

# FINAL PUBLISHABLE SUMMARY REPORT

The study of animal remains from archaeological sites –zooarchaeology– provides direct evidence about animal husbandry and meat diet of human past populations. The PICOSHEEP project investigated changes in animal husbandry at the Iron Age-Roman transition, as part of our wider understanding of the mechanisms of cultural transmission and contact during this momentous phase of human history.

The relative frequency of species as well as osteometry and kill-off patterns were used as proxies to detect changes in meat diet and herding between the two chronological periods. The geographic frame was the Western Mediterranean, and more specifically present-day Spain, Portugal, England and Tunisia.

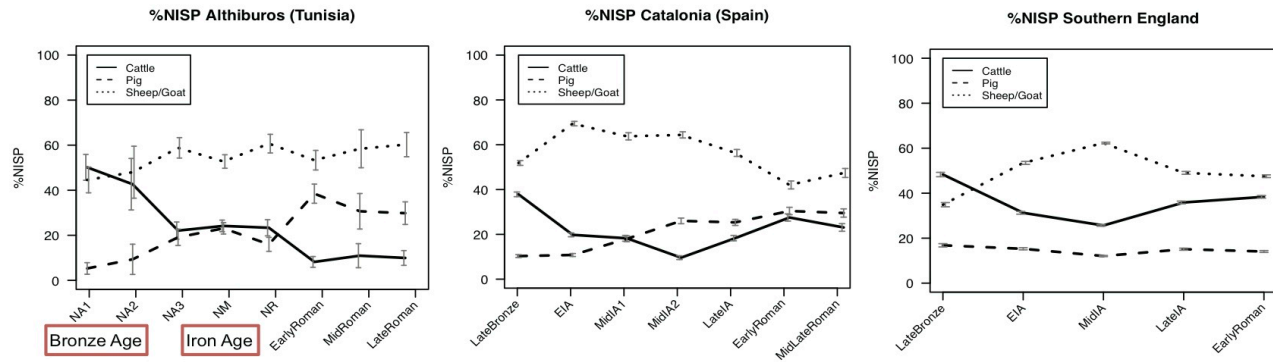
In addition to well-established methodology – zooarchaeology, biometry, statistics –, we used cutting-edge chemical analyses to investigate changes in animal mobility and meat supply. This work focused on Strontium and Oxygen isotopic values, which are known to be associated to the geological nature of the soil on which livestock pastured and the seasonal temperature of water, respectively. This latter approach was developed in collaboration with the NIGL laboratory, in Keyworth (Nottingham, UK).

Both the large geographical and temporal scale as well as the multidisciplinary approach shed promising results about our understanding of cultural change and resistance in Iron Age and Roman Europe, as well as the potential impact of animal mobility on the herding productivity of each territory and chronological period. Particularly, similar trends but also differences were observed between regions and sites. First of all, Roman impact was found to be somehow related to the distance from Rome, as the closer areas (Roman *Tarraconensis* and *Africa Proconsularis* provinces, located in present-day Catalonia and Tunisia, respectively), showed marked changes in the relative frequency of species and size of the animals (more and larger cattle). On the other hand, in the frontier areas analysed (present-day Portugal and Northern England), less marked changes were found when comparing animal husbandry in Iron Age and Roman times, sometimes not displaying any change at all.

Interestingly, some cultural resistance can be observed in *Tarraconensis*, as changes in animal size and relative frequency of species are apparent in newly built Roman sites, whereas the changes occur at a later stage –or just do not occur– in the indigenous sites that persist in Roman times.

Finally, and despite the ecological differences between Tunisia, north-eastern Spain and southern England, a similar chronological trend was recognized on the relative frequency of species, materialized by the decrease in cattle frequency from the Bronze Age to the Iron Age in the analysed territories (fig. 1).

Fig. 1. General overview of the composition of animal husbandry (in relative frequency of number of identified remains) at the site of Althiburos (Tunisia), in Catalonia (North-eastern Spain) and in Southern England. In all these territories, a reduction in the frequency of cattle can be observed between the Bronze Age and the middle Iron Age. Valenzuela in prep.



Similarly, a significant reduction in cattle size was noted between the Bronze Age and the Iron Age all over Europe, and then a size increase in Roman times in the conquered territories.

Animal mobility and the geographical origin of livestock were investigated using Strontium and Oxygen isotopic analyses from cattle and sheep teeth. A slice of enamel was cut from 95 cattle teeth from Owslebury (Hampshire, UK) dating from the 4<sup>th</sup> c. BC to the 4<sup>th</sup> c. AD, in order to determine any change in livestock supply through time (fig. 2). The chemical analyses revealed that animals were of local origin in the middle Iron Age (4<sup>th</sup> – 3<sup>rd</sup> c. BC), whereas animals were coming from a diversity of locations in Roman times (fig. 3).

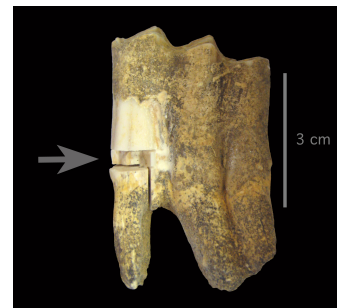


Fig. 2. Cattle tooth sampled. Minniti, Valenzuela et al. 2014

Further chemical analyses on sheep teeth from an Iron Age site in Catalonia (north-eastern Spain) also indicated a local geographical origin for the sheep dating from the middle Iron Age (Valenzuela et al. in prep). These results contrast with the evidence available for the Neolithic in different places of Europe, where animals (cattle, but also pigs and sheep) circulate and arrive to the site from a diversity of geographical areas.

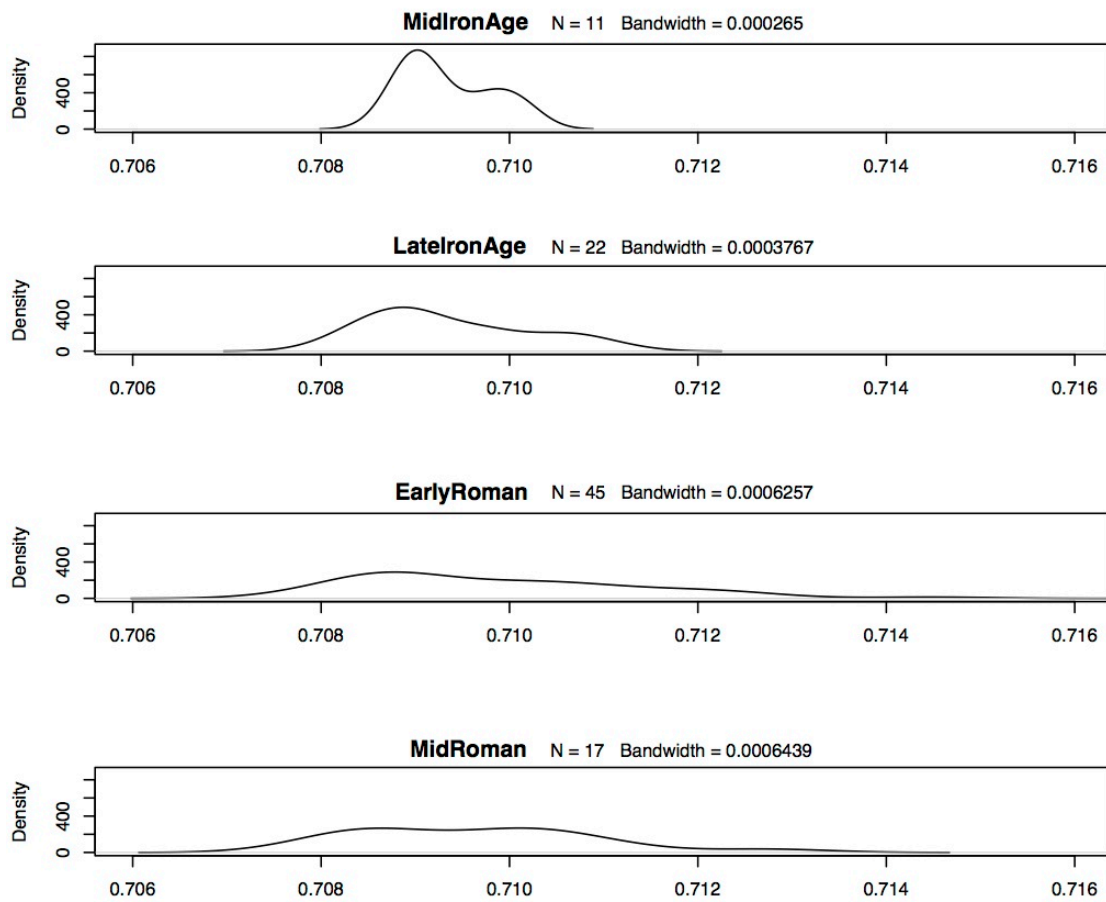


Fig. 3. Density of the Strontium isotope ratios obtained from Owslebury (Hampshire, UK).  
Minniti, Valenzuela et al. 2014

<http://www.shef.ac.uk/archaeology/research/iron-age>