Carcase Evaluation: Fit for the Future?

Industry Call for Views

This paper sets out the global situation around carcase classification and grading and aims to seek industry thoughts on future potential methods.

Currently, under EU legislation, the UK uses the common EU beef carcase classification system known as the EUROP grid. This is common language for the exchange of price information across the EU and forms the basis of domestic cattle purchase pricing mechanisms, with the ‘base price’ reflecting a point on the grid and premiums/penalties paid for deviations from the base point. Much discussion has taken place as to the on-going importance and relevance of the EUROP grid in communicating consumer and retailer demands and the desire to move rewards to meat quality and consumer-based outcomes. It is argued that the current system places price incentives on the wrong parameters and does not reflect market needs. Further development has also taken place on the automation of what has been to date a manual method of classification. The approval of the E+V Video Image Analysis (VIA) in the UK has led to the installation of automated methods of classification with little human intervention in some UK plants and has received a mixed response from farmers, which is not surprising since this represents the most radical change to classification methods for many years. Perhaps the most interesting catalyst for potential change lies within the EU requirement to price report in abattoirs slaughtering over 20,000 head per year. The UK’s plan to leave the EU means that this requirement will no longer be legally enforceable, however the industry still needs to communicate a clear price for a stated article up and down the supply chain. It is worth highlighting that the role of EUROP is to allow the exchange of commercial price data across the EU (classification) and is not meant to convey ‘quality’ signals (grading), a point often missed by users.

The Challenge:

The EUROP system has been in place since the early 1970s and, as such, has a long history with board industry recognition and acceptance. Changing such a long-standing system will present a number of difficulties in understanding, parameters, valuation etc. However, it is timely to have a wide industry discussion to evaluate appetite for change and what the key needs are.

The opportunity:

With a potential blank canvas of pricing/valuation of cattle and the resulting meat, there is an opportunity to develop a system/method that places emphasis on those factors that are important to today’s supply chains and consumers and to incentivise these parameters to drive industry change. Other countries have followed this route, for example the US and Australia, and have a clear market offering that conveys prices based on eating quality.

Summary of principle carcase classification/grading methods globally:

USA

The US Department of Agriculture (USDA) uses a marbling score (MS) as one of its main quality criteria, in combination with age/maturity and type/sex of the animal.

The development of the USDA carcase grading service to assess the degree of intramuscular fat or marbling of the M. longissimus dorsi at the 12-13th rib, 24 hours post-slaughter, was implemented in
1926. It was, however, principally developed to establish the level of finish of a carcase in order to determine the value of cattle and the derived beef, so as to merchandise them more accurately and report market trends, rather than as an estimate for anticipated beef eating quality.

The system used in the USA also established a reference point for several key parameters, including type of animal (except for bulls which are not eligible for classification), maturity, sex and marbling level. Post-slaughter-line chiller assessment by a USDA-certified grader, following ribbing, allocates a quality grade to the carcase, reflecting the degree of marbling and maturity, and a yield grade, based on degree of carcase fat and carcase weight.

USDA yield grades are based on a regression equation using measures of external and internal fat (fat thickness over the rib eye and percentage of kidney knob and channel fat – KKCF), the area of the quartered M. longissimus dorsi (area of rib eye), and the hot carcase weight.

Five yield grades are used as follows:

1. over 52.3%
2. 52.3 – 50.0
3. 50.0 – 47.7
4. 47.7 – 45.4
5. Below 45.4%

The USA grading scheme is voluntary and carcases can be graded at the request of the slaughterer for quality or yield grade, or both.

There is some evidence, however, that the USDA yield grade is a poor, or even invalid, predictor of yield in some situations. There has also been concern that because the determination of MS is subjective (based on training related to photographic scales), the large range in MS presented to graders and the human’s visual assessment of MS can result in discrepancies.

This has driven the search for more objective methods to measure the yield and quality factors of beef carcases and cuts, as a prediction of saleable meat yield and palatability, specifically tenderness.

What is interesting about the US system is, unlike some other grading methods, the consumer has some knowledge or understanding of the perceived quality of the product based on the standards. For example, USA consumers would recognise that USDA Prime, the grade given to cuts of meat that have the highest level of marbling, represents the pinnacle of beef quality in the USA and they would expect to both pay more and have a better eating experience from such a product.

Canada

The system for assessing yield grade in Canada is similar to that in the USA, which is not surprising given the cross-border trade of meat between the two countries. The system was set up in 1929 and is based on measurements of fat depth and rib-eye size using a specially designed ruler. These measures are then incorporated into an equation to give a predicted-lean-yield percentage for the carcase (similar to the US, bulls are excluded).

A quality grade is also assigned to each carcase, largely as a result of marbling and maturity assessments. As with the USA, what have been human assessments to date are now being augmented by using instrument grading.
Australia

The Australian system can be thought of as two interrelated parts of a common system, AUS-MEAT and MSA.

Historically, Australian beef grading standards were led by export requirements on the basis of conformation, age and fat cover but this has since been superseded by the AUS-MEAT standards which became operational in 1987. These newer standards recognised the difficulty in the interpretation of quality and, rather than define it, sought to establish a tight specification based on sex, dentition (as a proxy for age) and carcase weight. This base line standard can then be refined further with optional chiller assessments of additional parameters such as marbling, meat and fat colour.

While AUS-MEAT standards sought to establish a common language for the trade in beef, it was recognised that there was an opportunity to have a consumer language for the description of beef with specific reference to predicted eating quality.

The development of the methodology of what is now MSA found in 1995 that the key components of sex, dentition, weight and fat were unable to predict eating quality per se. In an attempt to refine this further, additional parameters were added to include ossification levels and marbling, as well as pre-slaughter factors such as degree of Bos indicus genetics, use of hormone growth implants and post-slaughter treatments, hanging methods and pH/temperature decline.

Going one stage further, it also recognised that carcases, being composed of multiple muscles, would deliver a range of eating-quality experiences and these would also depend on degree of aging and cooking method. Therefore, for a given muscle, its consumer grade will vary depending on date of use and cooking method.

This thinking has resulted in a complex grading framework at industry level with over 160 cut by carcase outcomes, while the consumer has a more straightforward decision choice of just 3 grades (for a specific cooking method). These being: 3* good every day, 4* better than every day and 5* premium.

The MSA assessment of the beef eating experience was carried out using direct consumer-based work to get a consistent measure of the consumer’s beef eating experience, rather than using a trained panel sensory assessment.

The data was then used in a prediction model for beef palatability, predicting consumer satisfaction, in the form of a score out of 100, which in turn determines a grade outcome. Unlike other beef grading systems, the MSA model does not assign a grade to a carcase but to specific muscle portions cooked by designated methods.

The aggregate benefit to the Australian industry of implementing the MSA system has been estimated to have a benefit-to-cost ratio of 2:1 from its introduction in 2007/2008. This work also highlighted the Australian consumer’s willingness to pay for improved eating quality.

The inclusion of cooking methods has also given the Australian industry the opportunity to add value on the export front for particular cuts and cooking methods, (e.g. with the inclusion of Yakiniku, the Japanese barbecue style used throughout Asia, and hence the ability to identify muscles suited to this cooking style).

The proposition of the MSA system for the consumer is a tangible one, namely, for a given cut and cooking method, a certain eating experience can be obtained at the appropriate price. In the main, the star grading system is used to underpin brands, rather than communicate directly with consumers.
South Africa

The South African system uses age (dentition) as its main criteria (together with sex, weight, fat class and conformation scores), but it is recognised that this is inadequate for different classes if tenderness is the most important quality aspect. As such, the system produces industry terms to facilitate the trading of carcases.

South America

Countries including Brazil, Uruguay, Argentina and Chile all share some similar grading parameters around sex, age and maturity. These are applied to a greater or lesser extent depending on the country in question but with a yield grade included in all.

In addition, some companies choose to use their own in-house system rather than the official system as they believe this more accurately reflects their, mainly export, customers’ requirements. This has also led to consumer brand grading schemes developing, such as Certified Angus, principally for domestic consumption.

Japan

The Japanese market is well recognised as the most demanding in terms of quality, but also with one of the highest retail values. The quality factors of interest to the Japanese include marbling, colour, brightness, firmness and texture. Further similar assessments are made of fat to give a combined quality grade from 1 to 5. A yield grade is also used based on rib-eye area and weight, together with a further assessment of carcase damage such as bruising or inflammation.

A similar system also exists in Korea.

Next steps

This is a two-stage process with the first being to gauge industry views on the following:

- Should elements of EUROP remain. If so, what
- Is there industry ambition to review both beef and sheep carcase evaluation
- What additional elements could be considered
- What other methods used have relevance to the UK
- How to avoid multiple systems to prevent confusion in a post-EU market
- What role, if any, should RPA or Government play
- How and who is to manage price reporting

All responses should be submitted by Friday 8 September by email to: carcase@ahdb.org.uk

The second stage (subject to industry ambition) would be a 12-week industry consultation.