

## RESEARCH PAPER

# Understanding the First Chalcolithic Communities of Estremadura: Zooarchaeology of Castro de Chibanes, Portugal. Preliminary Results

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This study integrates archaeological, zooarchaeological and taphonomic results from the Chalcolithic, the earliest chronological period from the excavations at Castro de Chibanes (Palmela, Portugal). Preliminary results from the “Horizonte IA” (Phase IA1 and IA2), regarding the first half of the 3<sup>rd</sup> millennium BC will be presented.

The faunal assemblage consists of a total of 858 remains. These predominantly comprise of domestic mammals – particularly pigs, sheep and goats – which are interpreted as food supply. With low percentages of wild game, animal husbandry emerges as a central activity for these populations, complimented by marine fishing. In addition, small game hunting – mainly of lagomorphs and a few birds – is also identified.

As at other archaeological sites in the region, the material culture suggests that Castro de Chibanes can be ascribed to the cultural domain of the pre-Bell Beaker Chalcolithic of Estremadura. Particularly comparative sites include Leceia, Zambujal and Penedo do Lexim, also fortified settlements with high rates of domestic livestock (suids and caprines) and extremely low percentages of wild game, in particular red deer.

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**Keywords:** Zooarchaeology; Chalcolithic of Estremadura; Portugal

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## Introduction

The archaeological site of Castro de Chibanes is a fortified settlement, located in Serra do Louro (Palmela, Portugal; **Figure 1**). It is located at

the top of the hill, naturally defended by a scarp to the south and overlooking the Barris valley. Below the site are exceptionally fertile lands watered by the nearby Ribeira da Corva stream. The site is also in close proximity to the Tagus River and the Atlantic Ocean.

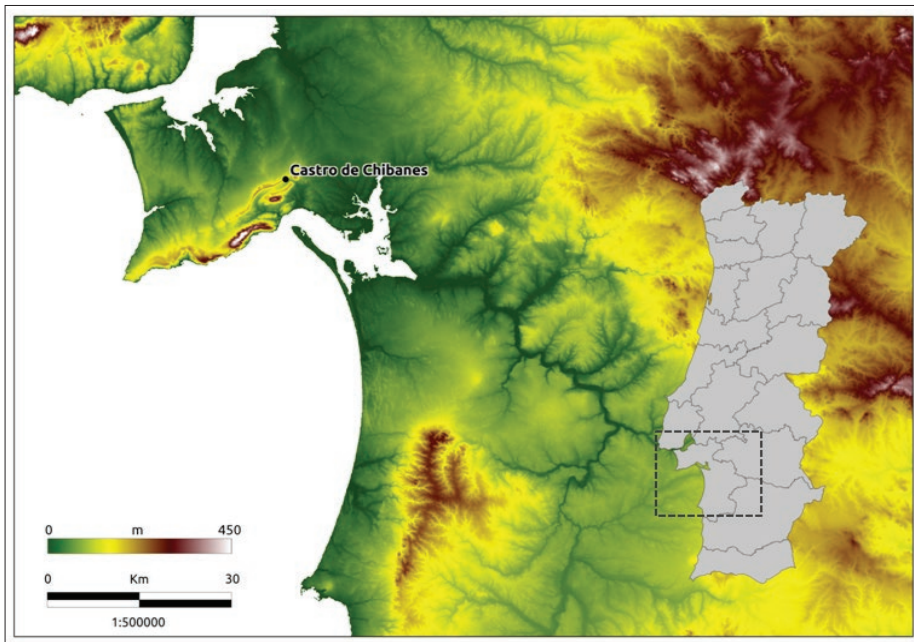
The geographical location of the site offers plenty of exploitable resources, making it an exceptional place to live. Consequently, it was occupied across three distinct periods: Early

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**Figure 1:** Location of Castro de Chibanes.

Chalcolithic/Late Bronze Age (3<sup>rd</sup> millennium BC); Iron II Period (4<sup>th</sup>/3<sup>rd</sup> century – 2<sup>nd</sup> century BC); and the Roman period (second half of the 2<sup>nd</sup> century – 1<sup>st</sup> century BC).

The site was identified and first excavated by António Inácio Marques da Costa, in 1906, with the recognition of structures and material culture spanning the Neolithic to the Roman period (Silva & Soares 1997: 33–39). Since 1996, the researchers Carlos Tavares da Silva and Joaquina Soares have been excavating and studying the site. As a result, four distinct phases of the 3<sup>rd</sup> millennium BC have been proposed, based on the decorative motifs of pottery (**Figure 2**) and stratigraphic occupation of the site, in combination with radiocarbon dates (Silva & Soares 2012: 74–78; Silva & Soares 2014: 159–164):

- Phase IA1: (2900–2600 cal BC) Early Chalcolithic I. Construction of the first defensive sites throughout the Chalcolithic of Estremadura. In Chibanes,

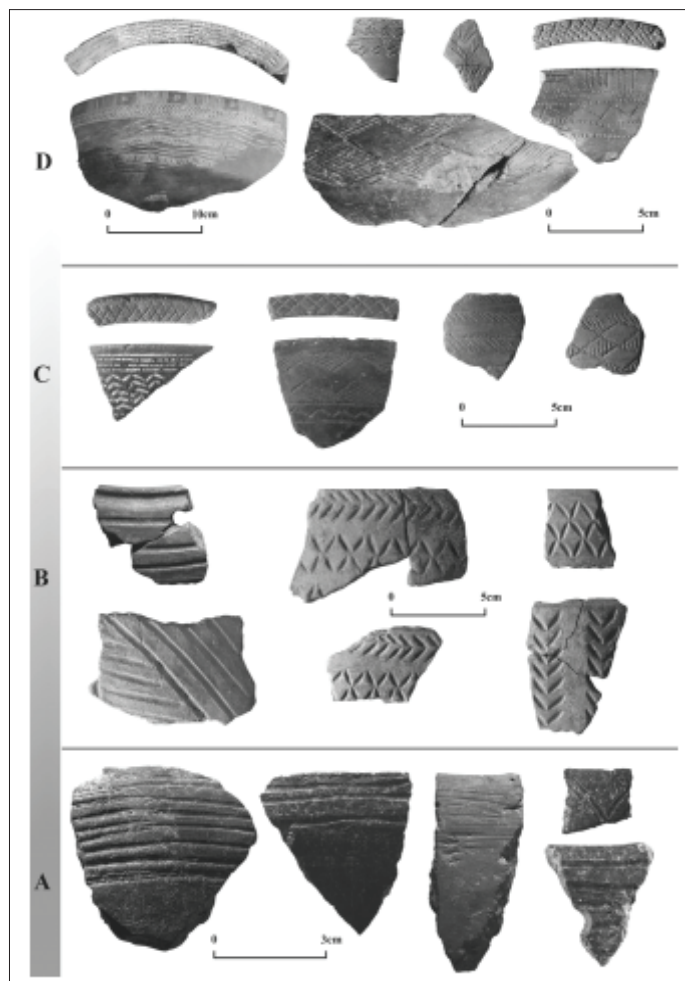
construction of the North defence wall (VIIIb). Pottery is generally marked by fluted decoration, notably applied to drinking ware.

- Phase IA2: (2600–2500 cal BC) Early Chalcolithic II. General collapse of some of the fortification walls (VI and VIIIb), as well as residential destruction levels (probably caused by an earthquake). Rise of the prototype of “leaf acácia” decoration on pottery.
- Phase IB: (2500–2300 cal BC) Middle Chalcolithic. First copper activities at the site. Pottery vessels display imprinted “leaf acácia” decorative motifs.
- Phase IC: (2300–2200 cal BC) Late Chalcolithic. Intense metallurgic activities. Coexistence of two distinct Bell-Beaker decoration styles: the “international group” and the local “Palmela style” (dotted geometric decoration associated with incised decoration).

- **Phase ID:** (2200–1950 cal BC). Early Bronze Age. Decline and abandonment of the settlement. Mixed Bell-Beaker and “Palmela style” with massive decoration on vessels.

In this article, preliminary data are presented, uniquely focusing on the analysis of fauna from the earliest archaeological phase at Castro de Chibanes; Phase IA (Early Chalcolithic) with the aim of gaining a

more detailed understanding of the first Chalcolithic communities of the Portuguese Estremadura, particularly the site of Castro de Chibanes. Phase IA can be divided into two: Phase IA1, characterised by the construction of the North fortification wall VIIIb (2904–2573 cal BC  $2\sigma$ ); and Phase IA2, featuring the collapse of the surrounding walls, as well as domestic buildings, followed by fires (2675–2277 cal BC  $2\sigma$  and 2639–2468 cal BC  $2\sigma$ ; Silva & Soares 2014:111–117).



**Figure 2:** Evolution of decorative patterns on pottery ware through the 3<sup>rd</sup> millennium BC, divided into four phases: A (= IA 1 and IA 2), B (= IB); C (= IC); and D (= ID) (Silva & Soares 2012: 74).

## Methods

An interesting and well preserved assemblage of faunal remains were collected during excavations, comprising mainly mammals and a small amount of bird and fish remains. All bone fragments were examined, counted and recorded with sample provenance (year, section, stratigraphic unit, etc.); bone fragment (taxa, element, portion, side, fusion); taphonomic data (animal, human or geo-chemical modifications); osteometric measurements; and other relevant comments.

Taxonomic identification depended predominantly on Schmid (1972), Barone (1976) and France (2009) for mammal determination; whilst for birds, Olsen (1996) was the main guide. Finally, all the uncertainties were clarified with the help of the osteological collection of the Archaeoscience Laboratory of Direção-Geral do Património Cultural (DGPC) in Lisboa and other specific bibliography relating to detailed species, as Zeder and Lapham (2010) for distinguishing sheep and goat or Heintz (1970) for bovines and cervids.

Age at death of mammals was calculated based on two distinct methods: For appendicular bones, three fusion stages of the epiphyses with respective diaphyses were considered: unfused for juveniles; partially fused for young adults; and fused for fully grown adults. For tooth analysis, tooth eruption and wear was examined considering *Ageing and Sexing Animal Bones from Archaeological Sites* (Wilson *et al.* 1982) and Payne (1973), particularly for sheep and goats.

Taphonomic matters were recorded considering the procedures laid out by Lyman (1994) and Reitz & Wing (2008).

Quantification was made using the Minimum Number of Individuals (MNI) and the Number of Identified Specimens (NISP). The Minimum Number of Animal Units (MAU) was not considered due to the small size of the sample.

Osteometric measurements were taken on mammal and avian bones according to von den Driesch (1976) parameters, as well as Davis (1996) for sheep and goats.

## The Sample

The analysed assemblage contained a total of 858 faunal remains, with a NISP of 257. Mammals form the majority of the dataset; (92% of the sample,  $n = 791$ ), followed by fish (7%,  $n = 59$ ) and birds at only 1% of the remains ( $n = 8$ ) (Table 1).

Excluding the absence of cervids in phase IA2, there was no significant difference between levels of Phase IA1 or Phase IA2, even though the first results from construction and domestic realities and the second is the outcome of an assumed earthquake and fire contexts (Silva & Soares 2014: 116–137).

## Mammals

### Lagomorphs

With 28 remains identified and a MNI of five (two for IA1, three for IA2), it is clear that lagomorphs were a regularly exploited resource. Most likely this material belongs to European rabbit (*Oryctolagus cuniculus*). Although not all the remains provided valuable measurements, the ones which did closely match rabbit, rather than hare (Llorente 2010).

Additionally, there is no known evidence of rabbit domestication during the Chalcolithic period in Iberia, which implies these individuals were wild and hunted in close proximity to the site. They were used as a food supply, given that butchery marks were identified in several bones from the sample. Spiral fractures also documented suggest meat processing activities with the intention of slow cooking of meals.

### Suids

With the exception of the third mandibular molar, which can be measured and distinguished accurately (Albarella *et al.* 2005), suid remains are extremely difficult to identify to species level and are presented as *Sus* sp.

With a MNI of five individuals (two for IA1 and three for IA2) and 93 remains, the distinction between wild boar and domestic pig was not achieved, but it seems clear that suids played an important role in subsistence

<b>Mammals:</b>	<b>NISP IA1</b>	<b>MNI IA 1</b>	<b>NISP IA2</b>	<b>MNI IA 2</b>
<i>Orcyctolagus cuniculus</i>	9	2	19	3
<i>Sus sp.</i>	46	2	47	3
<i>Cervus elaphus</i>	7	1	0	0
<i>Capreolus capreolus</i>	1	1	0	0
<i>Bos sp.</i>	8	1	12	1
<i>Capra hircus</i>	3	0	7	0
<i>Ovis aries</i>	0	0	1	0
<i>Ovis/Capra</i>	27	2	35	3
Undetermined	294	0	275	0
<b>Birds:</b>	<b>NISP IA1</b>	<b>MNI IA 1</b>	<b>NISP IA2</b>	<b>MNI IA 2</b>
<i>Morus bassanus</i>	2	1	1	1
<i>Alectoris sp.</i>	1	1	0	0
<i>Turdus sp.</i>	0	0	1	1
Undetermined	0	0	3	0
<b>Fishes:</b>	<b>NISP IA1</b>	<b>MNI IA 1</b>	<b>NISP IA2</b>	<b>MNI IA 2</b>
<i>Sparidae</i>	26	0	0	0
<i>Pagrus sp.</i>	2	1	0	0
<i>Sparus aurata</i>	2	1	0	0
Undetermined	21	0	8	0
<b>Total</b>	<b>449</b>	<b>13</b>	<b>409</b>	<b>12</b>

**Table 1:** Number of Identified Specimens (NISP) and Minimum Number of Individuals (MNI) by species and chronological phase.

strategies for the Chalcolithic communities of Chibanes.

More than 50% of the long bones are unfused or partially fused, which indicates that these individuals were slaughtered for meat at a young age. Considering the epiphyseal fusion, it seems that the majority of the specimens identified were killed before 12–24 months old (Reitz & Wing 2008:72). In addition, butchery marks were also identified on a few bone fragments.

The age at death and taphonomic markers suggest that the majority of these individuals

were probably domesticated, and raised for consumption, as hunting such a high percentage of wild boar juveniles would endanger the species and consequently decrease the availability of this resource as a meat supply. Nevertheless, the hypothesis of wild boars being part of the assemblage cannot be ruled out.

#### **Cervids**

##### **European Roe Deer – *Capreolus capreolus***

Roe deer is morphologically characterized in the sample by only one proximal metacarpus fragment from the right limb

(**Figure 3**). It allowed measurements of the breadth of the proximal end (Bp – 19,50 mm) and of the smallest breadth of diaphysis (SD – 11,48 mm) which are also compatible with this species.

Roe deer has a very low representation, not only in Castro de Chibanes, but also in other Chalcolithic sites throughout Portugal. Although it does not have any butchery marks associated with meat processing, its presence is most likely due to consumption and/or use of its antlers and hide. Nonetheless, it is a clear indicator of hunting.

#### Red Deer – *Cervus elaphus*

Cervids are also represented by red deer with seven bone fragments and an MNI of one. Along with the presence of other wild species, this testifies that hunting wild game was a regular activity at the site, with a significant part at the inhabitant's diet.

Such low presence of cervids is a regular trend among other sites of Estremadura for the pre-Bell-Beaker Chalcolithic, specially recognized in Leceia, Penedo do Lexim and Zambujal (Valente & Carvalho 2014: 9–10).

#### Bovines

In Castro de Chibanes, with 20 bone fragments identified and MNI of 2, it is possible to recognize cattle within the studied assemblage. Most of remains are from fully fused bones and most of the measurements are compatible with adult individuals of the domestic breed. In addition, a few butchery marks were noted, likely from carcass processing and suggestive of its consumption.

Cattle herding appears as rather well established in Estremadura during the Chalcolithic period, most likely supporting the Secondary Products Revolution with both dairy and traction (Valente & Carvalho 2014: 12). However, aurochs (*Bos primigenius*) were still widespread and are commonly found in archaeological contexts of this period (Valente & Carvalho 2014: 3, **Table 1**).

Cattle and aurochs are normally distinguished by osteometric evaluations,

unfortunately no complete epiphysis were recovered for measurement. Some of the cattle bone fragments were reasonably bigger and more robust, and thus the measurements would suggest aurochs, as shown by one rib fragment on the right side of **Figure 4**. Also a distal humerus fragment and other scattered remains were regarded as possible aurochs bone fragments but more data is needed to confirm this hypothesis.

#### Caprines

Caprines are represented in the assemblage by 73 remains and a MNI of five. The distinction between goat (*Capra hircus*) and sheep (*Ovis aries*) is rather difficult due to their skeletal similarities (Boessneck 1969; Zeder & Lapham 2010; Zeder & Pilaar 2010). Only ten remains were recognized as goat and one as sheep. The rest of the remains were more generally classified as sheep and/or goat.

Epiphyseal fusion stage was identified in 41 of the specimens; 30 of them were from newborns, or juveniles: 24% are rather small, poorly formed and spongy, thus suggesting newborn animals; 39% are unfused fragments and 10% are partially fused bones from animals just a few months old. Ultimately only 27% are fully fused bones, but some relate to distal humerus and proximal first and second phalanges, which fuse at an early age (Schmid 1972:75). Moreover, butchery marks were found on some of the remains.

These markers, the age at death estimation and the anthropic modifications on bones seem to indicate that sheep and goat were slaughtered at an early age, suggestive of its consumption and indirect evidence of milk production.

#### Birds

Even though bird remains are scarce within the assemblage, eight remains were identified and five were classified taxonomically, with a MNI of four.

#### Northern Gannet – *Morus bassanus*

A total of three bones were identified as northern gannet, two from IA1 and one from IA2, totalling a MNI of two.

Although in fairly low percentages, the northern gannet has been consistently identified at a few Chalcolithic sites from Estremadura (Zambujal, Leceia, Penedo do Lexim and Rotura) and also in Perdigões, an archaeological site from Alentejo (Pimenta & Moreno 2009). Usually it is interpreted as food supply and/or for use of its long bones and tendons.

#### Partridge – *Alectoris* sp

The partridge was identified through only one remain, a distal half of a right tarsometatarsus, making a MNI of one.

The *Phasianidae* family is also represented here with three first phalanges which were not possible to identify to species level.



**Figure 3:** Roe deer metacarpus, on the left, compared with sheep/goat metacarpus (Locus J1, C5), both at the same scale.



**Figure 4:** Castro de Chibanes (Locus J1, C5): Two *Bos taurus* scapulae and one horn fragment on the left, compared with a considerable big rib on the right, consistent with *Bos primigenius*.

### Thrush – *Turdus* sp

Also one bone – a complete right humerus, and a MNI of one. We can confirm the presence of this passerine bird, but further conclusions are difficult to attain.

### Fish

With a total of 59 remains, representative of 7% of the whole assemblage, only four bones were identified taxonomically, representing a MNI of two. Nevertheless, 30 fish bones are consistently matched with the *Sparidae* family, mainly vertebrae, and all of them from the IA1 phase.

Although no butchery marks were identified, it is assumed that these bones are a direct evidence of sea fishing and consumption, also talking into account the proximity of the site to the Atlantic Ocean.

### *Pagrus* sp

Only identified to genus level, one maxilla and one premaxilla were recognised as *Pagrus* sp., with a MNI of one.

### Gilt-head bream – *Sparus aurata*

Species identified through a right palatine and an opercular, from at least one individual.

### Taphonomy

Aiming for a better understanding of the faunal assemblage and its archaeological context, taphonomic markers (agents, processes and effects) were considered while analysing the bones. We were looking for anthropic modifications (such as fire alteration from cooking/roasting and butchery marks), animal modifications (such as carnivore gnawing, puncture marks and partially digested bone) and geo-chemical modifications that could weather, erode or abrade bones.

From the 858 faunal remains recorded, only 8% of them have butchery marks in consequence of carcass and food processing. Additionally, 41% of the bones have spiral fractures, implying their breakage while fresh, probably to enable cooking and bone marrow extraction, through boiling. The

majority of the faunal assemblage is therefore a result of consumption.

On the other hand, 86% of the bones demonstrate weathering, which may suggest repeated discarding of the bone fragments on the surface, rather than into a designated rubbish pit.

Burning modifications were identified on 8.74% of the remains ( $n = 75$ ), with a large fraction of them charred, however light brown and calcined bones were also identified. As the remains were probably scattered on the surface, it is difficult to differentiate between the burning marks as deliberate, anthropogenic measures (such as cooking), or resulting from accidental fires.

### Discussion and Conclusions

Livestock comprises the majority of the Phase IA1 and IA2, Early Chalcolithic Castro de Chibanes faunal assemblage, showing a fully sedentary population with husbandry as a central activity for human consumption patterns.

Pigs, sheep and goats form the clear majority of the remains from Chibanes, mainly for consumption purposes, with similar percentages and an equal MNI ( $n = 5$ ). Considering the published data (using mostly NISP frequencies), at other Chalcolithic sites from Estremadura, caprines are usually identified as the dominant species, in contrast with the prevalence of *Sus* in Alentejo. Nevertheless, taking into consideration only the pre-Bell Beaker period, although pigs are in fact predominant in the Chalcolithic archaeological sites from Alentejo, in Estremadura the percentages of sheep/goats *versus* pigs are very similar (Valente & Carvalho 2014: 9, Figure 5). The same happens in Chibanes as it is also not possible to determine which species overcome the other as NISP and MNI % show great similarities.

Due to the estimation of death, it appears that suids were used as the main protein suppliers, slaughtered while still juvenile, with the consumption of meat as the main goal. On the other hand, a high percentage of caprine were also killed while juvenile which



entail not only its exploitation for meat, but also the indirect evidence of milk production. Both species are straightforward to maintain and raise as they don't need large herding spaces and are easily and economically fed.

On the top of the meat consumption are also the lagomorphs, since rabbits, as pigs and sheep/goat, have at least five individuals present in the collection. Although rabbits provide fewer calories, they are abundant and easy to hunt.

The low range of cervids (*Cervus elaphus* and *Capreolus capreolus*) in Phase IA1 and their disappearance from the archaeological record during Phase IA2 may entail a growing exploitation of domestic animals and a subsequent sedentary lifestyle, contrasting with a decrease on the need of hunting for food. This trend is also recognized at other fortified sites from Estremadura like Leceia, Penedo do Lexim or Zambujal, where the percentages of wild species is extremely low (Valente & Carvalho 2014: 9).

Conversely, it seems that domestic cattle are scarce and were likely used for labour traction. Some bovine faunal remains appear to be quite large and bulky, which may represent hunting and subsequent consumption of aurochs, but more data is needed to elucidate this assumption.

In general, the faunal collection is very similar to other known assemblages from archaeological sites of Estremadura within the same timeframe. It shows a "typical" range of species, with similar taxonomic abundances. It is noteworthy that though equid frequencies are frequently low in Chalcolithic sites, in Castro de Chibanes no bones from this *taxa* were identified.

With low percentages, the presence of birds and fish are interpreted as a result of consumption, as well as a direct evidence of marine fishing and hunting activities. These wild resources were widespread and it makes perfect sense to make use of them as a complement to the diet of these populations. Additionally, birds were often relevant not only for its nutritional value but also for

its bones and tendons as raw material for diverse tools (Pimenta & Moreno 2009:12).

As the assemblage comprises a rather small number of identified specimens, more data is needed to verify some of the assumptions made here.

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### Competing Interests

The authors have no competing interests to declare.

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