PREDICTING THE BONING ROOM VALUE OF LAMB CARCASES FROM SELECTED INDICATOR CUTS

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Introduction

Lean meat yield has always been considered important across all sectors of the lamb industry. Processors in particular have regarded yield of saleable product highly but find it difficult to measure under commercial boning room conditions. VIAScan© has been developed to predict yield based on a digitized carcase image at the end of the slaughter chain. Hopkins and Fogarty (1998) showed from a research perspective measurement of carcase fat depth (GR) and eye muscle area (EMA) will be the most accurate way of obtaining an estimate of yield. From a commercial perspective however, EMA has not been able to be measured on the carcase. To obtain these measurements in a commercial boning room the primal cuts need to be linked to an individual carcase. This can be achieved using a radio frequency identification (RFID) tag reading system which will link primal cut and carcase information to the live animal. This will improve boning yield monitoring and producer feedback. It would be necessary to do this calibration for individual boning rooms based on the suite of primal cuts they were generating with periodic bone-outs, however it is a slow and labour intensive process.

Materials and Methods

In November 2004 367crossbred (B.L. X merino) ewes were joined to Poll Dorset sires selected for high and low eye muscle depth (PEMD) to generate variation in lamb growth, fat, muscularity and lean meat yield. The progeny, 400 second cross lambs were used to provide the data for this study.

The lambs were slaughtered as they met market specification, at a minimum 43.5kg live regardless of estimated fat depth, over 6 serial kills. To reduce any bias in the results each serial slaughter represented both muscle groups with a minimum of 40% of lambs coming from any one group. Information collected on lambs were RFID, body number, hot standard carcase weight (HSCW), fat depth (GR) and carcass length. The lambs were boned by 'Topcut' into their export specifications.

Each individual lamb carcase was broken into its major sections (legs, forequarters or saddles). These sections were then further divided into the primal cut (including forequarter square cut, forequarter shank, eight point French trimmed rack – cap off (rack), eye of shortloin, tenderloin and boneless leg), trim, fat and bone which were then weighed. These measurements were recorded against the individual lamb body number.

Statistical analysis

The data were analysed using linear model methodology in ASReml (Gilmour *et al.* 2002). The model used in the analysis included fixed terms for kill date, sire group and their interaction. Covariates for carcass weight, carcass length and carcass fat depth (GR) were also tested in the model. To identify the primal cuts that explained a significant amount in the total carcase value a multiplicative model with a log-log transformation was used (Model 1). A separate multivariate model was then used to determine the correlations between the total of the primal cuts and the individual cuts (Model 2).

Results and Discussion

The characteristics and primal cuts that explained a significant amount of the variation in carcass value from Model 1 are shown in Table 1. The rack followed by cold leg weight were the most significant primal cuts (indicated with * in the table). This supports the findings of McLeod *et al.* (2007), that increases in PEMD will improve value for lamb processors. Leg weight is relatively easy to measure, systems to maintain individual carcass RFID through a commercial boning room are being investigated to collect cold leg weight and rack weight.

Table 1 Model 1 ANOVA table

Analysis of Variance	Num DF	Den DF	F conditional	P conditional
sire (high & low PEMD)	1	367.0	47.02	< 0.001
Killdate	5	367.0	9.04	< 0.001
log(rack)*	1	367.0	369.69	< 0.001
log(carcase weight)*	1	367.0	109.56	< 0.001
log(cold leg weight)*	1	367.0	65.98	< 0.001

The correlations between each cut, shown in Table 2, were established to identify if the most significant primal cuts from Table 1 could be used as an indicator of the total primal value of the carcase. It was found that leg cold weight plus rack gave a good indication of the total saleable weight of all six cuts with a correlation of 0.87. This was improved, by using boneless leg and rack, to 0.92.

Table 2 Correlation between the total weight of the primal cuts and other carcase characteristics and cuts.

Cut/Characteristic	Correlation with total primal weight
Boneless leg weight + rack	0.92
Cold leg weight + rack	0.87
Carcase weight	0.86
Fat Depth (GR)	0.21

Conclusion

This study provides some promising opportunities to develop practical systems to estimate the value of saleable meat yield. Mechanisms are required to enable processors to identify and reward those producers supplying more profitable higher yielding lambs. Further analysis is being undertaken to develop algorithms from this data that will predict saleable value using HSCW, GR, cold leg weight and rack weight. Processors will need to build strong strategic alliances (relationships) with their suppliers if payment on the basis of these equations is to be accepted by industry.

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