



SHEEP CASTRATION IN THE MEDIEVAL AND MODERN PERIODS IN EUROPE


MODALITIES, DEMOGRAPHICS AND ARCHAEOLOGICAL EVIDENCE

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FOREWORD – OPEN ZOOARCHAEOLOGY PRIZE APPLICATION

- Most of the results presented here have been published in 2016 in *Argos* (vol. 54, p.132-139) under the title «*To cut a long tail short: The tail-docking and gelding of lambs in Western Europe. A confrontation of archaeological and historical sources*».
- Although *Argos* is an open-access venue, the paper still isn't available online. The print version of the journal has a very confidential distribution, and this article is currently very difficult to access. Furthermore, *Argos* does not allow the publication of supplementary material or the archiving of data files.
- I believe this paper **contributes significantly to the debate surrounding the identification of castration in the archaeological record**, and that the **novel approach it implements** may be of interest to many zooarchaeologists. I would therefore like to make this research more **widely accessible to all scholars**.
- If this paper is selected for an ICAZ Junior Researcher Open Zooarchaeology Prize, the data files will be published in Open Context, where they will be archived and openly available.



There are no livestock species in which as many males are deprived of the parts essential to generation as among the beasts of wool.

-Carlier, Traité des bêtes à laine, 1770

SHEEP CASTRATION IN HISTORICAL SOURCES

- Sources:
 - Medieval (13th-14th c.) and Modern (16th-18th c.) French and British agricultural treatises
 - «Manorial accounts»: annual financial and agricultural reports of seigniorial & monastic estates, including the composition of the livestock; 13th-15th c.



« Le bon berger », Jean de Brie, 14th c.,
print edition from 1542



Earl's Court Manor Roll for 1554, RBKC Libraries

WHY GELD SHEEP?

➤ An omnipresent practice mentioned in every historical agricultural treatise

➤ Reasons for castrating sheep include:

➤ Reduced aggression

➤ To prevent unwanted mating

➤ Higher fat content and better-tasting meat

➤ Larger animals

➤ Higher wool quality

➤ Galen, *De alimentorum facultatibus*, III.6 (K675–676), IInd. c. AD

People cut out the testicles of young pigs and oxen, but not for the same purpose; rather, those of the pigs for the sake of eating (for the flesh of castrated pigs is also more tasty, more nutritious and better concocted), and those of oxen for their usefulness in farming (for bulls are difficult for them to manage). But they remove the testicles of goats and sheep for both reasons.

➤ Columella, *De re rustica*, L. VII, 4., Ist. c. AD

...for the males are castrated (...) and their skins sold to dealers at a much higher price than other fleeces because of the beauty of their wool.

MEDIEVAL SHEEP CASTRATION: PRACTICAL PROCEDURES

*Tacuinum sanitatis, Vienna, ONB,
ms. 2396, f. 26, late 15th c.*



► **Jean de Brie, *Le bon berger*, 14th c.**

If the lambs are born in January, they should be amended the following March (...). Of the way to amend sheep: one cuts off a full finger's worth of the sacks of the testicles (...). And on the lambs' wound should be put fine ash, and the shepherd should keep the lambs from drinking (...) and should refrain from making them stand or strain; in the evening, he shall let them suckle in a narrow place, so that they do not run around and that the wounds do not open.

EARLY MODERN SHEEP CASTRATION: PRACTICAL PROCEDURES

- *The farming and memorandum books of Henry Best of Elmswell, 1642.*
- No less than four sections concerning the castration of lambs, including descriptions of how to deal with cryptorchidism.
- Recommends castration either at about a fortnight old, or between 6 weeks and 3 months, but notes some farmers delay as much as a year.
- One man holds the lamb down over bars, and *«the shepherd himself is to stand outside the bars, and to have a long sharp penknife therewith to slit their cods, and then is he to take hold of the end of the stones with his teeth, and so to draw them forth (...). You are also to provide [an ointment made of tansy and butter] set in a dish beside the shepherd, and ever as he has gelded lambs, he is to take some and therewith to anoint their thigh-holes; the butter is for healing the sore, and the tansy for keeping away flies.»*
- A quick procedure: *«for one that is ready at it will easily geld a hundred lambs in three hours»*

SEX-RATIOS IN HISTORICAL FLOCKS : EWES AND RAMS

MEDIEVAL PERIOD

- «*Préceptes cisterciens d'économie rurale*» (early 13th c.): 1 ram to 30 ewes
- Data from 7 English manors between 1209 and 1409: on average, 1/42 (from 1/30 to 1/63) (data Keil 1965, Page 2004, Stone 2004, Thornton 1992, Trow-Smith 1957)
 - Several manors, even with considerable flocks, appear to not keep rams at all but to rely on communal stock

MODERN PERIOD

- Henry Best, 1641: in good conditions, 1/40-50, recommends 1/30
- 18th c. agricultural revolution:
 - France (Carlier 1770, Daubenton 1782, Hastfer 1756): ratios from 1/15 to 1/100, mean recommendation 1/25
 - Great Britain (Lisle 1757, Johnston 1792, Sinclair 1792) ratios from 1/30 to 1/75, mean recommendation 1/60

Overall, relatively consistent sex ratios over time, between 1/30 and 1/40

SEX RATIOS IN HISTORICAL FLOCKS: WETHERS

Year 1279-1280	East Anglia	Chalklands	Kent	Total sample
Number of manors	14	22	12	64
Total number of adult sheep	4,571	16,997	5,038	34,943
Average wether share	36%	34%	26%	31%

Wether share in English manors for the accounting year 1279-1280, source Slavin 2016

Ideal sheep flock	13 th c. (Seneschaucie)	1792 (Sinclair)
Ewes	300	600
Rams		10
Wethers	400	370
Yearlings	200	530
Lambs		500
Total adult flock	700	980
<i>Wether share</i>	57.1%	37.7 %

Ideal flock composition in Great Britain in the 13th c. and in 1792 (Davis 1996)

- High average proportion of wethers, **usually 30-40%** between 13th-18th c.
- Important variation between individual flocks: from 0-100%
 - e.g. Yorkshire estate, year 1322, 124 ewes, 61 lambs, 1407 wethers wether share 92% (Davis 1996)

SHEEP CASTRATION: A SYSTEMATIC PROCEDURE



- If wethers represent on average 30%-40% of the adult (>2 years) sheep population, and if a ram-to-ewe ratio of 1/30 is applied (i.e. ewes 60-70%, rams 2% in adult population),

ABOUT 95% OF ALL MALE SHEEP WERE CASTRATED

- And as castration took place at an early age (ca. 1-3 months)
- About 95% of medieval and modern archaeological sheep bones identified as male are from castrated animals

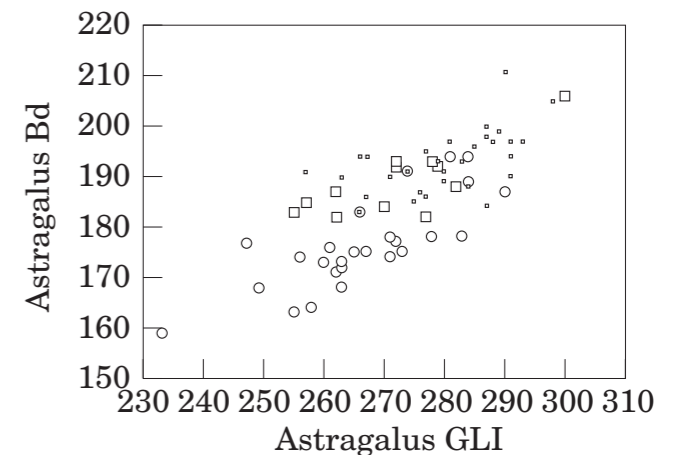
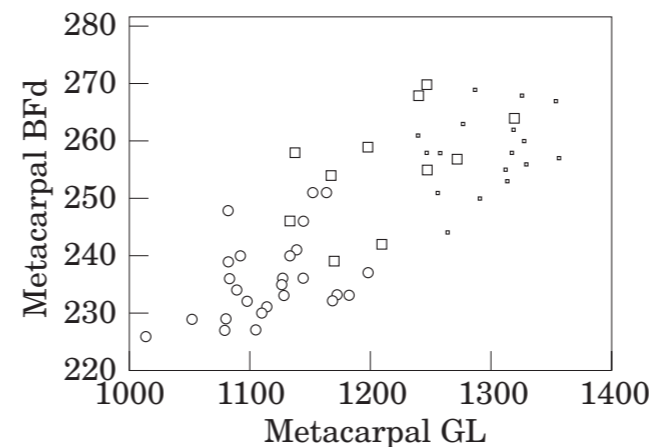
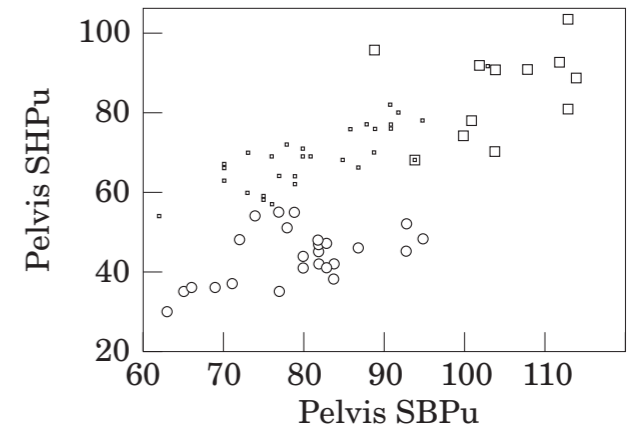
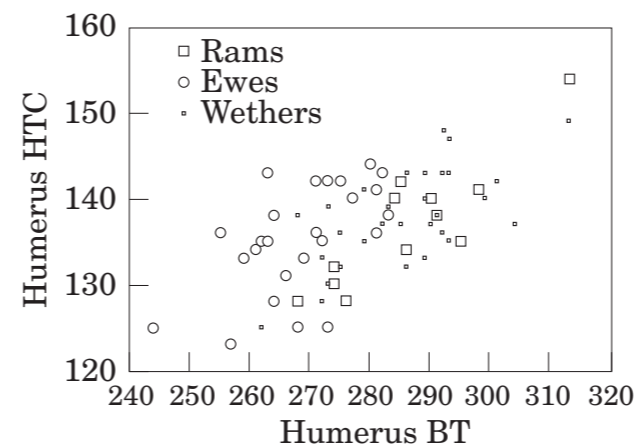
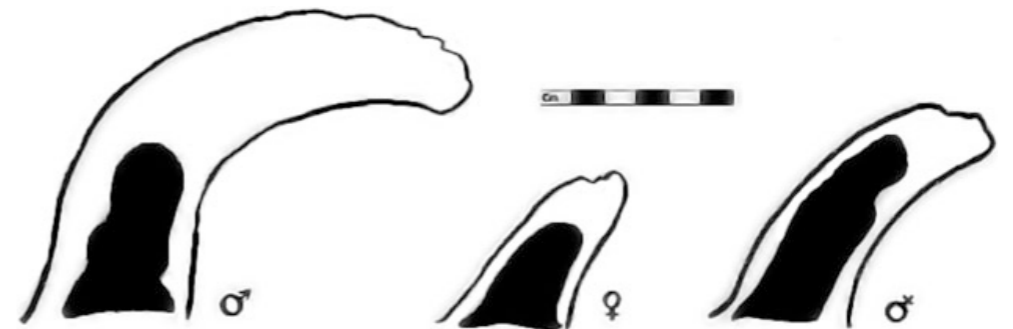
SHEEP CASTRATION IN THE ARCHAEOLOGICAL RECORD



ELUSIVE ARCHAEOLOGICAL EVIDENCE

- Soft tissue surgery: no direct evidence
- When early in life, affects secondary and tertiary sexual characters and epiphyseal fusion
 - Morphological approach (pelvis, horncores)
 - Osteometrical approach (metapodials)
- BUT
 - influence of age
 - influence of breed
 - overlap between the sexes

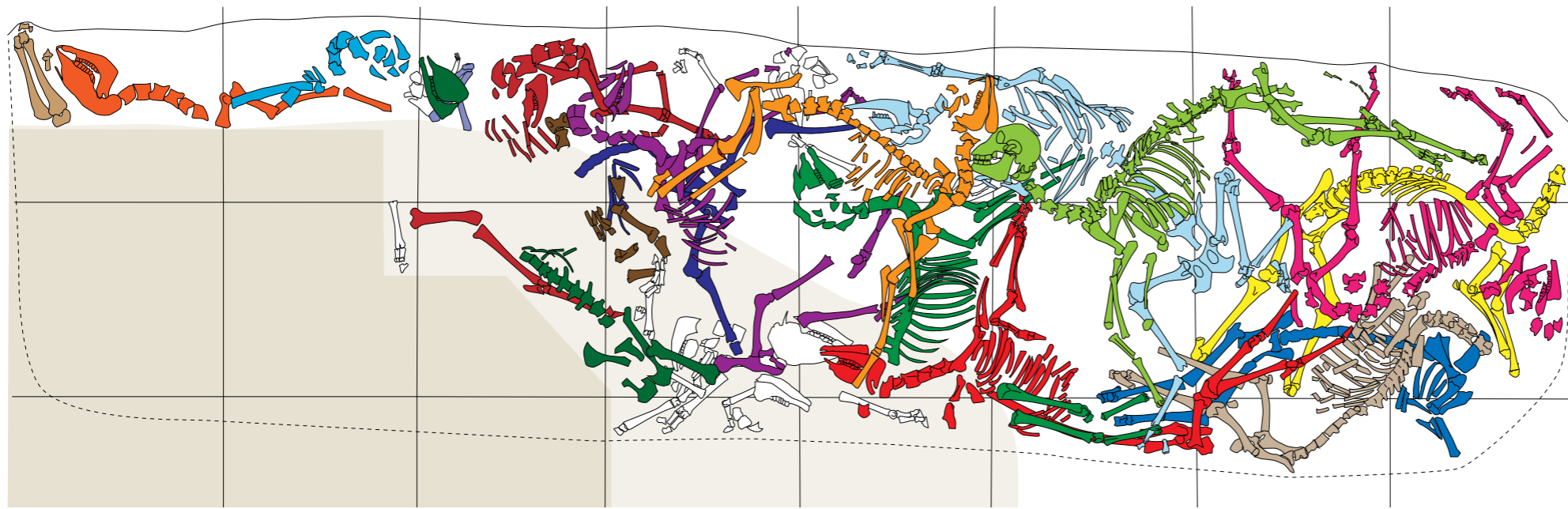
Zooarchaeology: Methods of Collecting Age and Sex Data, Fig. 5 Horn-core differences in male, female, and wether sheep individuals as determined from radiographs (After Clutton-Brock et al. 1990)



Scatter diagram of metric differences between males, females and castrates. Davis, 2000.

USING AGEING DATA TO IDENTIFY CASTRATED SHEEP

- Methods for age-at-death assessment of animal remains: dental eruption/wear and epiphyseal closure
 - Sex and castration status: **no influence on dental eruption and wear**
 - Sex and castration status: **major impact on timing of epiphyseal fusion**
 - Bones of intact males fuse slightly later than that of females (ca. 2 months delay)
 - Bones of castrated males fuse much later than both intact males and females (ca. 12 months delay; up to 21 months)
 - **Castrates usually show significant discrepancy between dental age and epiphyseal age** (if age is estimated using data collected on non-castrated animals)
- Approach suggested by Payne (1988), Davis (2000) and Worley et al. (2015), but never implemented by lack of adequate material



THE « SHEEP PIT » FROM ACHÈRES (FRANCE)

- **Site:** Achères «La Petite Ferme», Ile-de-France, France; INRAP rescue excavations in 2004
- Iron Age and Roman occupation, single post-medieval feature: feature 11-137
 - Large rectangular pit 4 m long
 - Partly destructed by mechanical excavator
 - **Containing the complete skeletons of 18 sheep**
 - No other artefacts
 - Radiocarbon dated, 17th or 18th c. (210 ±30 BP)



ASSEMBLAGE COMPOSITION AND DEMOGRAPHY

- **Age at death** assessed according to Jones 2006 & 2012
- Of the 18 individuals,
 - 4 were adults over 2,5 years of age
 - 14 presented **identical dental wear and eruption stages: Jones stage D6+, age-at-death estimated at 18-21 months**
- Probable cohort born in a same flock the same lambing season

Individual H, male



Individual O, sex unknown



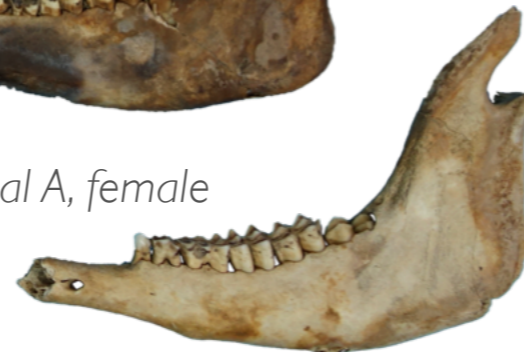
Individual P, male



Individual J, male



Individual A, female



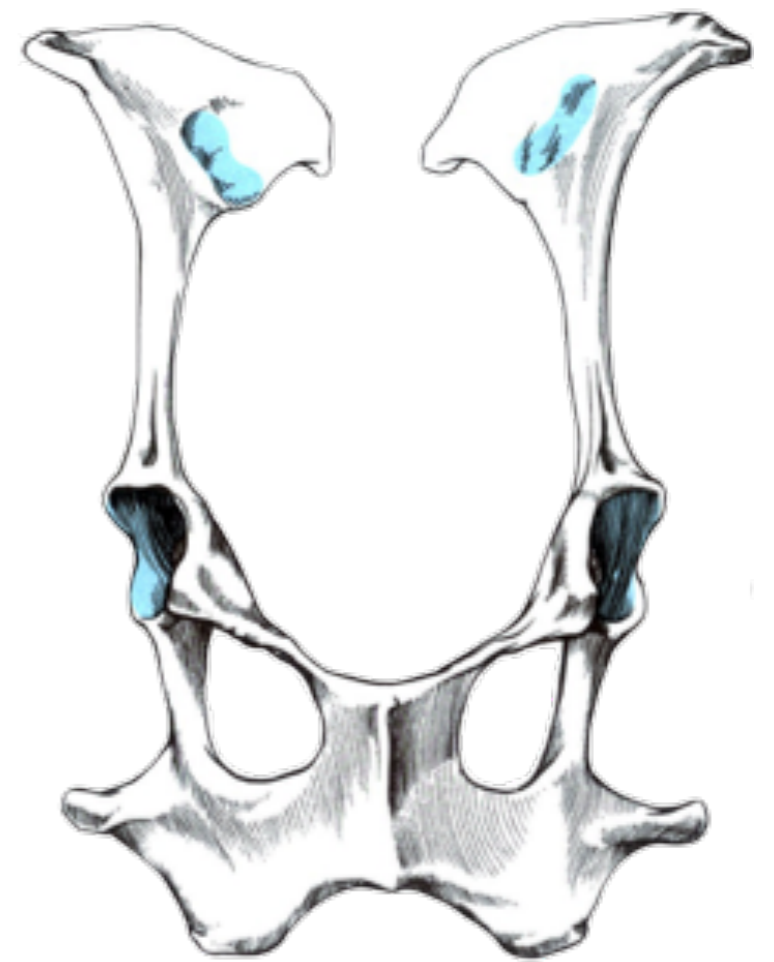
Individual C, female



Mandibles of 6 individuals presenting similar eruption and wear stages: presence of milk premolars, light wear on M2, M3 unerupted.

ASSEMBLAGE COMPOSITION AND DEMOGRAPHY

- **Sex** assessed by morphological and metrical criteria on pelvic bone: thickness of the pubis symphysis, pubic smallest diameter and section shape, presence/absence of pecten, presence/absence of ventral ridge, acetabular wall height
- Castration reduces «masculine» traits, but does not erase them, nor give «feminine» traits to the animal: castrated male sheep plot as male, albeit not very pronounced ones
- Of the 14 young sheep, 11 had sufficiently well-preserved pelvises for sex evaluation: **5 were male, 5 were female, 1 presented ambiguous characteristics**



Sheep pelvis. Pales & Garcia, 1981.

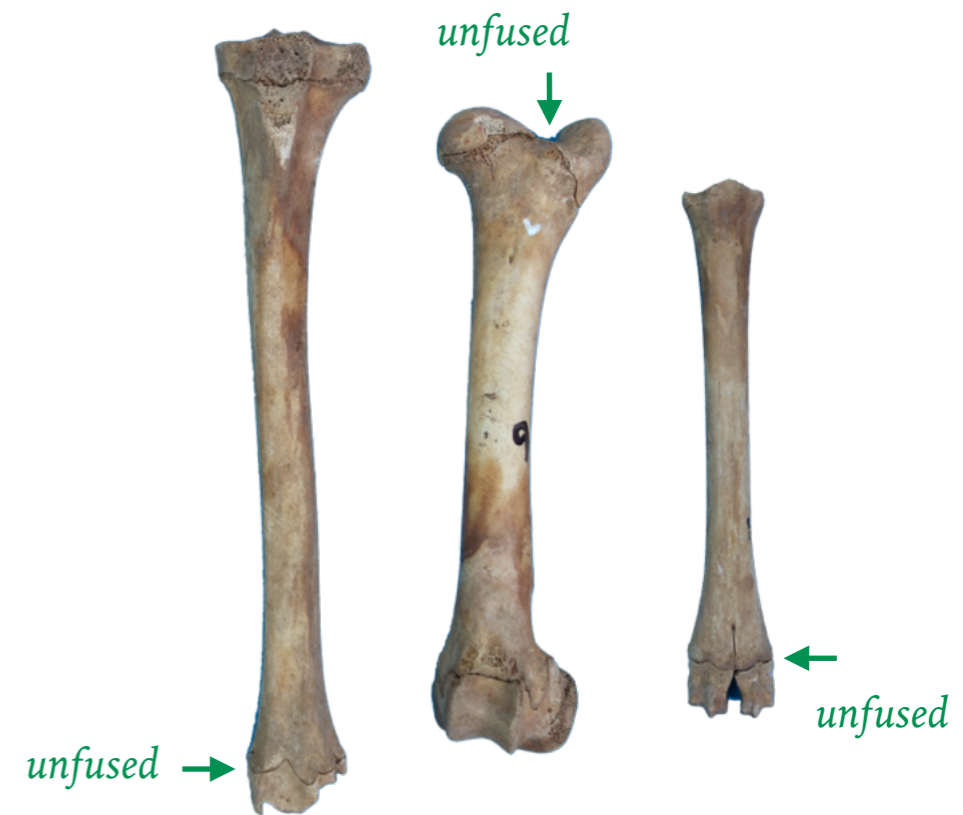
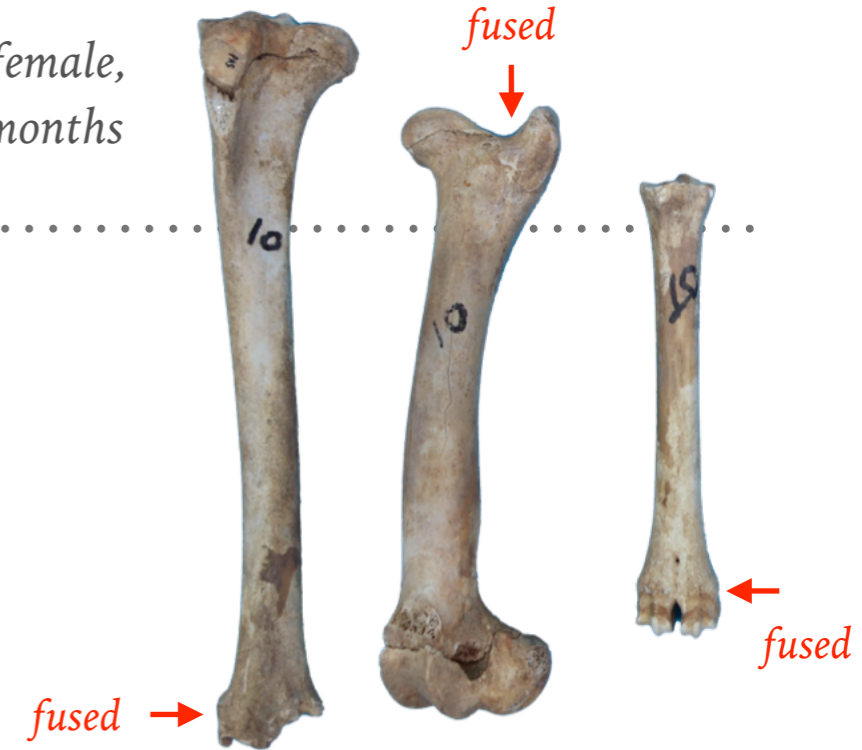
STUDY METHODOLOGY

- The 11 skeletons of sheep aged ca. 18-21 months for which sex was known were evaluated for epiphyseal closure
- Three growth plates preserved in all 10 individuals and fusing between 1 and 2 years of age were selected and noted fused/unfused

Growth plate	Minimal fusion age (months)	Maximal fusion age (months)
Distal tibia	7	19
Distal metatarsal	7	28
Proximal femur	16	31

Popkin et al., 2012. Epiphyseal plate closure in non castrated male and female shetland sheep.

Individual A, female, age ca. 18-21 months



Individual H, male, age ca. 18-21 months

RESULTS

Individual	Sex	Distal tibia	Proximal femur	Distal metapodials	MWS
D	Female	f	f	f	49
B	Female	f	f	f	51
K	Female	f	u	f	54
A	Female	f	f	f	56
E	Female	f	f	f	57
H	Male	u	u	u	50
F	Male	u	u	u	52
G	Male	u	u	u	54
J	Male	u	u	u	54
I	Male	f	u	u	-
C	Ambiguous	f	u	u	54

- Clear and significant discrepancy in fusion stages between males and females
- No significant age difference between males and females

ALL MALES OF THE SAMPLE WERE CASTRATED



SO... ARE WETHERS HIDING IN PLAIN SIGHT?



THANK YOU FOR YOUR ATTENTION

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