Lean meat yield and eating quality

What is LMY?

Lean meat yield (LMY) is the proportion of lean meat tissue to bone and fat in a carcase and is expressed as a percentage LMY%.

Lean meat yield is estimated from a combination of weight, muscle and fat dimensions and has been measured through devices such as dual energy x-ray or commercial bone outs and validated through computer tomography (CT) scanning. LMY has a relatively high genetic heritability.

How does LMY affect eating quality?

Lean meat yield and eating quality have a negative relationship, whereby as LMY increases, eating quality decreases, if it is not considered in the genetic selection decision. Eating quality is influenced by intramuscular fat (IMF), hot carcase weight (HCW) and LMY.

Lean meat yield and IMF are opposed traits and need to be balanced in genetic selection decisions. Use of the Sheep Genetics eating quality indexes, and accounting for other production traits of importance assist in decreasing adverse breeding outcomes. Generally, a high yielding carcase with lower IMF values have an increased shear force, resulting in tougher and less tender meat.

Eating quality research utilising untrained consumers scored sheepmeat samples for tenderness, juiciness, flavour and overall liking. This research confirmed that as LMY increases, eating quality decreased, though this trend was less in higher percentage IMF samples. Low IMF percentages and high yielding carcases were found to score negatively across various cuts in the carcase for all four sensory scores.

Figure 1: The relationship between lean meat yield (LMY%) and consumer meat quality (MQ4) score for high (7%), medium (5%) and low (3%) levels of intramuscular fat (IMF%).
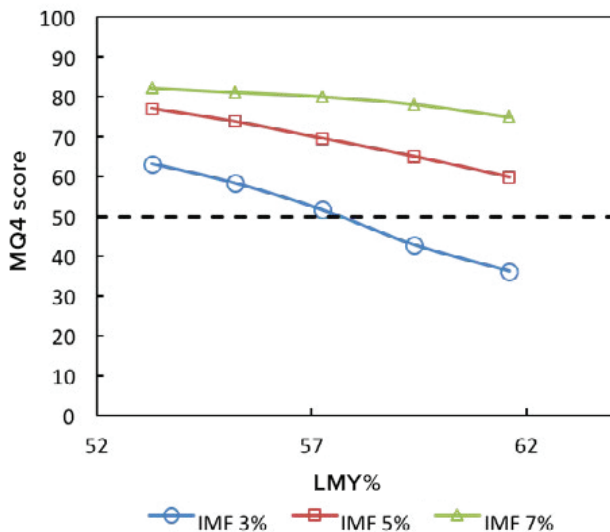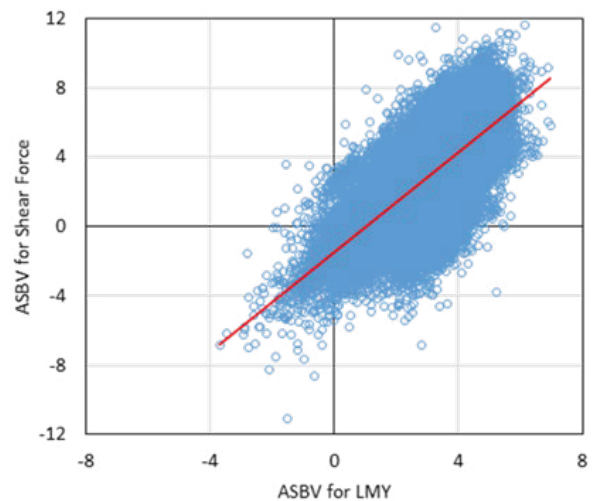

Figure 2: Relationship between the shear force and lean meat yield (LMY) Australian Sheep Breeding Values (ASBVs) in the Australian flock.

Utilising ASBVs and eating quality indexes to select rams will assist in improving the eating quality of the progeny.

Click the below links for further genetics resources or visit genetics.mla.com.au or sheepgenetics.org.au:

Eating Quality ASBVs

Terminal Indexes for buying rams

Terminal Indexes for breeding rams

Figure 3: A schematic representation of the relative amounts of bone, fat, and meat in carcases with low and high LMY%. The area of each circle equals the percentage of each component of a whole carcase.

Low yielding carcase
Bone 9%
Fat 51%
Meat 40%

High yielding carcase
Bone 9%
Fat 28%
Meat 63%
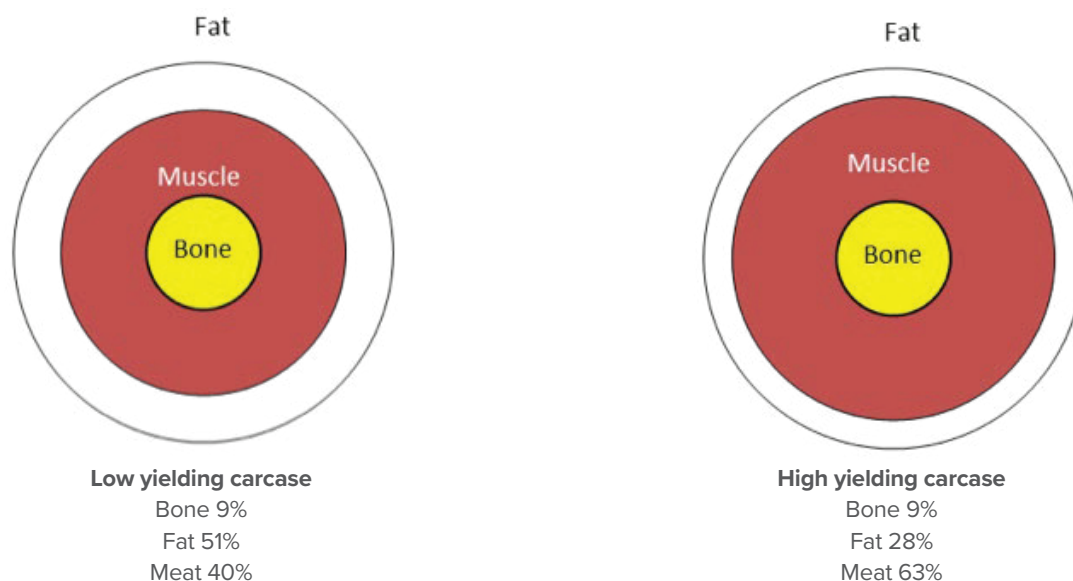
Consumer meat quality (MQ4) scores are a combined score of tenderness, juiciness, flavour and overall liking, and are a score out of 100. As part of the Meat Standards Australia (MSA) program, this score is used to classify the product as fail, good everyday (3 star), better than everyday (4 star) or premium (5 star). The below tables illustrate the different consumer quality scores based on a 26kg carcase with a range of IMF and LMY percentages for both the loin and the topside.

Table 1: Consumer meat quality scores and MSA star rating for the loin across a range of intramuscular fat (IMF) and lean meat yield (LMY) percentages, for a 26kg carcase.

	LMY (%)						
	50	52	54	56	58	60	62
IMF (%)	Loin						
3	61.9	61.7	61.5	61.3	61.1	60.9	60.7
4	64.6	64.4	64.2	63.9	63.7	63.5	63.3
5	67.2	67.0	66.8	66.6	66.4	66.2	65.9
6	69.9	69.7	69.4	69.2	69.0	68.8	68.6
7	72.5	72.3	72.1	71.9	71.7	71.5	71.2

🟢 3 star (good everyday) 🟣 4 star (better than everyday)

Table 2: Consumer meat quality scores and MSA star rating for the topside across a range of intramuscular fat (IMF) and lean meat yield (LMY) percentages, for a 26kg carcase.

	LMY (%)						
	50	52	54	56	58	60	62
IMF (%)	Topside						
3	49.9	49.7	49.5	49.3	49.0	48.8	48.6
4	51.1	50.9	50.6	50.4	50.2	50.0	49.8
5	52.3	52.0	51.8	51.6	51.4	51.2	51.0
6	53.4	53.2	53.0	52.8	52.6	52.4	52.2
7	54.6	54.4	54.2	54.0	53.8	53.6	53.3

🟢 3 star (good everyday)

For more information   📞 1800 111 672   ✉ msaenquiries@mla.com.au   🌐 mla.com.au