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Interim Report

Review of the implications of changing the definition of lamb to allow eruption of permanent incisors, but without either incisor being in wear.

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Background

Holmes Sackett have been commissioned by SCA in order to review the impacts of any change to the Australian Language definition of lamb such that it would harmonise the Australian definition with the New Zealand definition, which is to allow the eruption of either, or both, of the first pair of permanent incisors so long as neither incisor is 'in wear'.

This interim report has been compiled from past industry and scientific research in conjunction with in-depth interviews with technical specialists. The interim report focuses on the potential implications to the Australian sheep industry from a change of lamb definition to one that is defined by 'no permanent incisors in wear'.

Analysis of implications have focused on the following five areas:

- 1) Dentition as an indicator of lamb age
- 2) Market Access Implications
- 3) Lamb Category Eating Quality Impacts
- 4) Market regulation and compliance
- 5) Impacts on lamb production and processing

Based upon the submissions, survey data, and other stakeholder information received during the public consultation period, Holmes Sackett will provide a final report to the SCA Board in February 2018. Holmes Sackett anticipate that a version of this report will be released publicly after SCA consideration.

The alternative definition being considered

Lamb means: meat derived from a female, castrated male or entire male ovine animal that has **no permanent incisor tooth in wear**.

Dentition as an Indicator of Lamb Age

Surveys of the age at which teeth erupt in Australia shows that the first permanent incisor will erupt anywhere between 369 and 483 (average 427 days) days of age. This is impacted by genotype, sex and nutrition. Undernutrition delays teeth eruption but no evidence has been found that better nutrition could substantially shorten the time taken for teeth to erupt). Survey work in New Zealand shows average age of teeth eruption to be slightly older.

It is not known how much older the proposed change in the definition of lamb would allow lambs to be. Wiese et al 2005 recorded the average time taken to get from eruption to both permanent incisors in wear is ~27 days. The variation around this average was from a minimum of 9 days to a maximum of 56 days.

The New Zealand definition does not allow either of these incisors to be in wear. It is probable therefore that the time taken before the first permanent incisor is in wear is considerably less than 27 days as both permanent incisors rarely erupt together.

Market Access Feedback

Enquiry into market access issues has found the following;

- 1) The EU and Canada are possibly the only two country/region where there is the possibility of regulatory implication for a change in the definition of lamb.
- 2) Age (<12 months) is the key criteria in the definition of lamb in the EU. In the EU the age guideline of an animal under 12 months of age has relevance to their food safety guidelines around TSE (scrapie). Within the EU the age is determined by dentition with no permanent incisor to have erupted (same definition as in Australia).
- 3) New Zealand has access to all markets that Australia has access to including the EU. New Zealand is the largest exporter of sheep meat (predominantly lamb) to the EU.

- 4) New Zealand includes age (<12 months) in their definition, however dentition is the means by which the live animal is assessed as being a lamb. The New Zealand definition allow either of the first permanent pair of incisors to have erupted, however neither can be in wear. The New Zealand definition therefore allows an older animal than the Australian definition.
- 5) It is unclear from the Canadian definition whether “no permanent incisors” means no permanent incisors erupted or no permanent incisors in wear.
- 6) Feedback suggested other countries (Mexico, certain Middle Eastern countries) had markets where there were expectations that a lamb was under 12 months of age but for which there were no regulations in place on labelling of lamb.
- 7) Domestic market feedback suggested that extending the definition was undesirable (because it posed risk to the ‘lamb brand’) however if it was changed it would not change how major markets source their supply.

Key findings around market access

- 1) No organisation through the discussion of the market access findings (AMIC/SCA/JBS) has expressed a desire to move the definition beyond harmonization with the New Zealand definition.
- 2) There is a general awareness that extension of the definition of lamb beyond ‘no permanent incisor in wear’, which is beyond what is currently used in New Zealand, does carry some additional market access/brand risk, however the risk is highest in comparatively small markets (EU).
- 3) Furthermore, harmonization with the New Zealand definition is thought to carry low risk with regard to market access because New Zealand has access to all markets that Australian has access to.

Implications for lamb eating quality

- 1) There has been no further work done since Pethick 2008 on eating quality and age. In that report the conclusion was that any substantial change in the lamb definition (i.e. lambs could have the first two permanent incisors in wear but not a 3rd erupted) would have a material reduction in eating quality even with MSA standards adhered to.
- 2) A minor change in the definition (i.e. first incisors erupted but not in wear) would not have any material impact on eating quality if MSA standards were adhered to. It is this latter finding that is relevant to the change in definition that is being proposed in this document.
- 3) There is no research on what happens to eating quality if MSA standards are not adhered to.**
- 4) There is no research on how the delayed eruption of incisors via undernutrition would relate to eating quality even if the growth rate requirements for MSA immediately prior to slaughter were adhered to.**
- 5) There is research under way as to whether new season lamb (<6 months?) has better eating quality than older lamb.**

Market Compliance

- 1) It is recognized that a more subjective (and therefore difficult) point at which to judge whether an animal is a lamb (in wear v not in wear) however New Zealand provides a precedent by which the industry can be confident that the definition can be enforced.
- 2) The cost of changing the definition has not been accurately quantified with AUSMEAT (e.g. re-training, support materials, other).

Impacts on lamb production and processing

- 1) From the 2008 “Assessment of the economic impact on stakeholders and industry from extending the lamb definition” survey work it was identified from the

processors surveyed that incurred losses as a result of animals not meeting lamb specification due to a permanent incisor having erupted, the value of those losses came to a total of 15.6M. This estimated loss is a consequence of lambs that are found to have teeth erupted prior to slaughter but which had been purchased as lamb.

- 2) From the 2008 “Assessment of the economic impact on stakeholders and industry from extending the lamb definition” survey work it was identified that less than 0.1% of lambs from specialist prime lamb breeders and dual purpose lamb breeders cut teeth before being sold. The main reason for this is that lambs at risk of not making target weights were being offloaded to specialist finishers.
- 3) From the 2008 “Assessment of the economic impact on stakeholders and industry from extending the lamb definition” survey work it was identified that approximately 20% of lambs being sold had an average age of 13 months and were therefore at risk of teeth eruption. It was estimated that 5% of that 20% had teeth erupt before they were sold.
- 4) From the 2008 “Assessment of the economic impact on stakeholders and industry from extending the lamb definition” survey work it was identified that ~ 20% of all lambs were going through a specialist finishing system, and that approximately 50% of those were at risk of cutting teeth (10% of all lambs) because of the age they entered that finishing system. From the surveys, the average loss rate in those lambs that were at risk of cutting teeth was 7% (0.7% of all lambs).
 - a. It is therefore estimated that of the ~520,000 tonnes carcass weight of lamb produced in Australia, ~5,200 tonnes miss lamb market specifications before slaughter. Therefore for every \$1/kg discount on that product \$5.2 million dollars is lost to producers.
- 5) AMIC has indicated the issue of wastage at the processor level (animals purchased as lambs but are then found to be hogget due to teeth eruption) would be relatively small in context of the total Australian processing sector. AMIC believes the bigger opportunity is for producers as it would give them a definitive

signal by which they could get lambs onto the market, rather than estimating the time to sell lambs before permanent incisors erupt.

- 6) Whilst it is logical that moving to the New Zealand definition would reduce 'wastage' at slaughter from lamb purchased without any teeth eruption but for which a tooth has erupted at point of slaughter. It is difficult to judge just how significant that reduction in wastage would be without knowing
 - i. How many days it takes from tooth eruption to being 'in wear'.
 - ii. Without knowing the time taken from eruption of a tooth to it being in wear it is not possible to judge how effectively tooth eruption could be used as a signal to get lambs into a fast growth path scenario (i.e. into a feedlot) in order to ensure a better product at slaughter.
 - iii. How effective detection mechanisms (regular mouthing of live animals) would be in getting lambs to market after eruption but before any permanent tooth is determined to be in wear.

Probable on farm lamb production systems changes

- 1) Probable farm production system changes would be dependent on the additional time to eruption the proposed change in definition to no permanent incisors in wear allows.
- 2) On the assumption that the additional days is half the 27 days recorded by Wiese et al 2005 then it would not be sufficient to allow any substantial change in lamb breeding production systems, other than allow producers and finishers to push up target sale weights (where it is not limited by pasture availability) knowing they have an indicator of the maximum time they have available before they will start incurring discounts on animals that do not meet lamb specifications.
- 3) For specialist lamb finishers it is believed that purchases of older lambs might be made with more confidence if eruption of teeth can be used as an indicator of when lambs need to be sold. It is not possible to determine how substantial this

change might be without knowing the average time taken from eruption of a tooth to it being in wear.

Implications of findings for lamb production and processing

- 1) The new definition being investigated is comparable to the New Zealand definition.
- 2) There is no known market access restrictions likely from a change in the definition of lamb in Australia to be in line with that which is used in New Zealand.
- 3) There is unlikely to be substantial change (in % terms to industry production systems or production as a whole) as a consequence of a change in the definition.
- 4) In relative terms to the industry as a whole minor changes are likely through avoiding 'waste' in the industry where sheep that have a tooth erupted are now classified as mutton and sold at a substantial discount when eating quality research shows that there would not likely to be substantial deterioration in eating quality. These changes could be significant for individual businesses within the industry.
- 5) This change in the definition would also allow producers to take lambs to high weights with confidence that they have an indicator of when those lambs must be sold.

APPENDIX: GLOBAL LAMB DEFINITIONS

Australian Definition of Lamb

Lamb means: meat derived from a female, castrated male or entire male ovine animal that shows no evidence of eruption of permanent incisor teeth.

EU Definition of Lamb

Categories shall be designated as follows:

- a) L: carcasses of sheep under 12 months old (lamb);
- b) S: carcasses of other sheep.

At present 12 months of age is assessed through dentition as the eruption of a permanent incisors (same as Australia).

USA Definition of Lamb

Lamb;

- 1) Means meat, other than mutton produced from sheep (7 USC 1638)
- 2) Means ovine animals of any age, including ewes and rams (&CFR 1280.11).

There is no formal definition of mutton other than meat from sheep. Lamb seems to apply for most/all sheep meat because the system is geared towards killing animals youngish.

Mexican Definition of Lamb

- 1) No known legal definition of lamb – informally a lamb is under 12 months of age.

Canadian Definition of Lamb

An ovine carcass that has the Maturity Characteristics for Lamb Carcasses

- 1) Fewer than two permanent incisors.
- 2) Two break joints or, in the case of a carcass with one break joint and one spool joint, the break joint has four intact and well-defined ridges with at least a slightly red and slightly damp surface.
- 3) Ribs that are no more than slightly wide, tend to be rounded rather than flat and are reddish in colour.

New Zealand Definition of Lamb

Lamb means: a sheep less than 12 months of age or which does not have **any** permanent incisor teeth in wear.

Kingdom of Saudi Arabia

Categories designated as follows:

- a) Lamb: The average age of animals is less than one year
- b) Sheep: The average age of animals is more than one year

Syrian Arab Republic

Categories designated as follows:

- a) Lamb: A sheep one year or younger
- b) Hogget: A sheep that is 1.5 years
- c) Mutton: A sheep that is two years or older

Other Middle East Lamb Definitions

No local definitions identified in other Middle Eastern countries. Culturally lamb is a smaller animal.

References

Wiese et al 2005). Effect of teeth eruption on growth performance and meat quality of sheep. Australian Journal of Experimental Agriculture, 2005, 45, 509-515.

Pethick D. P. 2008. Lamb definition project. Key area 2: Assess the impact of extending the lamb definition on eating quality. Meat and Livestock Australia.