DETERMINING GR FROM SUBCUTANEOUS FAT DEPTH OVER THE EYE MUSCLE

With the development of an ultrasonic probe suitable for measuring subcutaneous fat depth in sheep (Gooden et al. 1980), schemes designed to achieve genetic change in the carcass composition of breeding stock used for meat production have emerged. This has largely arisen in response to consumer preference for lean cuts of lamb (Hopkins and Congram 1985). The current basis of determining the level of fatness in slaughter progeny is the GR measurement, i.e., the total tissue thickness at the 12th rib 110 mm from the midline of the carcass. As a result, the national performance recording scheme LAMBPLAN converts subcutaneous fat depth values measured ultrasonically and adjusted for weight to GR equivalents. This raises questions about the association of the two measurements, the level of accuracy when converting from one to the other, and the appropriate conversion factor.

Data from 271 lambs are presented. Eighty-eight (47 ewes, 41 wethers) were sired by Suffolk (S) rams and 183 by Poll Dorset (PD) rams (76 ewes, 107 wethers). The management of these lambs is outlined by Hopkins (1989). Age at slaughter ranged between 5.5 and 8.5 months. Hot GR measurements were obtained at slaughter and fat depth over the eye muscle (C site, Wood and Macfie 1980) measured after cutting the chilled carcass horizontally between the 12/13th rib. Both S and PD lambs had mean GR measurements of 11.0 mm. Suffolk sired lambs had a mean (± s.e.) C site fat depth of 4.8 ± 0.36 mm and the PD lambs 4.0 ± 0.18 mm. Mean carcass weights were 15.9 ± 0.29 and 17.0 ± 0.21 kg respectively.

Initial data analysis revealed C site (C) measurements to be highly skewed. A square root transformation dramatically improved the normality of the distribution. A separate model was developed for each sire breed group and included the independent variables C and carcass weight (W). The two models were:

(PD) \[ GR = 3.37 \times C^{0.5} \pm 0.29 \ W, r = 0.97 \quad r.s.d. = 2.86 \quad P<0.001 \]

(S) \[ GR = 2.59 \times C^{0.5} \pm 0.38 \ W, r = 0.98 \quad r.s.d. = 2.28 \quad P<0.001 \]

These models both show that transformed C measurements are strongly associated with GR measurements. Therefore, selection for fat depth at the C Site would be expected to result in changes at the GR site. This is not surprising because although GR is a total tissue measurement it includes a large proportion of subcutaneous fat. The relationship is weight dependent, but this can be overcome by first adjusting C measurements for weight as performed in LAMBPLAN.

Conversion of C measurements to GR equivalents using a common value is likely to result in some differences across breeds but it is apparent that the multiplication factor is in the order of 3. The accuracy of the conversion indicated by the residual standard deviation terms is less than desirable. For both breeds a predicted GR measurement could vary by at least ± 2.00 mm. Clearly if GR is to be expressed by measurement at the C site then a degree of error will exist. It is evident that to accurately determine the GR measurement should be at this location on the animal.


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