Objective Carcass Measurement to Improve Lean Meat Yield and Eating Quality in Australian Beef, Sheep and Pork

D.J. Brown[1,5], D.W. Pethick[2,5], P. McGilchrist[2,5], C.K. Ruberg[3,5] ,W.S Pitchford[4,5], R. Apps[3,5] & G.E. Gardner[2,5]

[1]*Animal Genetics and Breeding Unit, University of New England, 2351, Armidale, Australia*
[2]*School of Veterinary and Life Sciences, Murdoch University, 6150, Murdoch, Australia*
[3]*Meat & Livestock Australia, 40 Mount Street, 2060, North Sydney, Australia*
[4]*School of Animal and Veterinary Sciences, University of Adelaide, Roseworthy, Australia 5371*
[5]*Advanced Livestock Measurement Technologies project, Meat & Livestock Australia, 40 Mount Street, 2060, North Sydney, Australia*

Abstract

Australia's meat supply-chains are a significant contributor to GDP and thus continued improvement in productively across the whole value-chain is vital. To this end a new project has recently commenced aiming to transform industry competitiveness by creating feedback and decision support systems linked to accurate carcass measurements. The project is implementing the following in major beef, lamb and pork supply-chains;

1) accurate measurement systems for live animals, carcases, and cuts;
2) actionable producer feedback to effect decision making on compliance and profitability; and,
3) value-chain information systems to extract maximum economic return from products.

Current pricing systems reflect the lack of accurate technologies that can measure eating quality (EQ) attributes and proportion of saleable meat (lean meat yield; LMY) in a carcass. Thus for lamb and pork there are no price signals for EQ, with carcases mainly traded upon weight, with some value-chains also using a single manual assessment or measurement of fat depth to indicate LMY. Although similar in beef, the Meat Standards Australia grading system enables price signals for EQ. To address these deficiencies, the project is developing measurement technologies to assess both LMY and EQ, and carcass inspection support tools. The technologies being investigated include: 3D-imaging, high throughput dual energy x-ray absorptiometry (DEXA), near infra-red spectroscopy, RGB digital and hyperspectral image analysis. Data capture systems are planned to enable "data-to-decisions" forward and backward between retail, abattoir and on-farm sectors. These technologies will assist on-farm for both seed-stock and commercial producers by providing more accurate prediction of carcass composition for improving genetic gain for 'difficult to measure' carcass traits and improved compliance to carcass weight, fatness, and EQ specifications. The data will also allow processors to precisely value carcases, optimising market-based cutting decisions, market allocation of products, and improving labour efficiency. For retailers this project will result in greater consistency of product size and EQ, and an improved ability to predict supply. The project will also pilot assisted or automated offal assessment to aid in disease detection and feedback to producers.

The DEXA technology being developed by this project is delivering very promising results for measurement of carcass composition in both sheep and beef at commercial abattoir line speed. Work is continuing on measurements related to eating quality, with hyperspectral imaging for tenderness, intramuscular fat, meat colour and pH. The resulting data from all of these measurements will facilitate the development of novel pricing mechanisms that reflect true value of the carcass to the whole value-chain.

It is known that antagonisms exist between LMY and EQ, and these measurement technologies will assist producers to manage these, both at the phenotypic and genetic levels. The industry is also working towards using these new measurement technologies, with progeny testing and genomic

testing to provide data to underpin the genetic evaluation for these traits and reduce the current reliance on expensive resource populations.

This project has key advantages for the whole value-chain by providing a foundation for objective value-based price signals. This will also enable enhanced product description and more sophisticated value-based marketing.