

Quantifying Spine Characteristics in Sheep using Computed Tomography (CT)

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Background

Body (Carcass) Length

- Immediately associated with spine characteristics (vertebra length and/or number) of the thoracolumbar (thoracic plus lumbar) spine region (image 1)
- Directly affects the high quality loin region as this muscle runs along the length of the thoracolumbar section

Key: Cervical Thoracolumbar Sacral Caudal

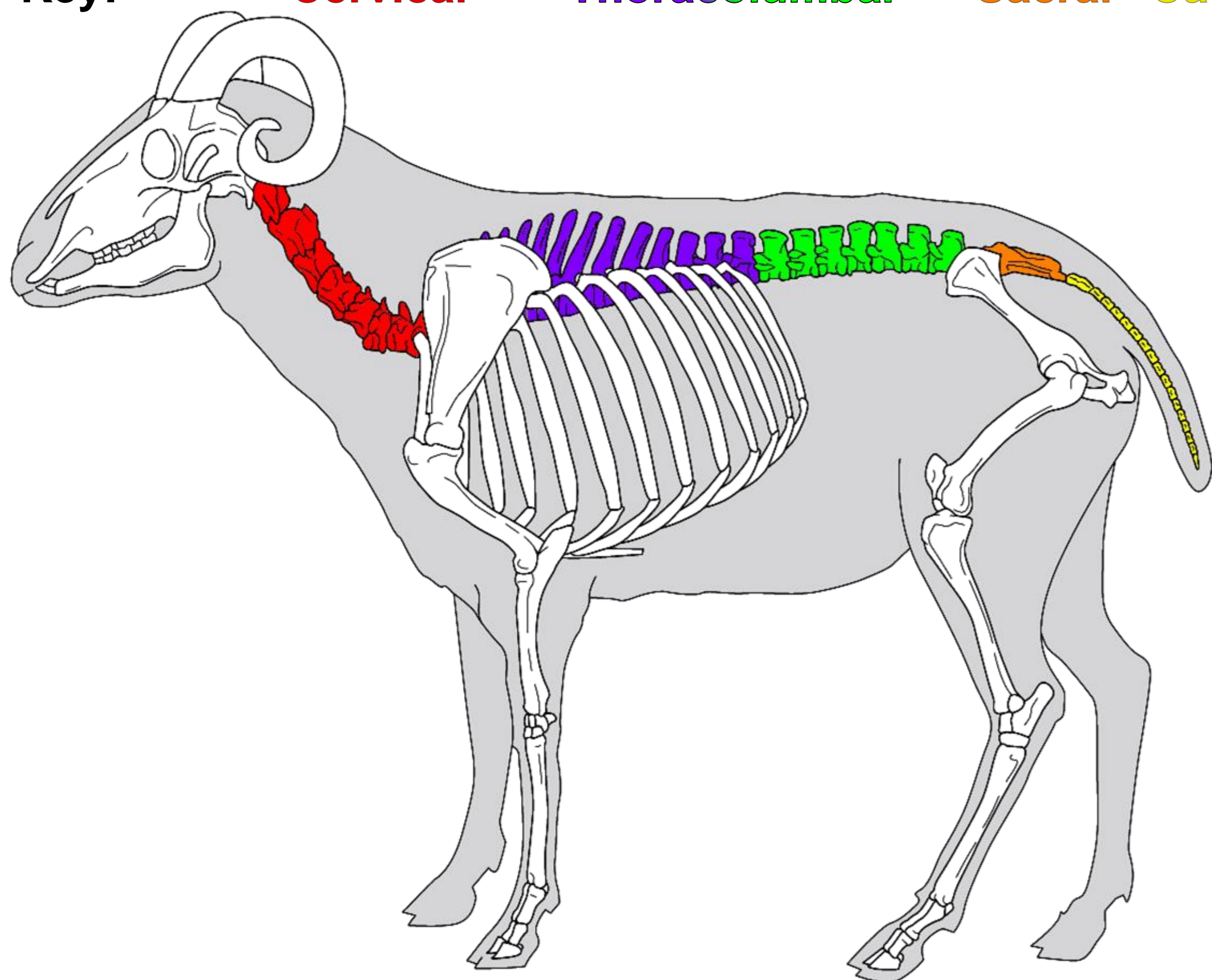


Image 1. Diagram highlighting the location of the thoracolumbar region in the mammalian spine (Image adapted from www.archeozoo.org; authors M. Coutureau & C. Carpentier; accessed 02/12/2010)

Learning from Pigs

With consistent selection for body length in bacon pig breeds...

- Commercial breeds now commonly possess 2 – 4 more vertebrae than their wild boar ancestors
- Reported increase in body length by approx. 15mm per additional vertebra
- Overall increase in meat yields

Objective

With the use of x-ray computed tomography (CT), determine if variation in spine characteristics (vertebrae number and length) exist within and across breeds of sheep

Computed Tomography (CT)

- Non-invasive technique

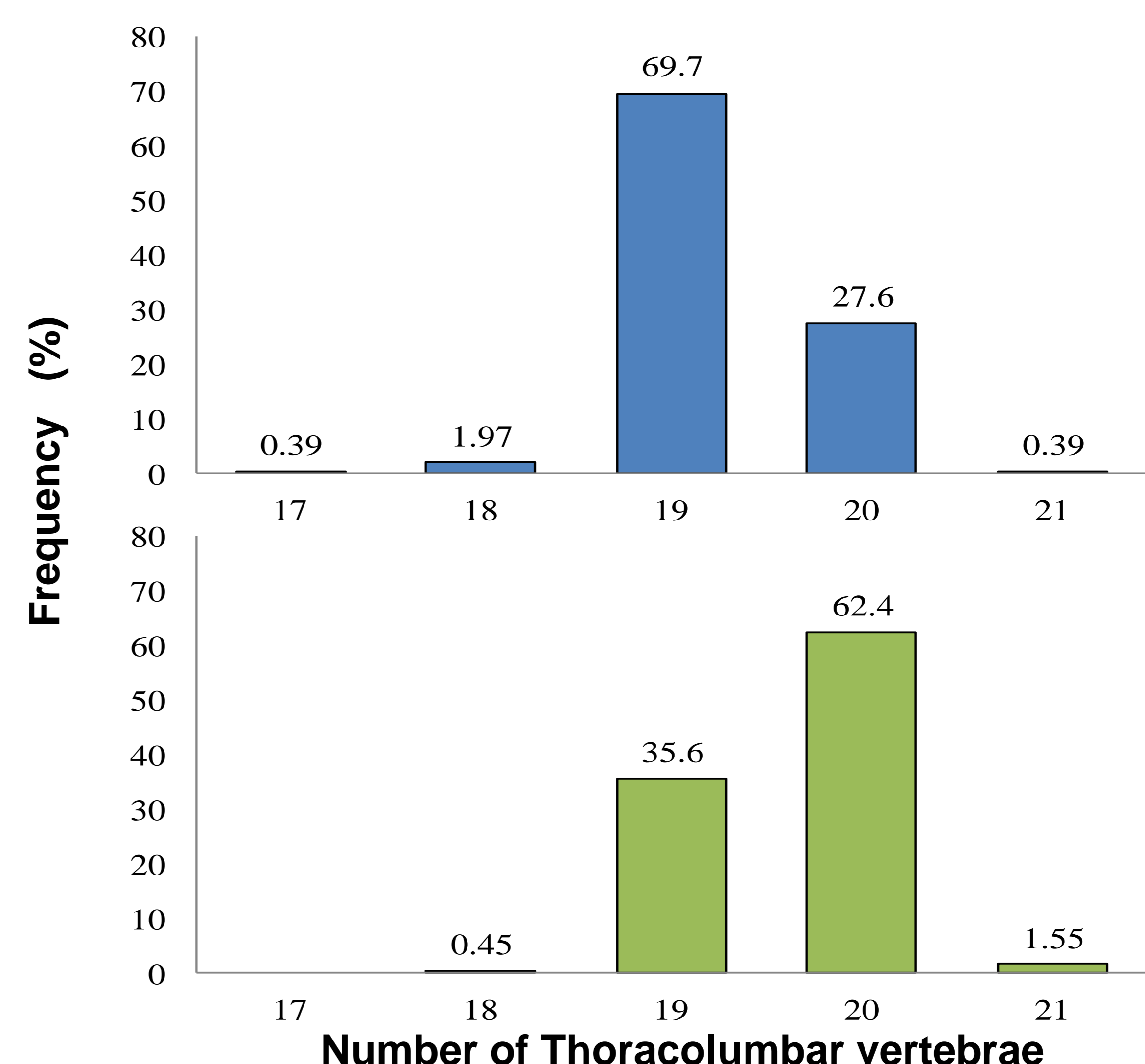


- Is currently in use with the aim of breeding sheep terminal sire lines for better carcass quality
- CT scans permit excellent discrimination between fat, muscle, and bone and can be used to take a wide range of *in-vivo* measurements

- One type of scan, the 2D topogram (see above), allows vertebrae to be counted and their lengths measured from desired spinal regions

Results

- Example of breed differences for number of thoracolumbar vertebrae



Future Work...

- CT technology will allow us to predict correlations between these spine characteristics and other commercially important traits

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