A COMPARISON OF METHODS FOR MEASURING EYE MUSCLE AREA IN LAMB

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The eye muscle area (EMA) of the M. *longissimus thoracis et lumborum* (LD) at the 12th rib is a measurement often taken for meat research or for carcass competitions, and is used as an indicator of carcass lean meat content (Hopkins 1990; Kenney *et al.* 1995). Some quicker, more practical methods for measuring EMA may result in a lower level of accuracy. This paper compares the accuracy of four methods for measuring EMA to a reference method.

A sample of 100 lambs with a range of EMAs was selected from a experiment described by Kenney *et al.* (1995). The 4 EMA measuring methods and reference method used were:

DW8-EMA	Depth and width of LD muscle at the 12th rib, multiplied by 0.8 to give EMA.
Grid-EMA	A transparent celluloid sheet printed with one centimetre grids to measure EMA.
Plani-EMA	EMA as measured by a manual planimeter.
Elect-EMA	EMA as measured by the Paton Electronic Planimeter (Paton Industries P/L, S.A.).
Paper-EMA	Weighing cut out images of the eye muscles, then using a conversion factor, converting the paper weight to an area - the reference method used.

Both the DW8-EMA and Grid-EMA were recorded in the meat laboratory after the carcasses were dissected. A small metal ruler was used to measure the LD muscle at the deepest and widest point. The depth (cm) and width (cm), was then multiplied by 0.8 to give the area. The celluloid EMA grid is a transparent sheet, marked with 1 centimetre grids; in each grid is a central dot. The sheet was laid over the exposed surface of the muscle and the number of 'dots' covering the LD muscle counted.

At the time of dissection the outline of the 12th rib LD cross-section was traced on to transparent sheets and later photocopied onto paper. The area of this image was estimated using a manual planimeter (Plani-EMA), and a second copy of the image was cut out and then fed through the Paton Electronic Planimeter (Elect-EMA).

The reference method, Paper-EMA, was achieved by weighing (±0.000 1 g) paper images of the eye muscle. Weights were converted to area using a formula which was developed by weighing known areas of graph paper. Using multiple regression (Genstat 5, Payne and Lane 1987) DW8-EMA, Grid-EMA, Plani-EMA and Elect-EMA were each modelled on Paper-EMA. In addition to the four EMA methods, the eye muscle depth (Depth-EMA) and width (Width-EMA) were also modelled on Paper-EMA.

The EMA method found best to predict Paper-EMA was Elect-EMA. This model explained 93.8% of the variation, and the Plani-EMA model explained 89.3% of the variation. Both DW8-EMA and Grid-EMA were similar in their ability to estimate Paper-EMA, with 75.5% and 74.8% of the variation explained, respectively. Of the two non-area methods, Depth-EMA was a far better predictor of Paper-EMA explaining 63.9% of the variation. Width-EMA explained only 36.7% of the variation. The results are consistent with the Grid-EMA and DW8-EMA being methods that estimate area. In contrast, Elect-EMA and Plani-EMA are quantitative methods for measuring area.

The planimeter methods, with the electronic planimeter being better than the manual planimeter, give the most accurate measure of EMA. However, both Grid-EMA and DW8-EMA give satisfactory results and would be most practical when immediate results are required, for example when judging a carcass competition in an abattoir. When using single parameters, as is commonly used for live animal assessment, depth was twice as accurate as width in explaining the variation of Paper-EMA.

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