SIZWG 2023
Stable Isotopes in Zooarchaeology
Working Group

Animal management practices in the Western Iberian Peninsula during the Neolithic-Chalcolithic transition: the study case of Leceia site (Oeiras, Portugal)

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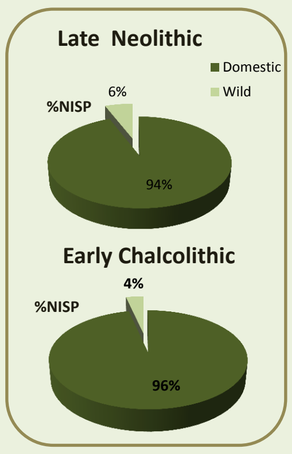
Background & Objectives

The IV-III millennium BC in the Western Iberian Peninsula was a pivotal time of social and economic change with evidence of increasing social complexity resulting in the formation of hierarchical settlements. Although the composition of the herds was different according to the regions of the study area, domesticated animals played an important role in these economies (Valente&Carvalho, 2014). Such differences can be explained by environmental and climatic characteristics, but also by different socioeconomic systems. In this sense, the management of the feeding habits of domesticates could be a key factor to understand the success of the different grazing systems during the Neolithic-Chalcolithic transition in the Western of the Iberian Peninsula.

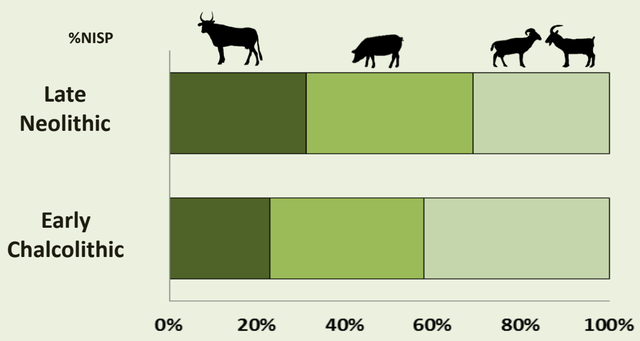
The principal aim of this work is to establish the degree of human control over the management and animal diet of domesticates and characterize different herding systems during the Neolithic-Chalcolithic transition in Leceia site.

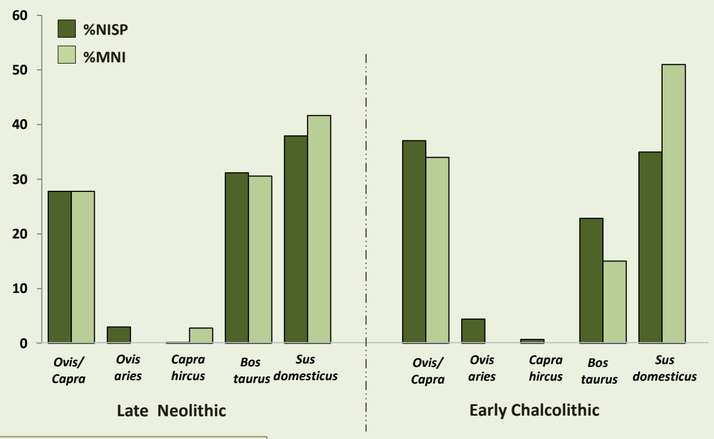
ZooArchaeological Analysis

A total of 4882 faunal remains from levels 4 (C4) and 3 (C3) of the Leceia site have been analyzed (Cardoso&Detry, 2002).



Late Neolithic	Early Chalcolithic
NISP= 716	NISP=4166
MNI= 37	MNI= 156





NISP= Number of Identified Specimens
MNI= Minimum Number of Individuals

Materials

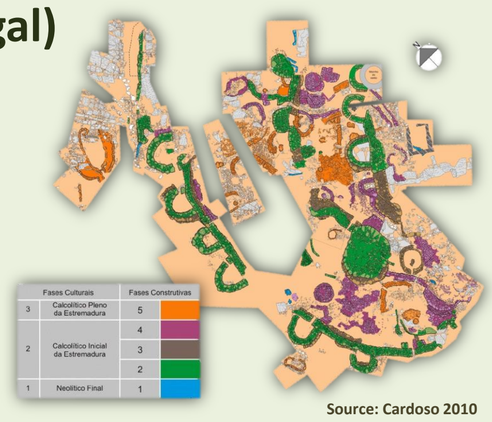
A total of 46 specimens were selected from Late Neolithic (C4) and Early Chalcolithic (C3) for stable carbon and nitrogen isotope analysis.

	Late Neolithic (C4)		Early Chalcolithic (C3)	
	NISP	MNI	NISP	NMI
Bos taurus	5	5	5	5
Ovis aries	2	2	8	8
Capra hircus	2	2	1	1
Sus domesticus	9	9	9	9
Cervus elephus	1	1	-	-
Sus scrofa	-	-	1	1
Bos primigenius	-	-	1	1
Oryctolagus cunniculus	1	1	1	1

Leceia site (Oeiras, Portugal)

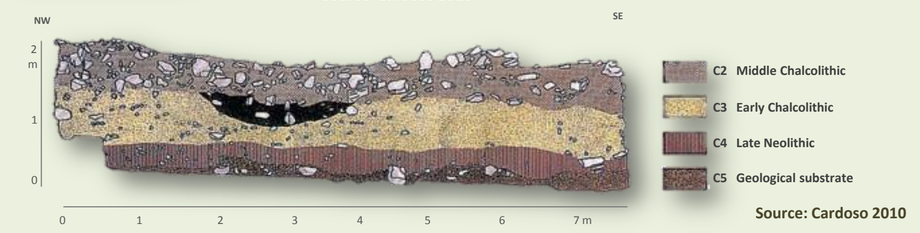
Leceia is a fortified settlement ^{14}C dated to c. 3500–2200 cal BC at Oeiras, Portugal. The site is located on a steep rocky platform on the eastern and southern slopes, with a constructed area of around 11,000m^2 (Cardoso, 2010).

The defensive device consists of three arched walls, all with entrances, articulated by winding paths that cross the entire defensive space. On the outer side of the walls, there are large bastions of a semi-circular plan, hollow, which would have been secondarily used as houses or warehouses. There is a bell-shaped period hut built in the outer part of the village (Cardoso 2000, 2010).



Source: Cardoso 2010

In Leceia, three cultural phases and five constructive phases were identified, beginning in the Late Neolithic (ca. 3400-3000 BC) and the Early Chalcolithic (2800-2600/ BC) and Middle/Late Chalcolithic (ca. 2500-2200 BC), coinciding with the outbreak of the bell-shaped phenomenon (Cardoso, 2000, 2010, 2017)."



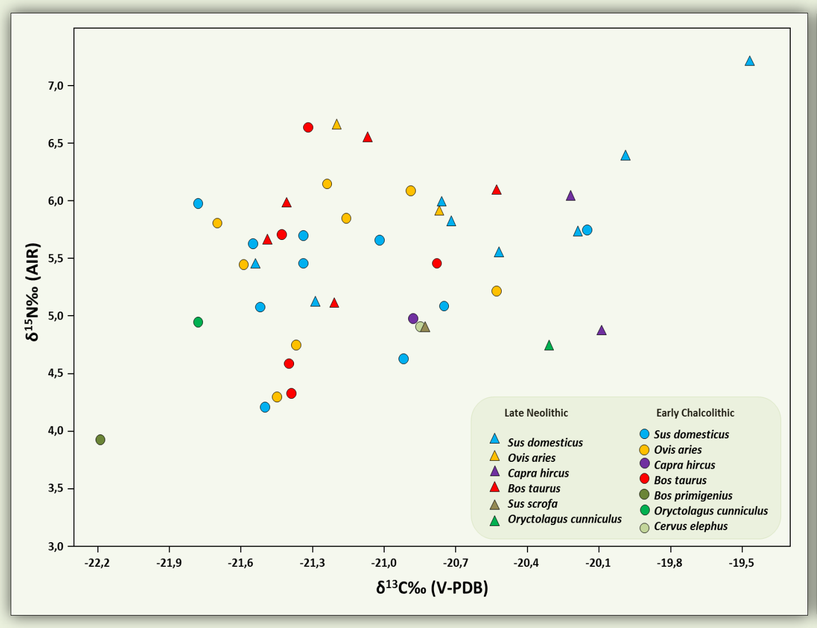
Source: Cardoso 2010

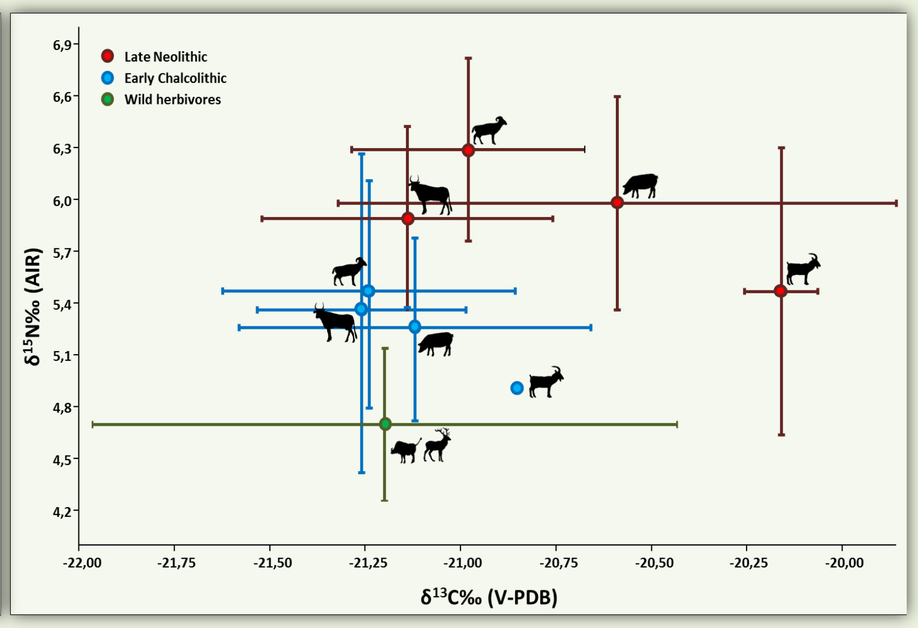
Methods

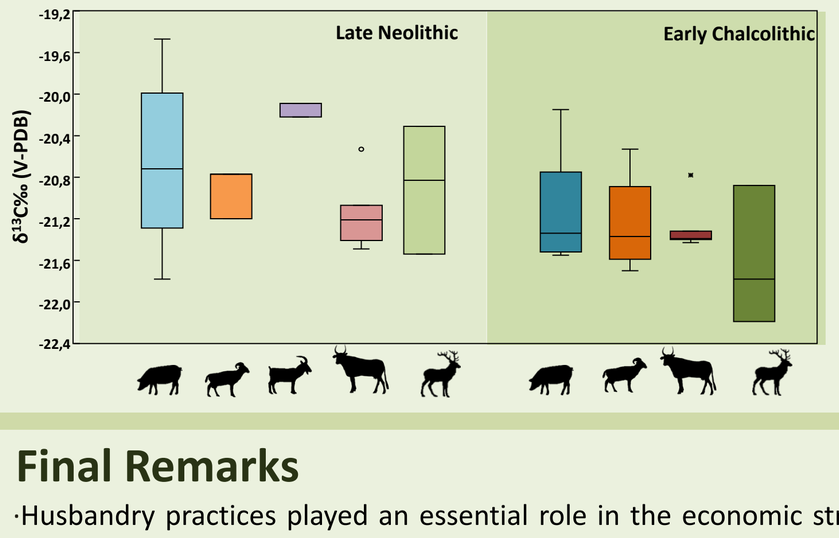
Samples for stable isotope analyses consisted of adult specimens and included only the diaphysis of long bones. Specimens were selected to represent individual animals by sampling the same-sided portion of a specific element.

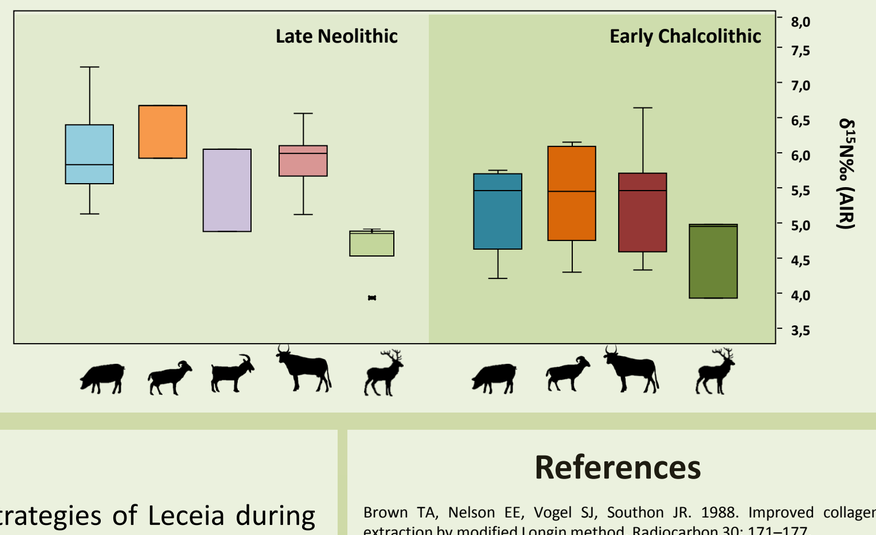
Collagen extraction and stable isotope analysis were extracted and analysed at the HERCULES Lab, Universidade de Évora (PT). Bones were cleaned mechanically to remove the surface, and the extraction followed a modified Longin method (Brown et al., 1988). Collagen samples (0.3 mg) were analysed in duplicate using a Thermo Flash 1112 (EA) coupled to a Thermo Delta V Advantage (IRMS) with a Conflo III interface, at the ICTA-UAB (SP). All statistical tests were performed in PAST 4.11.

Foddering strategies









Final Remarks

·Husbandry practices played an essential role in the economic strategies of Leceia during the Neolithic-Chalcolithic transition. Domestic species show a high percentage of representation compared to wild species.

·Isotopic results from domesticates exhibit a range of $\delta^{15}N$ and $\delta^{13}C$ values that may provide evidence for diverse husbandry strategies and foddering regimes between herds during Late Neolithic and Early Chalcolithic.

·Isotopic values of the *Bos primigenius* specimen might provide information about closed environments. Isotopic heterogeneity in late neolithic pigs may suggests that the individuals are likely to come from disparate areas (also proposed for the cattle during the Chalcolithic: Wright et al 2019). The enrichment of ^{15}N in domesticates compared to wild herbivores suggests some degree of manuring effect.

References

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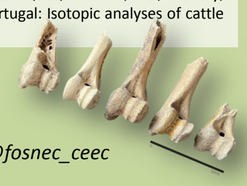

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