Evaluation of computed tomography for estimating reticulo-rumen characteristics

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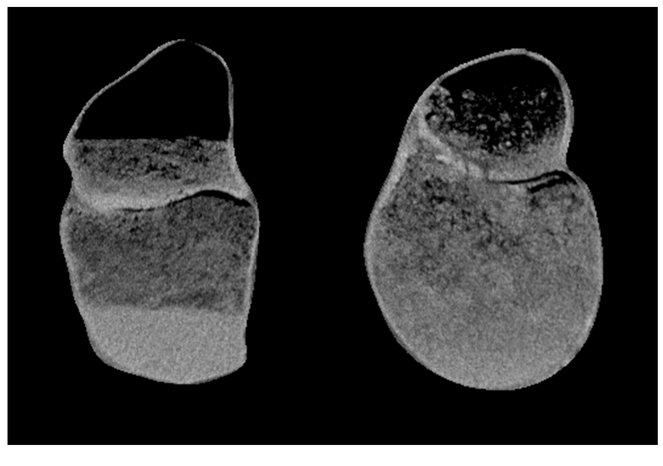
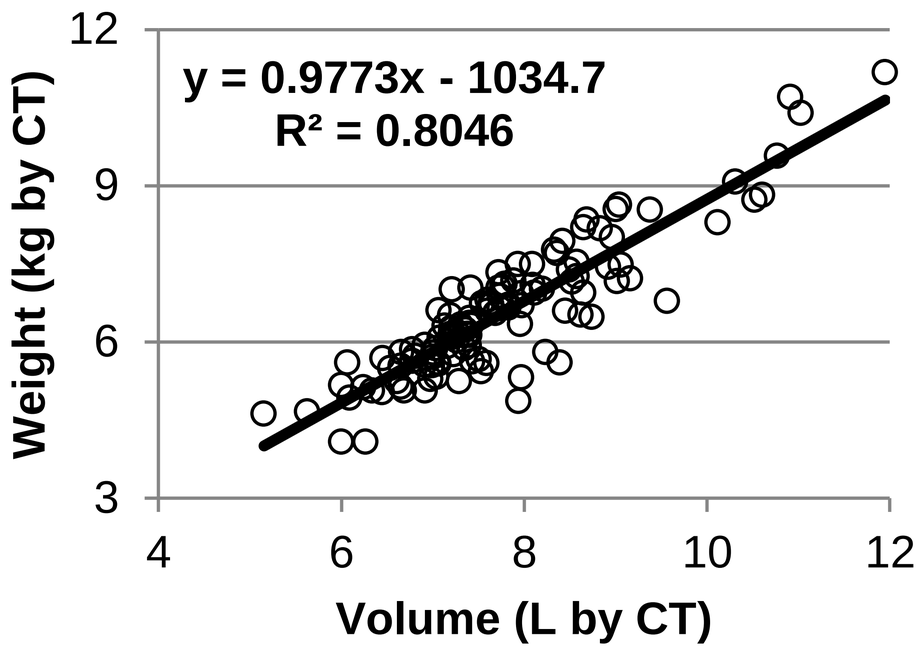
Methods for assessing rumen characteristics such as volume, shape and weight in living animals may be useful for elucidating rumen function.

Computed tomography (CT) scanning has been used to estimate the lean, fat and bone contents of live sheep and to estimate some aspects of rumen morphology in sheep differing in methane yield. Here we report on aspects of calibration of CT scanning to estimate volume and weight of the reticulo-rumen.

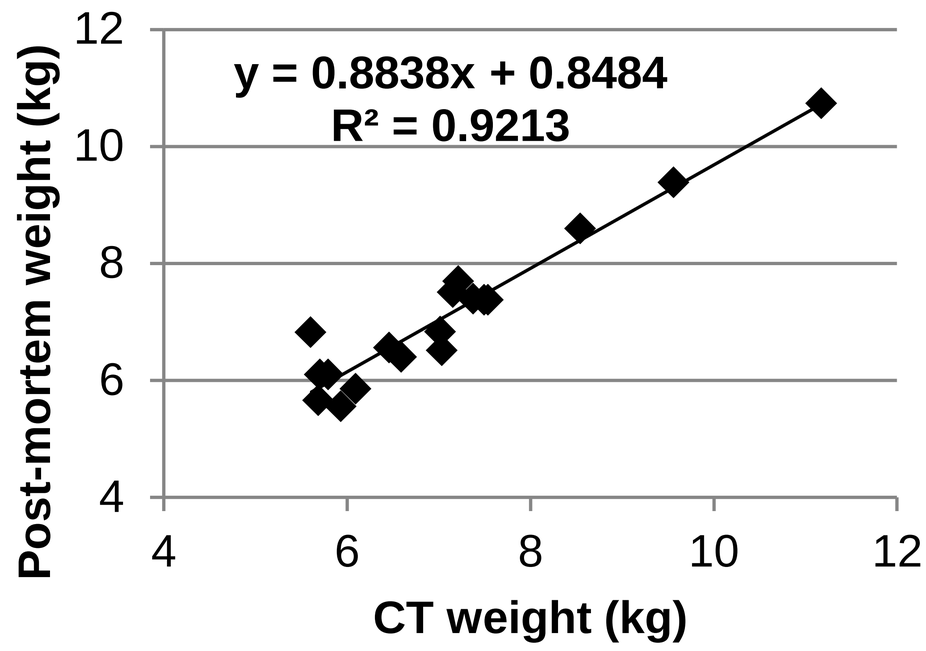
Eighteen 33-month-old Merino wethers were fed an oaten/lucerne chaff diet once daily at two levels of intake (1.0 × and 1.5 × metabolizable energy for maintenance) in two seven-week periods using a crossover design. Volume and weight of the reticulo-rumen were estimated three times per period by CT scanning. The volume of the reticulo-rumen was estimated using OsiriX software and the weight of the reticulo-rumen (tissue and contents) was estimated using Autocat software. At the end, animals were subjected to CT scanning and were then euthanized. The reticulum and rumen were removed and all components were weighed.



CT estimates of the volume and weight of the reticulo-rumen were highly correlated.



Post-mortem measurements of reticulo-rumen weight were strongly correlated with pre-slaughter CT estimates.



The repeatability of CT estimates of:

- reticulo-rumen volume was 0.87 for both levels of intake.
- reticulo-rumen weight for the low and high level of intake was 0.84 and 0.88, respectively.

It is concluded that CT scanning is a useful non-invasive tool for assessing the physical characteristics of the reticulo-rumen.

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