PREDICTING THE WEIGHT OF CUTS FROM MUTTON CARCASSES

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SUMMARY: Carcass data was obtained on 227 mutton carcasses of which 116 were ewes and the remainder wethers. The carcasses weighed on average 21.4 ± 0.30 kg and had a fat depth at the GR site (12th rib) of 11.9 ± 0.53 mm.

Each carcass was boned under commercial conditions into a range of cuts. Equations to predict the weight of trimmed boneless legs, backstraps and fillets were developed using regression analysis and all explained a large amount of the variation in component weights (r^2 = 0.65 - 0.89).

Use of these equations is discussed as they relate to pricing of carcasses.

INTRODUCTION: Recently Australia adopted a national description language (AUS-MEAT) for livestock and meat (Hall 1988) to increase the dissemination of information throughout the livestock and meat industries. Within this system two parameters are obtained on small stock slaughter floors to enable description of sheep carcasses. They are carcass weight and a measure of fatness which is based on the "GR" measurement (total tissue thickness at the 12th rib 110 mm from the midline).

It has been shown that these two variables are good predictors of the composition of sheep carcasses (Kirton et al. 1986). Investigations of mutton have however been minimal because of it's low value compared to other meats. Nevertheless a system which enables pricing of carcasses based amongst other things on objective carcass information is of significance to industry.

Using the approach outlined by Hopkins (1989) for lamb the aim of this work is to develop a series of prediction equations to be incorporated into a computer program for establishing prices. Preliminary data is presented in paper.

MATERIALS AND METHODS: Two hundred and twenty seven mutton carcasses have been selected under commercial slaughter conditions. Of these 116 were ewes and 111 wethers.

Prior to boning the carcass weight (i.e. cold and fats out) was recorded and the GR (total tissue thickness at the 12th rib 110 mm from the midline) measured using a "GR" knife.

All carcasses were butchered into a range of cuts including the legs(LG), backstraps(BS) and fillets(FT). Leg cuts were trimmed to a selvedge acceptable for sale on a retail basis and the bones removed.

Carcass components were totalled and compared with the cold carcass weight obtained prior to boning. If the difference between the two values exceeded 0.5 kg, data for the carcass was not used in analysis (this is equivalent to a 2% cutting loss).

Initial data analysis was performed to ensure regularity and models then developed using regression analysis. The influence of sex on the predictions was examined and found not significant so the data was pooled to derive common equations. All analysis was performed using STATGRAPHICS 3.01.

RESULTS: The carcasses boned so far have covered a wide range of weight and fatness as shown in Table 1.

Table 1. **Means, standard errors and ranges of carcass characteristics (n = 227).**

	Mean	± s.e.	Range
Cold carcass weight (kg)	21.4	0.30	12 0 - 40.4
Cold GR (mm)	11.9	0.53	0 - 39.0
Leg (kg)	4.2	0.05	2.6 - 6.8
Backstrap (kg)	1.3	0.02	0.7 - 2.1
Fillet (kg)	0.14	0.002	0.09 - 0.23

The models were based on the variables carcass weight and GR. They were:

$LG = 0.59(\pm 0.098) + 0.19(\pm 0.006)CWT - 0.03(\pm 0.003)GR$
$r^2 = 0.89$, r.s.d = 0.24

$BS = 0.10(\pm 0.049) + 0.06(\pm 0.003)CWT - 0.002(\pm 0.0017)GR$
$r^2 = 0.81$, r.s.d = 0.12

$FT = 0.015(\pm 0.0068) + 0.007(\pm 0.0004)CWT - 0.001(\pm 0.0002)GR$
$r^2 = 0.65$, r.s.d = 0.02

The extent to which each equation explains the variation of each component weight is demonstrated by the range of r^2 from 0.65 - 0.89. In all cases carcass weight is more strongly associated with component weight as indicated by the magnitude of the various coefficients.

DISCUSSION: Development of prediction equations enables a processor to easily establish the weight of different cuts using variables measured on the slaughter floor.

If this information is linked to financial information the break-even or equilibrium price for different carcasses can be established. As previously outlined for lamb (Hopkins 1989) a processor must have a knowledge of the various component prices and the costs associated with preparing the product for sale.

Such a system enables the true value of different types of carcasses to be established although this would be a tedious task if performed by hand.

In order to extend the concept to industry a computer program has been developed for lamb provisionally called LAMPRO (Hopkins et al. 1990). This program will be adapted to cater for mutton and prediction equations like those presented here will form the predictive function of the program.

CONCLUSION: The prediction of component weights from mutton carcasses can be achieved using the variables carcass weight and GR. Consequently it is feasible to determine objectively the value of different carcasses in terms of yield, end use, anticipated returns for each component and costs of processing.

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