

# The use of ultrasound measurements for monitoring subcutaneous fat and muscle depths of Churra da Terra Quente ewes submitted to a long-term feed restriction

Silva, S.R., Guedes, C., Santos, V., Lourenço, A., Mena, E. and Azevedo, J.,  
CECAV, UTAD, PO Box 1013, 5001 – 801 Vila Real, Portugal  
(e-mail: ssilva@utad.pt)



## INTRODUCTION

In the Northeast of Portugal most sheep are raised under extensive production systems which can conduct to seasonality of feed resources. Objective techniques, such as Real Time Ultrasonography (RTU), are able to monitor body reserves during food shortage periods.

## OBJECTIVES

Our aim was to monitor subcutaneous fat (SF) and *Longissimus thoracis et lumborum* muscle (LM) depletion using RTU.

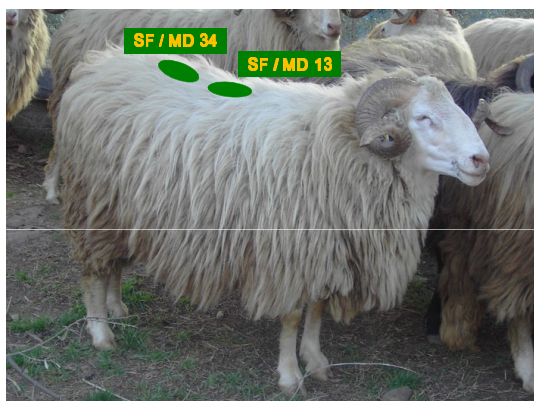


Figure 1. Churra da Terra Quente ewe and measurement points

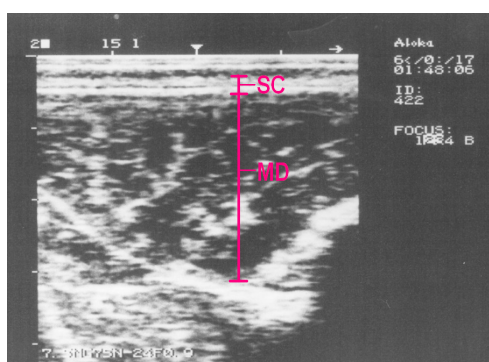


Figure 2. RTU image showing subcutaneous fat depth (SC) and *Longissimus thoracis et lumborum* muscle depth (MD).

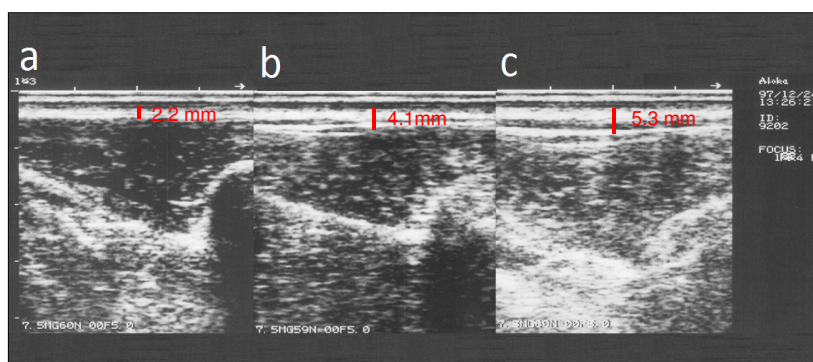


Figure 3. Example of RTU images for ewe number 9202 with different SF depths at week 1 (c), week 20 (b) and week 40 (a).

## RESULTS

Both SC and MD were depleted (SC: 7 to 3mm; MD: 22 to 14mm). The Figure 3 show the example for ewe number 9202 SF variation.

The decrease of 1mm on SC and MD represented 2.4 and 1.4 kg of BW loss, respectively.

The relative growth of SC (SC13:  $b=1.73$ ;  $>1$ ; SC34:  $b=1.62$ ;  $>1$ ) confirmed that SC is a highly labile body fat depot.

## MATERIAL AND METHODS

- Eighteen non-lactating and non-pregnant Churra da Terra Quente (CTQ) ewes were fed restricted diets to loose body weight (BW:  $49 \pm 5$  to  $37 \pm 1$  kg).
- During 42 weeks all ewes were scanned biweekly using AlokaSSD500V equipment with a 7.5 MHz probe.
- The probe was placed perpendicular to the backbone over the 13<sup>th</sup> thoracic (13) and between the 3<sup>rd</sup> and the 4<sup>th</sup> (34) lumbar vertebrae (Figure 1).
- The subcutaneous fat-SC (SC13 and SC34) and the *Longissimus thoracis et lumborum* muscle-MD (MD13 and MD34) depths were measured by image analysis on digitized ultrasound images (Figure 2).
- Relationships between BW and RTU and the relative growth of SF and MD were analyzed by regression.
- To establish the relative growth of tissues the Huxley allometric equation in its logarithmic form was used.
- The best fitting regression equations were evaluated by the coefficients of determination ( $r^2$ ) and the residual standard deviation (rsd).

## CONCLUSIONS

Results suggest that RTU can be used to monitor subcutaneous fat and *Longissimus thoracis et lumborum* muscle depletion.