

final report

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Lamb Value Calculator Enhancements (Version 2); Carcase Profitability Analysis Tool

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Abstract

The main drivers of lamb carcase profitability along the supply chain from carcase acquisition to retail sale can be difficult to identify and requires tools to analysis what-if scenarios to assess where efficiencies can be achieved. The Lamb Value Calculator has been designed for this purpose.

The calculator estimates the Gross Profitability (GP) of a carcase by estimating primal weights of either Merino or Cross-breed (XB) lambs based on their carcase weight and fat depth. The software has the facility to capture the retail value for each primal, along with the costs of production from acquisition of the carcase through to the boning room. The GP is calculated for each primal, as well as the primal regions (FQ, Loin, HQ) and the whole carcase. The calculator is equipped with analysis tools to assist the user identify the main drivers of carcase profitability.

Executive Summary

The Lamb Value Calculator has been built to estimate the Gross Profit (GP) of a carcase, using the Carcase Weight and Fat Depth to estimate the weight of selected cuts. It is envisage that the Lamb Value Calculator will assist the user to determine the optimum Gross Profit for individual cuts and the entire carcasses.

During the process of optimising the Gross Profit for a carcase, “what if” scenarios can be assessed to evaluate their effect on the profitability of a given cut, primal region, or the whole carcase level.

Examples of “what if” scenario could be;

What happens to GP if carcase weight increases?

What impact does fatness have on carcase GP?

If a cut is boned to a lean endpoint product rather than a bone-in primal will this improve its profitability?

How does GP change if the Over the Hook Grid is altered?

What is the impact of reducing the variable cost pre and post-slaughter?

Which individual cuts are driving the GP, and which cuts are under performing?

Where along the supply chain can efficiencies be made to improve GP and achieve set GP targets?

The calculator requires the weight, GR fat depth, and breed type of a carcase to be entered so that it can estimate its primal weights. The estimated primal weights are based on boning data previously collected in Australia by MLA. The user can then select cut specifications which may consist of a range of product, from bone in to completely denuded muscles.

The Lamb value calculator provides an estimate of the gross profitability of a carcase by taking into account the carcase retail value and the costs of production from carcase acquisition through to the boning room. The calculator has analysis tools and charts that will assist the user identify the main drivers of carcase profitability

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Background

The Lamb Value Calculator has been designed to estimate the Gross Profitability (GP) of a carcase. To estimate the gross profitability, the calculator must have the ability to estimate the primal weights of either Merino or Cross-breed (XB) lambs.

The calculator predicts the primal weights using the relationship of the Hot Standard Carcase Weight (HSCW) and the GR fat depth with primal weight to estimate the composition of either Merino or Cross-breed (XB) lambs. The main prediction equation used by the calculator is a quadratic model of HSCW and GR fat depth. However in some instances, a simple linear model of HSCW and GR fat depth was more appropriate and therefore used within the calculator.

The Lamb Value Calculator utilised the data set from the boning of 328 lambs from the Lean Merino Trial conducted in 2006. The trial was a joint partnership between MLA, DPI Victoria, WAMMCO and Cedar Creek Company (formerly SASTEK). The XB Breed dataset was derived from a CRC trial conducted at Katanning in 2008 consisting of 168 carcasses with a diverse range in breeding values for fatness and muscularity. This trial was conducted in partnership with Murdoch University, Sheep CRC, Cedar Creek Company and WAMMCO.

During the boning trials the weights of some commercial cuts were recorded and form part of the Cut Specifications available within the Lamb Value Calculator. Commercial cuts were trimmed to a subcutaneous fat depth of 6 mm. The primals were finally denuded to a lean product where all subcutaneous and inter-muscular fat was removed. The total yield of the denuded primals and the lean trim has been used to calibrate the VIAscan® technology. The VIAscan® yield definition can easily be selected by the user, to assess variation across different carcase weights and fat depths.

Project Objectives

The Lamb Value Calculator will be developed to estimate the gross profitability for an individual carcase and individual primals and provide tools for data interpretation and analysis to help identify the main drivers of carcase profitability.

Methodology

Quadratic functions of HSCW and GR fat depth have been used to estimate the primal weights within the Lamb Value Calculator. However for some primals (particularly smaller cuts), the quadratic function could not describe the relationship sensibly, so a linear model was used in its place.

The Linear function was:

~HSCW + GR fat depth

The Quadratic function was:

~HSCW+ GR +GR²+CCW:GR

The HSCW² was non-significant when predicting Lean weight, therefore it was removed from the model. In some cases the GR² and the HSCW: GR interaction were also non-significant but were included in any case for consistency within the software.

Results

Regression Performance

The estimated primal weights across differing HSCW and GR fat depth were analysed to assess the predictive ability of each regression. For a full description of the regressions please refer to "B.LSM.0037 Lamb Value Calculator Regression Performancev3.1.doc".

Functionality

The Lamb Value calculator has been designed to assist the user to evaluate the analysis outcomes and allow simply data entry. Some of the functionality found within the calculator includes;

- Options to select the type of carcasses trade (OTH or Saleyards/On-farm)
- The ability to select a cut specification to suit a market.
- An option to drop the Flap from cut specification and assign all the Lean to Primal regions when calculating yields
- The ability to assign a Retail Value to each cut
- Fields to capture the costs per head that occur pre and post slaughter
- Assesses the costs incurred along the supply chain
- Users can design an OTH grid using either GR fat depth or fatscore
- Able to capture the boning cost for a given cut
- Estimation of the Gross Profit for individual primals, primal regions (FQ, Loin, HQ) and, overall carcase
- Allow the user to manipulate actual and target GP at a cut level
- A HSCW / GR grid analysis of estimated primals weights and Gross Profit \$
- Simple navigation of the worksheets
- Enhanced error checking of data entries

The results generated by the calculator are summarised in a number of charts.

Charts that analysis the retail value of the carcasses include;

- Primal Value
- Primal Percentage contribution to retail value
- Primal Yields

The graphs of the Gross Profit information include;

- Cost Proportions Breakdown
- Retail Value vs. Gross Profit
- Actual vs. Target GP%
- Actual vs. Target GP\$

For a full description of the software and screen shots please consult the manual

User Manual

A comprehensive user manual has been written outlining the functionality of the Lamb Value Calculator. Please refer to "B.LSM.0037 Lamb Value Calculator User Manualv4.1.docx".

Discussions

Overall Progress

The Final Milestone has seen the Lamb Value Calculator developed into a Gross Profit analysis tool. The software enhancements enabled the user to capture the costs incurred along the supply chain from carcase acquisition to the retail market. One benefit of the software is it enables the user to edit their OTH grids and immediately see the effect on profitability. The other powerful function of the software

is the ability to manipulate the Target Gross Profit % of a primal and its Target Retail Price and then immediately observe the effects on profitability.

The demonstration of the latest calculator version has been limited to some brief presentations to industry, so to fully evaluate its usefulness consultation needs to continue with industry partners.

Consultation with Industry

JBS Australia was visited on April 13th, 2012 at Brooklyn Melbourne. Mark Inglis and Co. were present to view the functionality of the Lamb Value Calculator. The Milestone 2 enhancements were discussed and what functionality they would consider useful. They were particularly interested in the reverse engineering of the HSCW/FS grid using the Calculator outputs. Such functionality was beyond the scope of Milestone 2 and would be considered in a later release. They agreed that the Gross profit analysis that was proposed in Milestone 2 would be of considerable interest and were keen for a follow up meeting once the software upgrades were completed

The Lamb Value calculator has been sent to WAMMCO, however at this point in time very little feedback has been received.

While at Lamb Ex 2012, I had the opportunity to demonstrate the Calculator to Dawson Bradford, Chairman of WAMMCO International, who was very keen to see the final version of the calculator once released. He could see areas within WAMMCO's business model where the calculator would be of use, particularly with regard to VIAscan and the OTH grid.

The latest version of the Lamb Value Calculator was demonstrated to Matt Jenkins, (Livestock Manager – Coles) during the Lamb Ex. Conference. It would be worthwhile providing Coles with a thorough demonstration of the calculator to receive constructive feedback.

Implications of the Research Findings to Industry

The main drivers of carcase profitability along the supply chain from carcase acquisition to retail sale can be difficult to identify and requires tools to analysis what-if scenarios to assess where efficiencies can be achieved.

The Lamb Value calculator provides the analysis tools, so that once the relevant data has been entered, what-if scenarios can be evaluated from the whole carcase to a primal level.

Some examples of what-if scenarios could include;

- Where along the supply chain can efficiencies be made to improve GP and achieve set GP targets?
- What happens to GP if carcase weight increases?
- What impact does fatness have on carcase GP?
- If a cut is boned to a lean endpoint product rather than a bone-in primal will this improve its profitability?
- How does GP change if the Over the Hook Grid is altered?
- What is the impact of reducing the variable cost pre and post-slaughter?
- Which individual cuts are driving the GP, and which cuts are under performing?

Conclusions

The functionality of the Software has undergone significant testing, however the use of the latest version by industry has only been brief demonstration with individuals from Coles and WAMMCO International. There are plans to follow up with JBS Australia to go over the latest developments and see where we go from here with the calculator.

The future developments of the Lamb Value calculator could occur in the following areas:

- Setup a suite of VIAscan® regression to operate at WAMMCO International to predict commercial cut endpoints. The calculator would use these VIAscan® predictions rather than relying on HSW/GR to estimate yield
- Provide a facility for batch processing of a kill sheet and develop tools to assess the population statistics
- Develop Tools for cut optimisation for a given slaughter group
- Reverse engineer the OTH grid based on the GP\$.
- Integrate carcase dressing percentage into the cost of Saleyard/On-farm purchase
- Integrate help functions within the worksheets.
- Provide additional tools to help estimate the variable costs associated with slaughter and boning.

Appendices

Additional Documents / Program to support the Final Report are listed below;

B.LSM.0037 Lamb Value Calculator Regression Performancev3.1.doc

B.LSM.0037 Lamb Value Calculator User Manualv4.1.docx

B.LSM.0037 Lamb VALUE Calculator_Vers4.2.xlsm