

# Fat score or Condition score? - It all depends on what you want to do!

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## ABSTRACT

Condition score (manual assessment over the short ribs; score 1 is thin and 5 is very fat) and fat score (manual assessment over the long ribs at the GR site; estimated tissue depth in mm) are both used by industry to assess the fatness and condition of sheep for management and marketing, and there is debate and confusion over the relative merits of the different methods of assessment. In this experiment we measured condition score, fat score and C-site ultrasound fat and C-site ultrasound eye muscle depth were recorded for a group of 92 live Merino sheep in 6 months wool (45 young and 47 mature). All scores and measurements were done by two to four experienced assessors and repeated three times (runs) in a random order. The sheep were then slaughtered at an abattoir where the tissue depth at the GR site over the 12<sup>th</sup> rib (fat + muscle) was recorded on the hot carcass.

The repeatability or precision of all operators was very high ( $\geq 0.90$ ). However, in the case of fat score where estimated GR tissue depth could be compared with actual GR tissue depth measured on the carcass, only one assessor was accurate. The fat scores of this assessor (average of 3 runs) explained 88% of the variance in the average condition score of the sheep (4 assessors x 3 replicates). The relationship between estimated GR and condition score was not linear and in the condition score range of 2 to 3, which is considered to be critical for the management of commercial flocks of Merino ewes, there was very little variation in GR tissue depth (1 to 5 mm). Future recommendations for management of Merino ewe flocks should be framed in terms of condition score targets rather than fat score.

## AIMS

Condition score (CS) relates to the tissue cover (fat + muscle) as manually palpated over the loin (short rib) area of sheep. Whereas fat score (FS) relates to the tissue cover (fat + muscle) as manually palpated over the 12<sup>th</sup> rib (1<sup>st</sup> long rib from the short loin) at the GR site, approximately 110 mm from the vertical processes of the spine. Traditionally, CS has been used to estimate the 'energy status' or 'nutritional well-being' of adult ewes (Russell et al. 1969, J. agric. Sci. Camb.72, 451-454; Feeding standards for Australian livestock, Ruminants p 58-68). FS was also promoted by programmes such as Prograze as also being a suitable tool for assessing nutritional well-being. It has also been used to help estimate the yield of lean meat (%) of young sheep being marketed for meat; whole scores are related to 5 mm ranges in total tissue (fat + muscle) at the GR site over the 12<sup>th</sup> rib (see Fat Score on NSW DPI website).

During the MLA Prime Time Roadshows in 2004 it became very clear that both academics and producers were confused with respect to the pros and cons of the 2 approaches to estimating fatness. This confusion was also reflected in the results from a survey of 2100 sheep producers across Australia which indicated that most producers use both methods to assess the condition of reproducing ewes (Ian Rose, 'Lifetime Wool', EC298, unpublished).

Hence, MLA commissioned an experiment to establish;

1. The relationship between CS and FS in both adult and young Merino ewes as assessed by skilled industry recognised assessors.
2. The relationship between subjectively assessed CS, FS and objectively measured C site fat and eye muscle depth in the live animal and measured GR site tissue depth in the hot carcass.

## METHOD

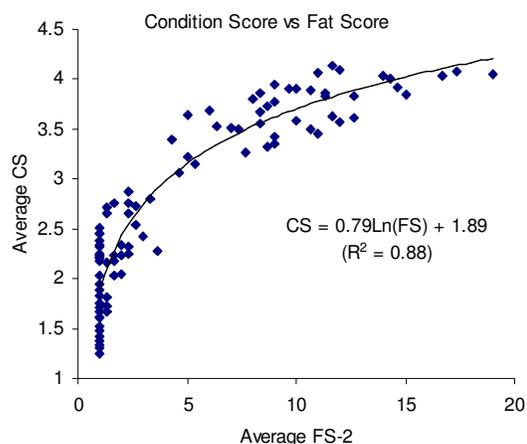
The CS, FS and C-site ultrasound fat and C-site ultrasound eye muscle depth were recorded for a group of 92 live Merino sheep in 6 months wool (45 young and 47 mature). All scores and measurements were done by two to four experienced assessors and repeated three times (runs) in a random order. Approximately 24 hr after the above measurements, the sheep were slaughtered at an abattoir where the tissue depth at the GR site over the 12<sup>th</sup> rib (fat + muscle) was recorded on the hot

carcass for 89 of these sheep. This measurement was also done by two experienced assessors using standard GR knives and repeated three times in random order.

## RESULTS

- All CS and FS assessors showed very high repeatability (Precision; av. correlation between runs = 0.90 to 0.95).
- There was no direct measure of the accuracy of CS but all assessors scored similarly with only very small biases between assessors. By contrast, there were considerable between assessor biases for the FS. Only one assessor was accurate when compared to the actual GR tissue depth measured in the chiller. The other three fat score assessors over estimated the tissue depth by an average 3 to 6 mm.
- There is a strong significant relationship between CS and FS and the more objective measurements at the C and GR sites. Both methods could be used to predict actual GR tissue depth with an average error of 2 mm (95% confidence limit of approximately 5 mm).
- In the original FS scale, 1 = 1 to 5 mm; 2 = 6 to 10 mm and 3 = 11 to 15 mm of actual GR tissue depth. However, in this experiment, the 95% confidence limits for actual GR tissue depth for FS 1 = 1 to 5 mm; FS 2 = 3 to 13 mm and FS 3 = 5 to 15 mm.
- There is a strong significant relationship between CS and FS. However, in the range CS of 2 to 3, that is considered to be critical for the management of ewes in the Lifetime Wool project, there was very little variation in estimated or actual GR tissue depth.

**Figure 1.** Relationship between the only accurate fat score assessor (FS-2) and average condition score for each sheep for 4 assessors



## CONCLUSION

We conclude that recommendations for management of ewe flocks should be framed in terms of CS targets as this offers far greater control than FS. On the other hand, FS should remain the preferred tool for helping estimate the yield of lean meat (%) of young sheep being sent to the abattoir.

However, while a skilled operator could accurately estimate FS, there was sufficient variance about the estimates to cause significant overlap in the boundaries of the fat score grids currently used by the industry for setting price. This issue could be addressed by replacing the current scoring system with training in assessing GR tissue depth in mm rather than FS as categories. Timely and accurate abattoir feedback on actual GR tissue depth would be an essential part of the training and ongoing calibration of all assessors.

## KEY WORDS

Sheep, condition score, fat score, C site, GR site, prediction and fatness

## ACKNOWLEDGMENTS

This project was jointly funded by MLA, DAFWA, VicDPI, NSW DPI, SARDI and WAMMCO. Collaborators included, Geoff Duddy, John Sullivan, Rob Davidson, Bob Marchant, Katrina Copping, Barb Sage, Andrew Kennedy, Tom Plaisted, Stephan Spiker, Peter Moore, Roger House, Mandy Curnow and Gus (Ian) Rose. Special thanks to Andrew Van Burgel for the statistical analysis.

**Paper reviewed by:** Andrew Thompson, Vic DPI and John Milton, UWA