

## Shedding Light on the Limestone Coast Dark Cutting Issue

High pH or dark coloured meat is referred to as 'Dark cutting' and is detrimental to meat quality, resulting in lower shelf life and inconsistent cooking. Dark cutting is the major cause of carcass downgrades under the Meat Standards Australia (MSA) grading system.

The University of Adelaide has been involved in the Meat and Livestock Australia funded 'Southern Beef Compliance Project' along with Murdoch University since 2014. This project aimed to investigate MSA compliance issues in pasture-based beef systems. Historical grading data highlighted the seasonal variation in the incidence of dark cutting, with the greatest risk during the period from February to June. Aside from the seasonal variation, the Limestone Coast region of South Australia is prone to above average incidence of dark cutting.

From July 2014-Dec 2016, 5800 cattle have been sampled as part of the project. For each mob sampled, pre-slaughter management information was collected and a pasture sample and estimate of feed on offer (FOO) was taken from the paddock/s available to the stock in the four weeks leading up to slaughter. Individual animal liver samples were taken as well as MSA grading results.

Mobs of animals older than 24 months of age had a significantly higher incidence of dark cutting than those aged less than 24 months. These animals were typically 'carry over' stock that failed to meet weight/condition in the previous spring as 16-18 month olds. This finding highlights the importance of maximising growth rates post-weaning so that the number of these animals is reduced. The cost of carrying these stock over summer given the inherent risk in non-compliance also needs to be evaluated.

Moving stock to a different paddock within 1 week of slaughter resulted in significantly higher risk of dark cutting. Most often these movements were as part of a rotational grazing system, or movement of stock to paddocks nearer to loading facilities. These movements resulted in changes in the available feed base, and thus a disruption and/or restriction in the diet. It appears this change was sufficient to impair the ability for cattle to accumulate sufficient energy prior to transport and slaughter. When planning to consign stock for slaughter, try and place stock in a paddock two weeks out from slaughter with enough feed to last them until the day of transport.

The concentration of Magnesium (Mg) in pasture was significantly related to the incidence of dark cutting, with higher levels associated with a lower mob incidence in dark cutting. Although the pasture concentrations measured were deemed adequate for growing cattle, it is likely that high Potassium and/or protein levels are inhibiting magnesium uptake by the animals. Magnesium is crucial for the function of many enzymes, energy metabolism pathways and also the adrenal (stress) response. Whether the relationship between Mg and dark cutting is due to long term inhibition of enzyme function, energy metabolism and thus glycogen accumulation

or heightened adrenal response and accelerated energy utilisation is not known. It is recommended that producers measure the magnesium and potassium levels in pasture to evaluate the risk of magnesium deficiency.

Liver biopsies taken during this project have highlighted widespread deficiencies of both copper and zinc in pasture-finished cattle, with 99 and 90% of animals tested having below adequate levels of these elements respectively. Although there was no significant relationship with the percentage of dark cutting, both elements were positively associated with intramuscular (Marbling) and subcutaneous fat (Rib fat) deposition. This indicates that energy accumulation and thus growth is impaired by these deficiencies, and thus the energy status at slaughter, and propensity to cut-dark, will be affected. It is highly recommended that producers identify the mineral and trace element status of their pastures to determine the risk of deficiency. If at all possible, liver samples should be collected from a subset of slaughtered animals and tested to determine their actual status. If producing animals in regions know for such deficiencies (such as the Limestone Coast), supplementation of stock via drinking water additives or loose-licks is recommended.

If faced with high levels of dark cutting, step-back and analyse the risk-factors these animals may have been exposed to. Pre-slaughter management and feed quality both combine to determine an animals' ability to both accumulate, and deplete energy stores in the lead up to slaughter. Consistency is the key, particularly in the two weeks before consignment.

The research outline above will continue during 2016, and any producers wishing to be involved or know more are urged to contact Michael Wilkes at: [michael.wilkes@adelaide.edu.au](mailto:michael.wilkes@adelaide.edu.au) or on 0407712180