights achieved during the 12 week period was excessive fat indicated by measurement GR (Fig. 1). With the exception of 3 lines all averaged greater than 12 mm GR at the final slaughter when around 70% of all carcasses graded trimmer or fat. Previous research in Canterbury (Geenty *et al.*, 1984) has shown, in the absence of progressive drafting, a high proportion of ewe and wether lambs grade trimmer and fat at carcass weights above 18 kg. It is estimated that had the design of the present trial permitted, progressive drafting of the ram lambs, based on assessment of GR in the live animals, would have resulted in around 90% of carcasses reaching 20 kg without grading trimmer or fat. Less than 50% of the carcasses would have reached 22 kg without being trimmer or fat.

The positions in Fig. 1 of lines with the highest rates of lean gain show that the first and second ranked lines had carcasses leaner than average (below the average regression line) while that ranked third was fatter than average. This indicates that in addition to rate of lean gain, genetic selection should take account of absolute level of carcass fat.

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