land

MDPI

Article

Landscape Exploitation and Biotic Resource Management at the Tossal de la Vila Hillfort through the Long Durée

Marta Pérez-Polo [1,2,*], Joan Negre [3], Ferran Falomir [4], Guillem Pérez-Jordà [5], Sonia de Haro [6] and Gustau Aguilella [4]

[1] Departamento de Prehistoria, Historia Antigua y Arqueología, Facultad de Geografía e Historia, Universidad de Salamanca, Calle Cervantes, 2, 37008 Salamanca, Spain
[2] Dipartamento di Storia Culture Civiltà, Università di Bologna, Piazza S. Giovanni in Monte, 2, 40124 Bologna, Italy
[3] Institut Català d'Arqueologia Clàssica, Plaça d'en Rovellat, s/n, 43003 Tarragona, Spain
[4] Servei d'Investigacions Arqueològiques i Prehistòriques, Diputación de Castellón, Av. dels Germans Bou, 28 (Museu), 12003 Castelló de la Plana, Spain
[5] Departamento de Prehistoria, Arqueología e Historia Antigua, Universidad de Valencia, Avda. Blasco Ibáñez, 28, 46010 Valencia, Spain
[6] Independent Researcher, Cl. Enseñanza, 11, 12001 Castellón, Spain
* Correspondence: mppolo@usal.es

Abstract: This paper focuses on the anthropic dynamics of environmental transformation and natural resource management in the specific case of the archaeological site of Tossal de la Vila in Castelló, Spain, a hillfort located at the end of the Eastern Iberian Cordillera. It presents two phases of occupation determined by multiple radiocarbon dating analyses: the first phase during the late Bronze Age (8th–7th centuries BCE) and the second at the beginning of the al-Andalus period (8th–10th centuries CE). The results of the comparison of the subsistence strategies and the biotic configuration of the natural environment in the same place at two different times have shown us that in the protohistoric period, the diversity of economic activities represented in the archaeobiological record is certainly heterogeneous, while in the al-Andalus period the complexity of these options is reduced to much less significant limits, possibly due to the different functionality of this space in both periods.

Keywords: Tossal de la Vila; hillfort; archaeobiological; economic strategies; late Bronze Age; early Middle Ages

Citation: Pérez-Polo, M.; Negre, J.; Falomir, F.; Pérez-Jordà, G.; de Haro, S.; Aguilella, G. Landscape Exploitation and Biotic Resource Management at the Tossal de la Vila Hillfort through the Long Durée. *Land* **2023**, *12*, 1033. https://doi.org/10.3390/land12051033

Academic Editors: Angelo Castrorao Barba, Manuel Castro-Priego and Giuseppe Bazan

Received: 17 April 2023
Revised: 25 April 2023
Accepted: 3 May 2023
Published: 9 May 2023

1. Introduction

In this study, we present the most important archaeobiological results from recent research performed at the Tossal de la Vila archaeological site, with the aim of highlighting the economic strategies developed at the settlement during its two phases and the occupants' relationship with the surrounding biotic resources. We used a comparative approach between its only two moments of occupation: first, as a hamlet from the late Bronze Age to the early Iron Age (8th–7th centuries cal BCE), and second, as a hillfort from the early Andalusi period (8th–10th centuries CE) (Tables 1 and 2) [1–5].

The Tossal de la Vila archaeological site is located on a wide rocky outcrop, on one of the highest peaks (954 m above sea level) in the south of the Serra d'En Galceran, a mountain range that delimits two of the main communication routes in the central area of the province of Castelló, Spain (Figures 1 and 2). This gives rise to two very important natural corridors to the east and west of the mountain range, used by the many human communities that have inhabited the area since prehistoric times. To the west runs the Carbonera wadi, a tributary of the river Millars, which connect the route between the Mediterranean coastal area and the inland regions of El Maestrat. To the east is the corridor

between Cabanes and Sant Mateu, a natural and traditional passage between the sub-region of La Plana de l'Arc, to the south, and the coastal plains formed by the rivers Cervol, Sénia and Ebre, to the north.

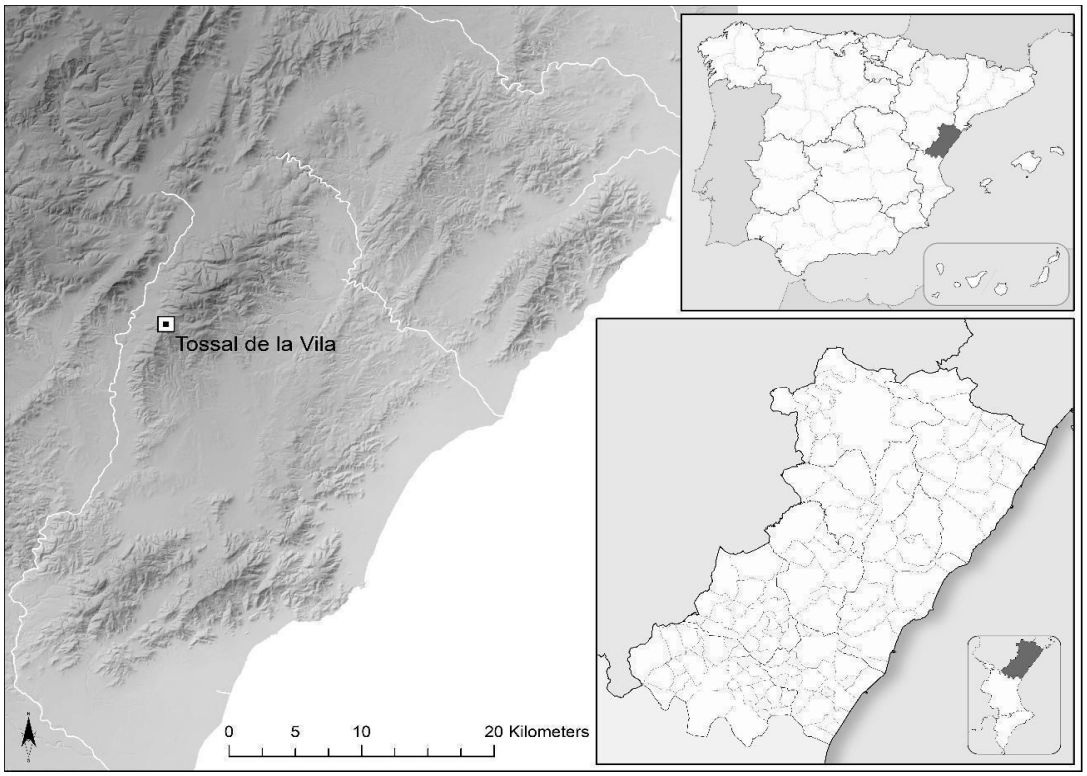

Figure 1. Location of the Tossal de la Vila (Serra d'en Galceran, Castellón).

Figure 2. Aerial photograph of Tossal de la Vila.

Table 1. Periods of occupation at Tossal de la Vila.

Period	Phase	Chronology	Dating Criteria
Late Bronze Age	Previous occupations	8th century BCE or earlier	Ceramics and stratigraphic TV-1; TV-2
Late Bronze Age	Construction and use	8th–7th centuries BCE	
Late Bronze Age early Iron Age	Destruction	First half of the 7th century BCE	TV-3
Emirate Andalusi period	Construction	8th century CE	Ceramics and stratigraphic TV-4; TV-5; TV-6
Emirate Andalusi period	Use	8th–10th centuries CE	
Emirate–Caliphate Andalusi period	Abandonment	10th century CE	TV-7; TV-8

Table 2. Absolute dating of Tossal de la Vila.

ID	Laboratory Code	Sample Type	Conventional Radiocarbon Age (BP)	Calibrated Age (1σ 68.2%)	Calibrated Age (2σ 95.4%)	Calibration
TV-1	Beta-336276	Charred material	2520 ± 30	800–770 cal BCE	800–760 cal BCE 680–670 cal BCE	IntCal09
TV-2	Beta-480635	Bone collagen	2460 ± 30	751–683 cal BCE 591–509 cal BCE 668–637 cal BCE 623–616 cal BCE 497–495 cal BCE	672–429 cal BCE 758–678 cal BCE	IntCal13
TV-3	Beta-393531	Charred material	2360 ± 30	540–410 cal BCE	745–685 cal BCE 665–645 cal BCE 550–400 cal BCE	IntCal13
TV-4	Beta-588420	Charred material	1220 ± 30	784–835 cal CE 844–877 cal CE 774–778 cal CE	770–888 cal CE 686–742 cal CE	IntCal20
TV-5	Beta-503127	Charred material	1200 ± 30	788–872 cal CE 774–779 cal CE	765–895 cal CE 714–744 cal CE 928–940 cal CE	IntCal13
TV-6	Beta-639687	Bone collagen	1160 ± 30	920–955 cal CE 870–898 cal CE 828–861 cal CE 776–787 cal CE	820–978 cal CE 772–790 cal CE 804–810 cal CE	IntCal20
TV-7	Beta-588421	Bone collagen	1130 ± 30	915–976 cal CE 889–902 cal CE	875–994 cal CE 830–851 cal CE 776–786 cal CE	IntCal20
TV-8	Beta-419185	Charred material	1050 ± 30	900–925 cal CE 945–990 cal CE	890–1015 cal CE	IntCal13

1.1. Theoretical Framework

The late Bronze Age and Medieval archaeology performed throughout the territory of Castelló still very much concentrate their attention on the traditional archaeological record, i.e., ceramics and constructive remains, while many other materials, such as archaeobiological remnants, are identified only occasionally. Nevertheless, the use of a multi-proxy perspective that includes the study of faunal, carpological and anthracological leavings, among other information sources, is increasingly considered as a more appropriate way to approach the historical analysis of economic strategies and palaeoenvironmental conditions in past societies [6–9]. In this sense, drawing on multiple lines of evidence allows us to better evaluate the conditions under which different communities would have developed broad subsistence and exploitation plans in the same place at different periods in time. Moreover, this viewpoint shows how helpful multi-proxy proposals can be for a refined un-

derstanding of past human–land interactions and the way in which political configuration could have affected that association and its correlation.

This assumption arises from the idea that different social actions of production, consumption and distribution cause variations in the archaeobiological record recovered during excavation and that these differences can be explained in terms of group survival decisions. In other words, consumption remains could be considered the material signature of different activities destined to fulfil the specific needs of a community, which in turn would indicate a specific pattern of behaviour towards the exploitation of different resources. Therefore, this paper presents a first approximation of Tossal de la Vila anthropic activity markers, the models connecting those archaeological proxies, such as archaeobotanical or zooarchaeological remains, with the specific activities or strategies inferred from different information sources and interpretive paradigms coming from archaeological discussion [10–13].

Lastly, this text bases its discussion on the potential of archaeological comparative analysis, highlighting similarities and discrepancies in the management of the same agroecosystem in two different historical moments. In that regard, it is necessary to identify and reproduce the palaeoecological and historical setting of each one of them in order to evaluate the influence of environmental, social, economic and political causes on the inferred activities developed within the site. One of the most important issues confronting archaeological studies is the extent to which human behaviour is shaped by factors that operate cross-culturally throughout time, as opposed to those that are unique to particular societies [14] (p. 3). Lamentably, most common approaches to comparative analysis in archaeology focus on synchronic comparisons, due to a complex set of reasons, such as the interest in the study of historical questions regarding a particular society or time and the very nature of time and social change [15–17].

Our work operates in this scenario only, studying the material record of each phase to explore variation over time that could explain the causes that led these societies to adapt to a particular area. These kinds of comparisons, typically focused on major questions in cultural transformation such as the origins of agriculture and the emergence of states, could also benefit new robust comparative claims applied to case studies such as the one that is presented here [18–20]. As of today, unfortunately, and despite some remarkable early works on this topic from other domains [21], work in this area is still poorly developed and archaeology has yet to progress very far, with rigorous and relevant comparisons where the spatial settings remain stable, while varying the chronological focus.

1.2. Objectives and Hypothesis

In this paper, we provide an exhaustive analysis of archaeobiological records, which are currently unique in their respective fields of study, with the objective of determining two forms of distinct occupation. Based on the carpological, anthracological and zoological remains recovered during the archaeological excavations of the last ten years, the aim is to shed light on the economic strategies that both enclosures developed in relation to the biotic resources available in the environment. The detailed study of the patterns of production and consumption of plant species, in terms of food and the supply of raw materials for construction and fuel, in both periods of occupation, contributes to a substantial increase in knowledge of the relationship between the inhabitants and their sources of supply, both produced and exploited. The analysis of livestock management methods is also important for understanding the economic choices made, both in relation to the survival of the group and patterns more typical of a hierarchical society with an exploited workforce.

The archaeobiological materials recovered over the years have allowed us to sketch in this article a first approach to the subsistence strategies followed during the two periods of occupation. The main objective therefore is to confront these strategies against the drawn hypothesis about the general setting and functions of the two occupation phases. We look forward to refining and consolidating the image presented here, with future studies of new samples recovered from the site. At the moment, anthracological and archaeozo-

ological information have been recovered from the two periods, while the carpological record is restricted to the first phase of occupation due to taphonomical and preservation problems. An initial carpological outline has already been presented [1], although in the following pages, we will detail and expand on some aspects (see Table A1). A draft of the initial archaeofaunal information from the Andalusi phase was also presented in the II Encuentro de Zooarqueología Ibérica (2021), of which the publication is under review [22]. Notwithstanding, this paper regroups this information, as well as summarising the zooarchaeological record of the first occupation and the entire anthracological record, both of which are unpublished.

Regarding our initial hypothesis or interpretation of the archaeological contexts, in the first period of occupation, in the 8th and early 7th centuries BCE, Tossal de la Vila consisted of a small settlement. Based on archaeological excavations in the region, subsistence economy strategies seem to have been the norm for the community. There is evidence of livestock farming, agricultural activity, gathering and the use of forestry resources. Hunting would also supplement the economic spectrum.

In the case study of the early Andalusi period of occupation, judging by the records recovered, the structured, hierarchical, militarised and ritualised nature of the site, the population has been identified as a garrison of early Islamic troops. Their main functions, therefore, would include road and coastal surveillance, as well as territorial control of the limits between different domains. The strong focus of this particular function would naturally lead to the detriment of other basic functions such as those linked to the maintenance and reproduction of social life. This context led to the exploitation of the closest forestry resources, with a preference for species that would ignite rapidly for fuel and have a short useful burn time. Exploitation of the wealth and heterogeneity of ligneous species would be limited by the restricted diversity of the activities performed. Regarding the specific register linked to food in this particular context, both plant and animal species conformed to the social norms marked by certain religious precepts—such as the prohibition of the consumption of suidae—and the patterns typical of these types of militarised groups, primarily a very limited diversity of species and the exploitation of their secondary products.

2. Materials and Methods

2.1. The Site within the Context

During the late Bronze Age and the early Iron Age, Tossal de la Vila was enclosed by a perimeter wall located on the north, west and south sides of the settlement. Various rectangular-shaped spaces were built against the wall that shared party walls and were accessed from the central interior space (Figure 3). At present, excavations have identified 17 of the spaces that are located along the entire length of the walled perimeter. The eastern side of the settlement was naturally defended by escarpments. This distribution delimited a large, central plateau-like space, largely free of structures and with limited sedimentation, from where herds could be controlled, or other activities performed.

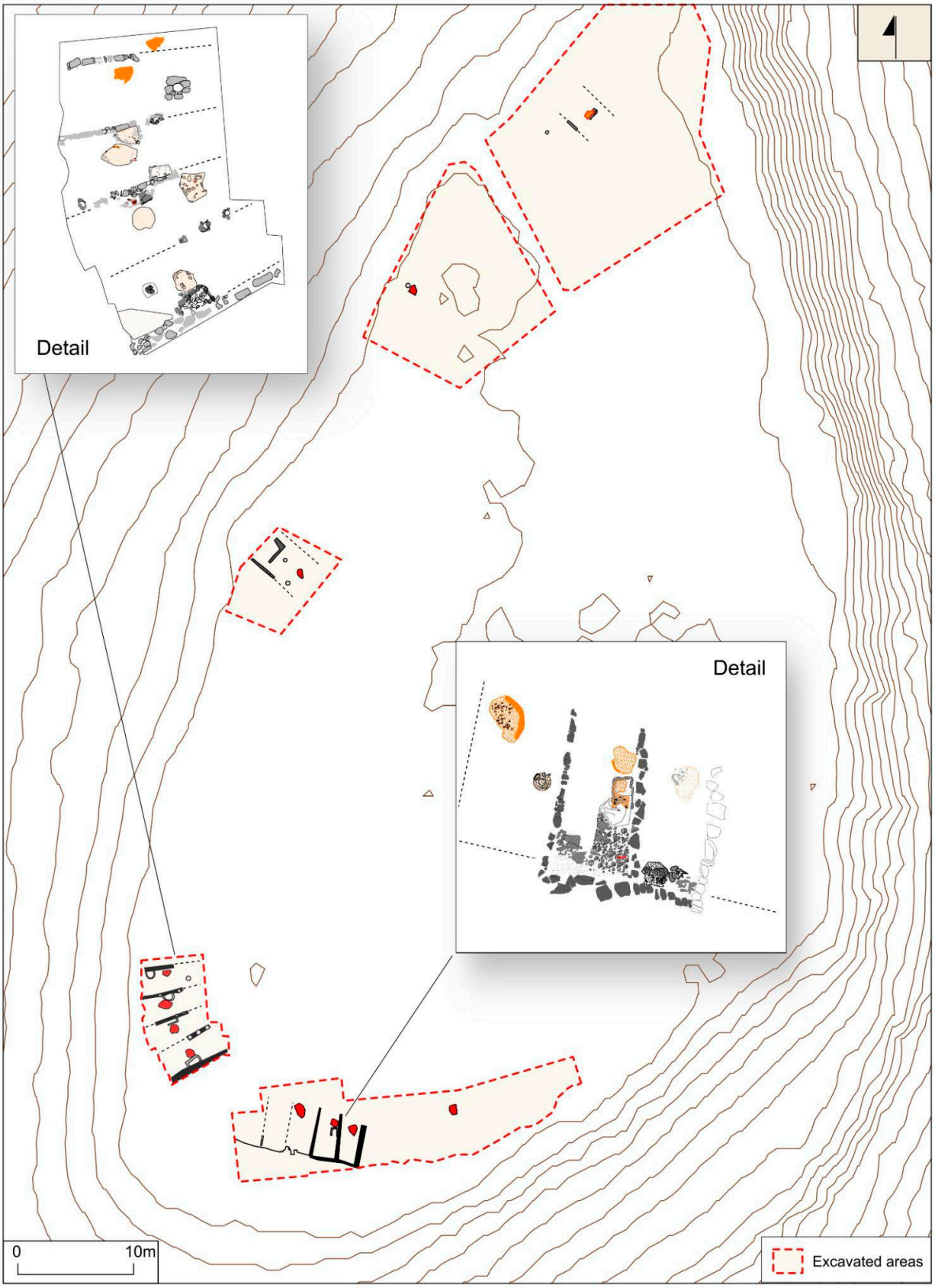

Figure 3. Occupation plan of the protohistoric phase. Although the remains of this phase have been greatly altered by the early medieval occupation, rectangular domestic spaces and various associated structures are documented, as shown in the plan.

Inside the different spaces, the excavations identified hearth and storage structures, as well as the remains of domestic activity, such as the processing and storage of foodstuffs (Figure 4). The archaeological record of the interior suggests certain functional differences; however, at present, features associated with social hierarchies have not been observed. A theoretical calculation based on replicating the module of the spaces on the perimeter wall gave a maximum of 56 possible areas. We do not believe that each one was associated with a family unit, but for estimation purposes, if we consider each pair of areas for a family of 3–4 individuals, it gives a demographic range between 84 and 112 individuals.

Figure 4. Details of domestic and combustion structures (**a**) and a storage space (**b**).

Among the construction techniques that characterise this period of occupation, there is a clear distinction between the large perimeter wall, which was built using double masonry held together with earth, and the internal partitions or walls separating dwellings, which were wooden frames covered in earth and vegetation raised on stone foundations. This same technique was also used for roofs, while floors took advantage of the geological level, which, if required, would be levelled with gravel and earth [1,23].

Regarding the assemblage of artifacts, handmade pottery is of particular interest as it represents a fairly broad repertoire of forms that can be dated to the 8th century BCE. However, some elements can be dated to the late 8th and, in particular, 7th century BCE. This is the case with certain forms and decorations on ceramic vessels, and also with various amphora fragments from Phoenician trade. Other elements that highlight trade contacts are metals, such as various iron objects, including two knives, and other copper-based objects.

Due to its general state of conservation and the lack of other comparable sites, Tossal de la Vila could be considered a model of a late Bronze Age III settlement in the northern region of Valencia. It features proto-urban characteristics, of which the origins can be traced to other sites in southern Catalonia with a slightly older chronology.

In the case study of the emirate Andalusi period of occupation, similar to the protohistoric period, most of the structures built in the interior are completely connected to the wall itself and are arranged longitudinally. Based on the floor area accounted for each residential unit identified in the site, we suggest that the settlement was inhabited by a small group of no more than fifty individuals (Figure 5).

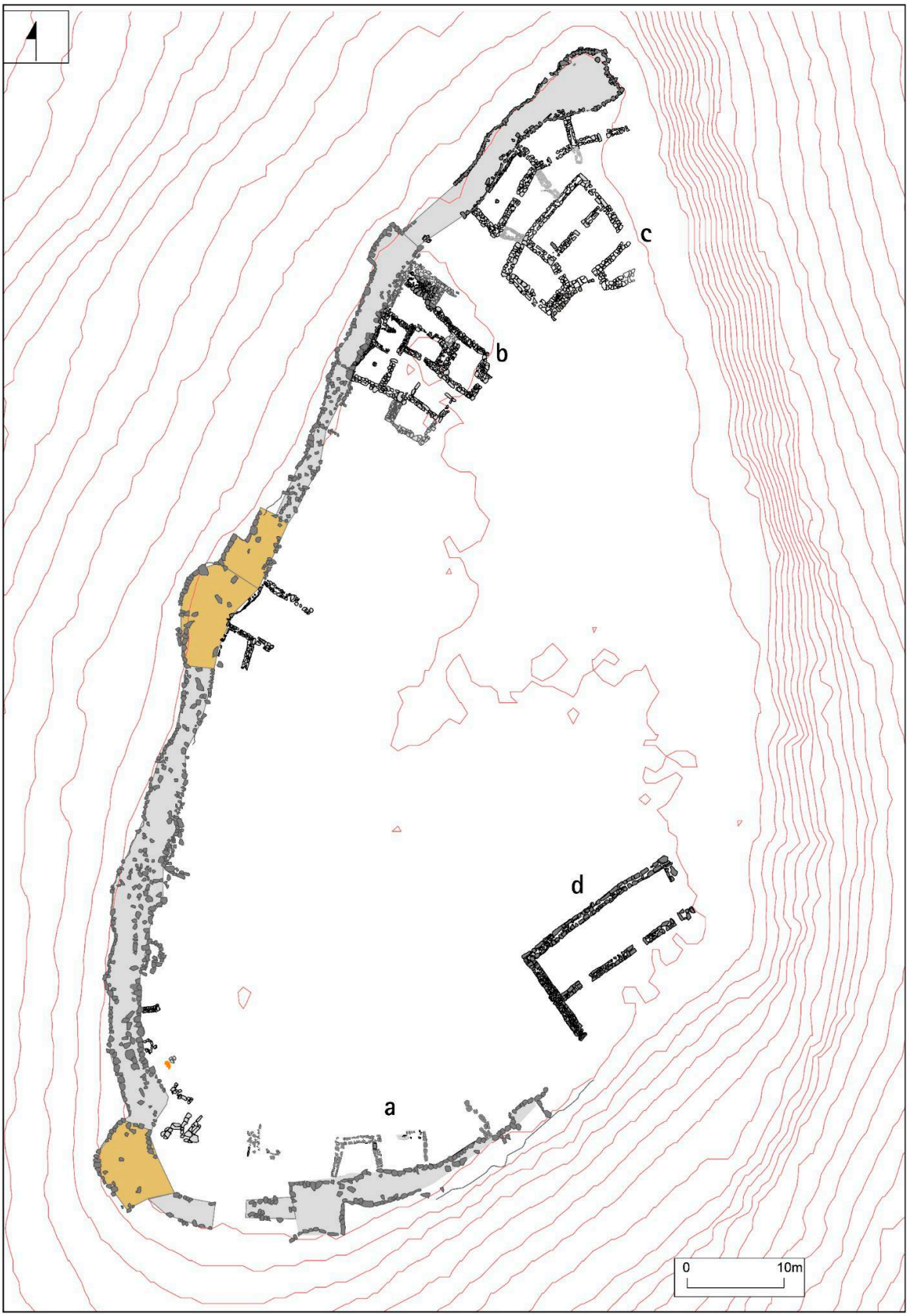

Figure 5. Occupation plan of the Andalusi phase showing the fortification system and the different types of buildings described in the text: (a) simple modulations (a), multi-cellular building (b), privileged residential complex (c) and a mosque (d).

The easily accessible western front is defended with square or circular towers and bastions, together with a formidable wall with an average width of 3 m. The construction technique used consists of two solid dry-stone masonry walls, with the space between them filled with blocks and gravel (Figure 2). The layout was also conditioned by the intermittent nature of its function. Successive functions repeatedly repaired and modified the defensive structures, of which the intensity and functionality are still being analysed [3].

The entire central space of the settlement is free of buildings, with the exception of two free-standing structures, one described as a 'privileged' residence and the other as a mosque for communal use [5]. With regard to the different areas excavated protected by the wall, up to three different forms of modulation were identified. From the northern sector of the site to approximately half of the total length of the wall, a series of simple modules were identified, the basic residential units documented, each of which contained at least one hearth. The only multi-cellular building system discovered also shows a clear evolution from a simple module. Its development can be seen within different additions to the complex, which are not always orthogonal to the initial space and eventually form a clearly hierarchical space. We also identified a communal activity area attached to the complex with an independent entrance. The area had a raised oven built with slabs surrounded by various hearth structures, which we have identified as a small kitchen. Lastly, in the southern sector of the site, we identified a new simple module of completely different proportions and morphology to those of the residential modules. In this case, this was associated with various enclosures possibly made of perishable materials, which we believe to be a space for stables and storage (Figure 6).

Figure 6. Details of the different sectors from the Andalusi period, including an area for stabling and storing (**a**); a small communal kitchen (**b**); a mosque; (**c**) and a privileged residential complex (**d**).

The construction techniques associated with the buildings are homogeneous. However, two development phases of the settlement's urban fabric can be differentiated via the quality of the workmanship. The orthogonal walls of the residential modules are arranged against the main wall on stone foundations, built using double masonry filled with gravel and earth, possibly using a frame. Earth might also have been used as mortar and even cladding. The masonry is much more elaborate in the two free-standing buildings. The layout of the walls and partitions was built directly on natural rock during the hillfort's foundation phase, and on a relatively uniform layer of gravel and earth during the later renovation period. The roofs were probably built using plant-based materials in the form of flat slabs. Thoroughfares would have been built either on the calcareous geological base itself or on the protohistoric building materials which, if taken in order of collapse, would constitute levels of use in the al-Andalus period.

The archaeological records have made it possible to establish a solid scenario in terms of the periodisation of the site's architectural development, the spatial organisation of activities and the identification of the occupants and the functions they would have performed [3]. Ceramic materials mostly appear in a secondary position and are highly fragmented, due to the planned and ordered abandonment of the settlement. However, the analysis of the finds led to the initial morphotypological identification, which primarily comprises local production together with other elements from different parts of the Iberian Peninsula. This indicates the presence of occupants from different parts of the al-Andalus domains. In turn, the metal record gave rise to the recovery of a small set of military panoply, as well as other elements linked to domestic use. Other unique objects were also found, such as pieces carved in bone and game boards carved in stone.

Eleven excavations have been performed at the site since 2012, funded by the Serra d'en Galceran Town Council and the Castellón Regional Council. These campaigns have gone through different phases in terms of execution and objectives, and research is currently focused on obtaining a complete understanding of the phases of occupations from the perspective of chronological precision, functional distribution and construction of the space. It also aims to open the focus towards a better contextualisation of the territorial scope within the chronological context of each of the two periods.

2.2. Characterisation and Methodology of the Carpological Material Analysis

All the samples considered correspond specifically to the protohistoric levels [1]. The methodology for taking and obtaining samples was also replicated in the stratigraphy of the al-Andalus chronology. However, at present, no positive results have been obtained.

An intensive sampling of the sediment was performed, which included a 1 m^2 grid collection, with the aim of determining the possible spatial distribution of the remains. In some cases, seeds and fruit were collected manually during the excavation process.

The sediment was treated in a flotation machine with a 1 mm interior mesh and a 0.25 mm mesh, where the floating material was collected. Once the residue was dry, it was analysed in the Prehistory and Archaeology Department laboratory at the University of Valencia. With the aid of a stereoscopic microscope, the remains were selected and identified based on a comparison with a collection of present-day remains.

2.3. Characterisation and Methodology of the Anthracological Material Analysis

For the anthracological analysis, 46 samples were examined. Exhaustive sampling was performed to recover charcoal, and the sediment was processed through dry sieving and flotation. The latter facilitates the recovery of practically all the plant macro remains, thus providing comprehensive information on the content of each sample [24]. Other larger charcoal fragments were collected individually by hand during excavations, in order to prevent fragmentation and avoid the over-representation of taxa.

For the identification of flora, a Zuzi 10× metallographic microscope with 4×, 10×, 40× and 100× objectives was used. This facilitated the detailed observation of different types of wood cells that, when burnt, retain their anatomical structure, by which plants can

be identified. In order to guarantee identification, the samples were checked against recent carbonised wood and various specialised plant anatomy atlases. The taxa were identified with varying degrees of success, ranging from precise to less precise identification at species level; genera that have been catalogued mention 'sp'.

Where the charcoal could not be identified between two genera of the same family, they were separated with a hyphen (-). Lastly, the *Quercineae* were grouped into two taxa that were easily distinguishable using a microscope: deciduous *Quercus,* including species such as oaks, and evergreen *Quercus,* including species such as holm oak/kermes oak/cork oak. Indeterminable taxa have also been included where it was impossible to observe the anatomical properties of fragments to determine their taxonomy, due to their small size or deformation.

At an anthracological level, the data obtained at Tossal de la Vila can be interpreted from either an ecological or an ethnological perspective, depending on the provenance and spatial distribution of the charcoal [25,26]. As a result, we correlated the charcoal samples to their spatial location and provenance in the settlement's two phases of occupation in order to be able to interpret them one way or another.

2.4. Characterisation and Methodology of the Archaeozoological Material Analysis

In both periods, the faunal elements correspond to food remains. This interpretation is based on the fact that the animal remains appear together with other materials, such as pottery, charcoal and seeds, and there are anthropic alterations such as butchery marks and there are no articulated portions or complete skeletons. The selection of stratigraphic units and sectors was motivated by the quality of the data: units derived from domestic residue, undisturbed units, sectors with significant assemblages, etc.

The faunal assemblage under study was collected manually during the excavation process. Although teeth, smaller animals such as leporids and a large number of bone fragments are recorded, we are aware that there may be a bias against smaller fragments.

The analysis of the sample was performed using comparative osteology. Given that, at present, no significant differences were found by breaking down the data by differentiated sectors, the total quantification for both periods are provided. In this article we work with the number of identified specimens (NISP, NISP%), and in the tables, we provide the minimum number of elements (MNE, MNE%) as a completment [27,28].

Sheep and goat bones and teeth were differentiated according to the criteria of Boessneck et al. [29], Payne [30], Halstead et al. [31], Zeder and Lapham [32] and Zeder and Pilaar [33]. However, the significant bulk of remains were included in the mixed category of caprinae (OC). When it was not possible to identify the remains at a species level due to the state of conservation, we quantified them osteologically by size, i.e., macro (cattle, horse) and meso-mammal (in which we grouped medium-sized animals, such as caprinae and suidae) categories. Small splinters with no osteological or taxonomic provenance were counted as unidentified remains. Unidentified avian remains were included in the general category of birds.

Regarding the frequency of the anatomical parts of the skeleton of each species, this was of each species, this has been evaluated taking into account the MNE, from which we have obtained the minimum number of animal units (MAU) [34]. MNE and MAU results have been grouped from larger units: head, axial skeleton, forelimb, hind limb and appendicular limbs.

The presence of equidae is low in both phases, only two remains could be attributed to horse (early medieval phase) and the rest were included in the *Equus* sp. category, because morphological and biometric criteria did not help us to make a specific identification. The size of the cattle remains leads us to rule out the presence of *Bos primigenius* for the time being. The differentiation between the domestic pig and its wild type has been established by metrical criteria. This differentiation was not always possible due to the presence of small fragments, and it is possible that some wild boar remains have been included in the category of domestic swine. In Appendix A (Table A9), we include some of the

measurements (we have followed the method of Von den Driesch [35]) that have helped us in these differentiations. For the moment, there are only a few measurable data, and we hope to increase in the next years the corpus of biometric data important to know the skeletal variations of different species, among other questions.

Age was determined by dental eruption and wear [36–38], and the level of detail of the appendicular skeleton [39,40].

In general, the data extracted from the protohistoric period are more limited than that of the early Middle Ages, and therefore only enables us to sketch a vague outline of the management and exploitation of the enclosure's faunal resources. The low percentage of fragments identified at the species level and their state of conservation limits the informative value of some of the classic analyses performed in archaeozoology. In this article, we will not dwell on the taphonomic results and other alterations, such as butchery marks, which may have affected the final preservation of the complex (for more information on the Islamic occupation, see Pérez-Polo et al. [22]). However, we would like to point out that the early medieval occupation razed a large part of the preceding structures, which, together with other post-depositional alterations, has conditioned the quality and quantity of the faunal remains from the protohistoric phase.

3. Results

3.1. The Protohistoric Settlement

3.1.1. The Protohistoric Carpological Record

The carpological study led to the discovery of a remarkable set of seeds and fruit, the results of which were included in a previous publication [1]. All the remains are charred, which must be related to the fire that seems to have led to the abandonment of the protohistoric settlement.

At present, the analysis has not provided any relevant conclusions about the spatial distribution of the carpological samples. The flora remains recovered from the levels of use show that the agricultural activity of the settlement seems to be mainly characterised by the cultivation of two taxa: durum wheat (*Triticum aestivum-durum*) and domestic barley (*Hordeum vulgare* subsp. *vulgare*). The presence of domestic wheat is marginal and there is no evidence to suggest that they were domestic crops. There was also evidence of weeds (such as *Lolium temulentum*, *Galium* sp.) in the same fields as the two cereals.

There is no evidence that other cereals, such as millet, were cultivated, although there is evidence in the chronologies at nearby sites, such as Los Morrones [41] and at several other sites in Catalonia [42]. In turn, it is not currently possible to confirm the cultivation of legumes.

Accordingly (Figure 7; Table A1), the agricultural model can be defined as exclusively based on annual crops (wheat and barley). Added to this is the systematic use of wild plant resources. Acorns (*Quercus* sp.) were particularly important, either for animal or human consumption, and, to a lesser extent, blackthorns (*Prunus spinosa*).

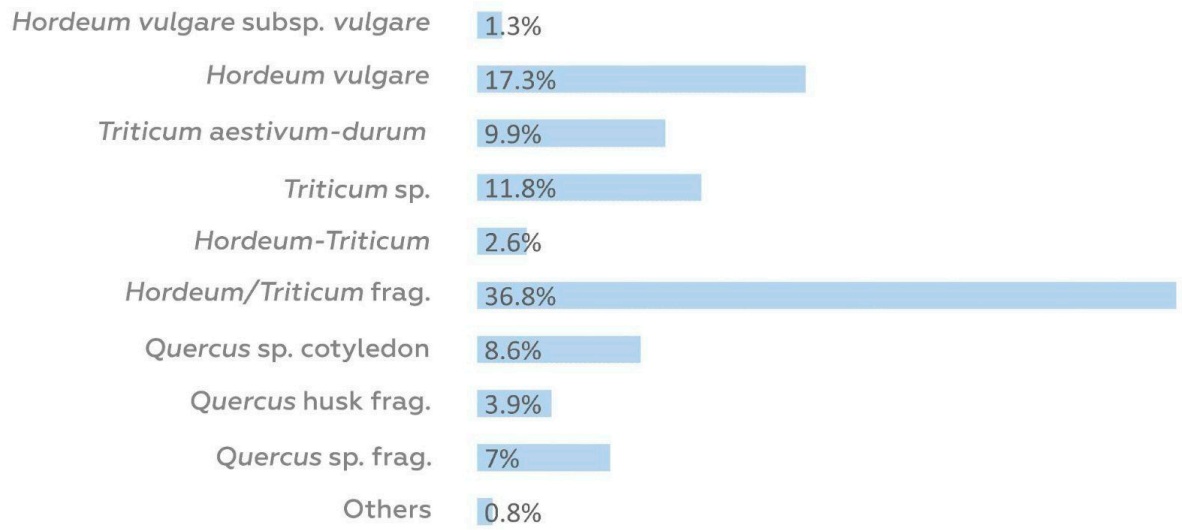

Figure 7. Protohistoric carpological record: relative frequency (%) of the carpological remains recovered. Data derived from Table A1 (Appendix A).

The collection and use of *Quercus* fruit is very common in the prehistory of the Iberian Peninsula, especially in the Bronze and the Early Iron Age [43]. This is documented in Tossal de la Vila by the constant and abundant presence of carbonised cotyledons in all the protohistoric areas excavated, including those in which the corresponding carpological study is not yet complete.

3.1.2. The Protohistoric Anthracological Record

A total of 2754 charcoal fragments were analysed in the anthracological study of the protohistoric occupation, corresponding to the construction and use (Phase I; 1362 fragments), and destruction and abandonment (Phase II; 1392 fragments) of the settlement.

In Phase I (Figure 8; Table A2), the charcoal samples appear either dispersed in the sediment or in carbonaceous concentrations not directly associated with any structure. In general, the samples have been interpreted as residue from cleaning out hearth structures that were in use over time and, therefore, are good ecological indicators. From this perspective, the samples analysed from the dispersed charcoal reveal the presence of evergreen *Quercus* in all but one of them, although with very variable percentages. There are also other taxa, most in negligible percentages, such as 'strawberry tree' (*Arbutus unedo*), legumes, gorse-type legume, ivy, rosacea, rosemary and heather. Five taxa were identified in the sample with the greatest variety. The most abundant was deciduous *Quercus*, followed by *Arbutus unedo*, evergreen *Quercus*, rosemary and heather.

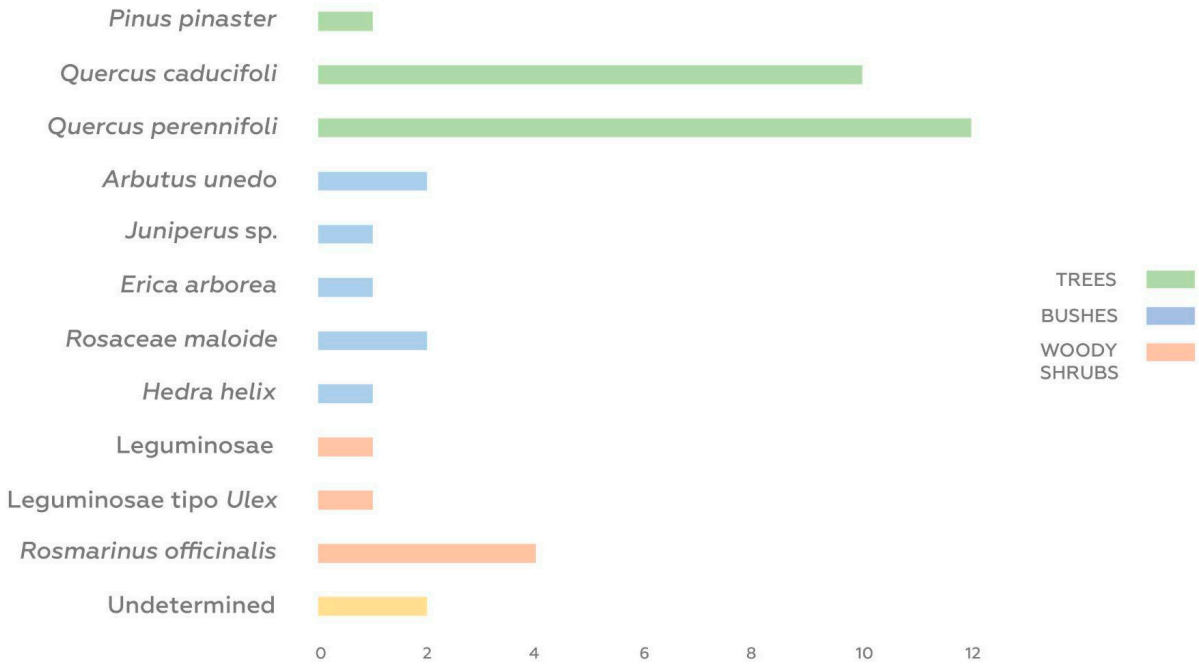

Figure 8. Protohistoric anthracological record: number of stratigraphic units in which different anthracological species have been recorded (Phase I). Data derived from Table A2 (Appendix A).

The charcoal found in carbonaceous concentrations was sometimes associated with building material, and in others, it was found next to or inside ceramic remains. These samples did not show significant variability, and most were monospecific such as evergreen and deciduous *Quercus*, except in one of the samples, where *Pinus pinaster* (maritime pine) and rosemary were also identified.

In the levels of abandonment or destruction (Phase II) (Figure 9; Table A3), most of the charcoal analysed was found at the level where the building structures had collapsed as a result of the fire. In several post holes, charcoal fragments of varying sizes were identified, the main taxa being oak and kermes oak. Oak seems to have been used more abundantly in construction, although holm oak was also used.

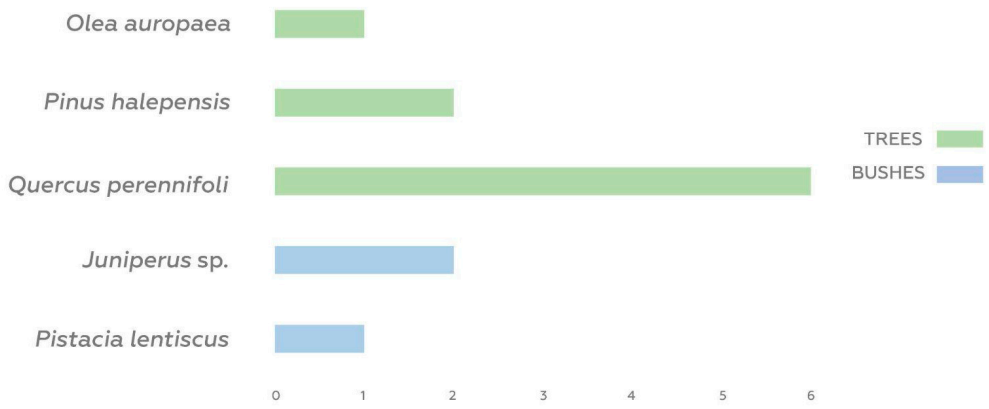

Figure 9. Protohistoric anthracological record: number of stratigraphic units in which different anthracological species have been recorded (Phase II). Data derived from Table A3 (Appendix A).

Charcoal was also found dispersed over these levels in the sediment, and the most abundant taxa found were also deciduous and evergreen *Quercus*. This suggests that they are the remains of the wooden structures that were destroyed, although they might be

mixed with remains from different origins. As a result, there seems to be no difference between their use as fuel in hearths and as structural fixings (posts/roofs).

The results from the protohistoric period indicate that the plant cover was dominated by a well-preserved mixed forest, with dominant tree layers of oak and kermes oak together with juniper or scale-leaf juniper, heather and 'strawberry trees', an approximation of what would have been the area's potential flora. The inhabitants of the settlement would have used these resources to obtain firewood for their homes, mainly holm oak, and used oak to build structures, which, due to its characteristics, would have been used for beams and other architectural features. The differentiation between charcoal intended for constuction material or fuel has been established by the species identified and by the location of each example within the settlement (within a structure, post hole, etc.). Other nearby protohistoric sites where anthracological studies have been performed, such as Els Estrets in Vilafamés [44] and El Cormulló dels Moros in Albocàsser [45], also document the use of holm oak and oak as construction material and fuel.

3.1.3. The Protohistoric Archaeozoological Record

The faunal assemblage analysed from the late Bronze to the late Iron Age comprises 1476 remains (Figure 10; Table A5), of which only 512 were identified at the species level, representing 34.6% of the total. This percentage highlights the assemblage's poor state of conservation and the over-representation of unidentified remains including small splinters without osteological or taxonomic provenance. However, it is indicative of an exhaustive manual collection.

The majority of the remains identified, 89.1%, were from domestic animals compared to 10.9% from hunted animals. Caprinae dominate (caprinae + sheep + goats; 64.9%), while domestic suidae (11.8%) and cattle (10.8%), the second most represented species, had similarly low values. Lastly, equidae remains (1.6%) were negligible (Figure 8; Table A5). In turn, malacofauna remains were token and reduced to five fragments corresponding to marine bivalves.

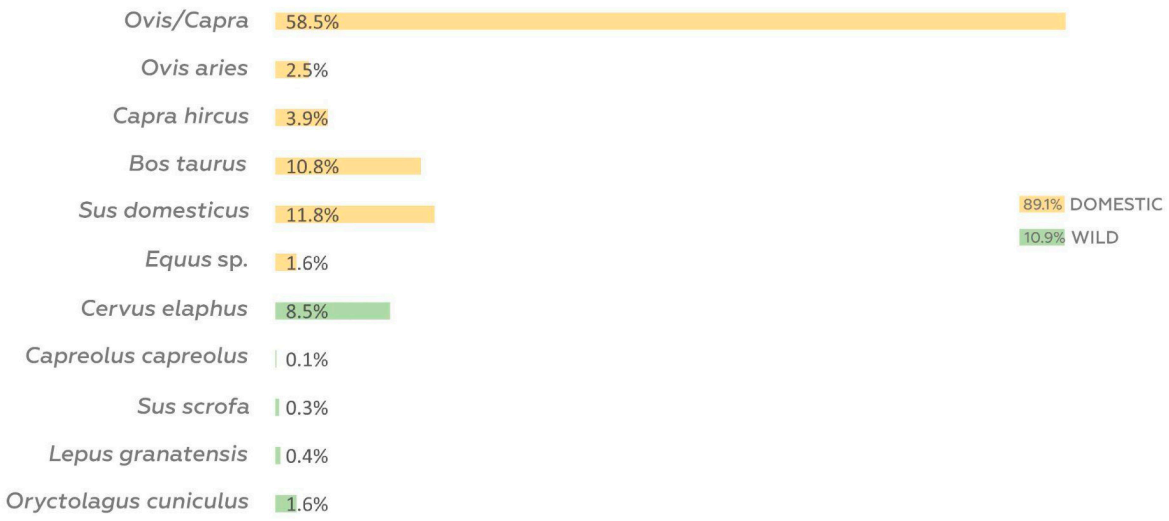

Figure 10. Protohistoric archaeozoological record: relative frequency (%) of faunal remains identified to species level recovered. Data derived from Table A5 (Appendix A).

The most recorded hunted species is red deer (8.5%). Other species documented in this group are less common and include: roe deer (0.1%), wild boar (0.3%), hare (0.3%) and rabbit (1.6%).

The differentiation between sheep and goats was not easy due to the state of conservation and the usual problems of identification between the two species. The bulk of the remains were included in the mixed category caprinae (OC; 58.5%). The limited number of sheep (2.5%) and goat (3.9%) remains do not support any particular hypothesis.

However, for the moment, the data indicate a similar weight of both species, with a slight predominance of goats.

The limited set of remains conditions representativeness and makes it impossible to establish the age at slaughter of caprinae, cattle and suidae, those with the highest rates recorded. Of the limited number of caprinae remains from which data on the state of epiphyseal fusion could be extracted, 30% derive from juvenile individuals, with preferential age of slaughter being between 1.5 and 2.5, and 2.5 and 3.5 years old. Examining the eruption and wear of the mandibular teeth to estimate the age of slaughter, only three mandibles belonged to sub-adult individuals (slaughtered between the second and third year of life, phases D and E), while the third belonged to an adult (>3 years old). In general, examining each tooth individually, the results coincide with the analysis of dental wear stages, given that most of the pieces (N: 23), except for one that shows the first stages of dental wear, show little wear (<9). In the case of cattle and suidae, the data are even less representative. In the former, there was one juvenile and one adult individual, while in the latter there were two sub-adult individuals.

Regarding anatomical distribution, the best represented parts of the caprinae according to the MAU analysis (Table A7) are the elements of the head, the rest being shown in a balanced way. As for the rest of the domestic species, the analysis yields insufficient data, so we point out, without further precision, the apparent presence of elements derived from all anatomical regions. Although the data are also scarce for the deer, the best represented wild species, we interpret the presence of all the anatomical parts as a consequence of a contribution of the whole animal to the settlement, and its hunting in the vicinity of the settlement. On the other hand, the axial skeleton is under-represented in all species, since due to the level of fragmentation, most of the remains were included in the meso-macromammal categories.

3.2. The Andalusi Emirate Hillfort

3.2.1. The Andalusi Carpological Record

A carpological analysis could not be performed, as no samples were found, despite several campaigns of exhaustive sample collection in multiple strata to determine hearth structures, ashes and levels of use. The question arises as to whether the uneven conservation between the protohistoric and early Medieval carpological contexts is due to a sampling problem or, in contrast, to taphonomy and the settlement's abandonment conditions at the end of their respective periods of occupation. In this regard, the fire that marked the settlement's abandonment in the early Iron Age gave rise to the exceptional conservation of seed and fruit remains from the period. In turn, archaeological records of the abandonment of the settlement during the first half of the 10th century CE highlight how the occupants of the hillfort removed all their possessions, including foodstuffs, in an orderly manner. Anything that was left behind disappeared due to decomposition, which only leaves the possibility of recovering contexts from hearths or middens, which are being thoroughly processed despite negative results.

3.2.2. The Andalusi Anthracological Record

A total of 687 charcoal fragments were analysed in the anthracological study of the Andalusi occupation (Figure 11; Table A4), corresponding to the use (Phase III; 610 fragments) and abandonment (Phase IV; 77 fragments) of the settlement.

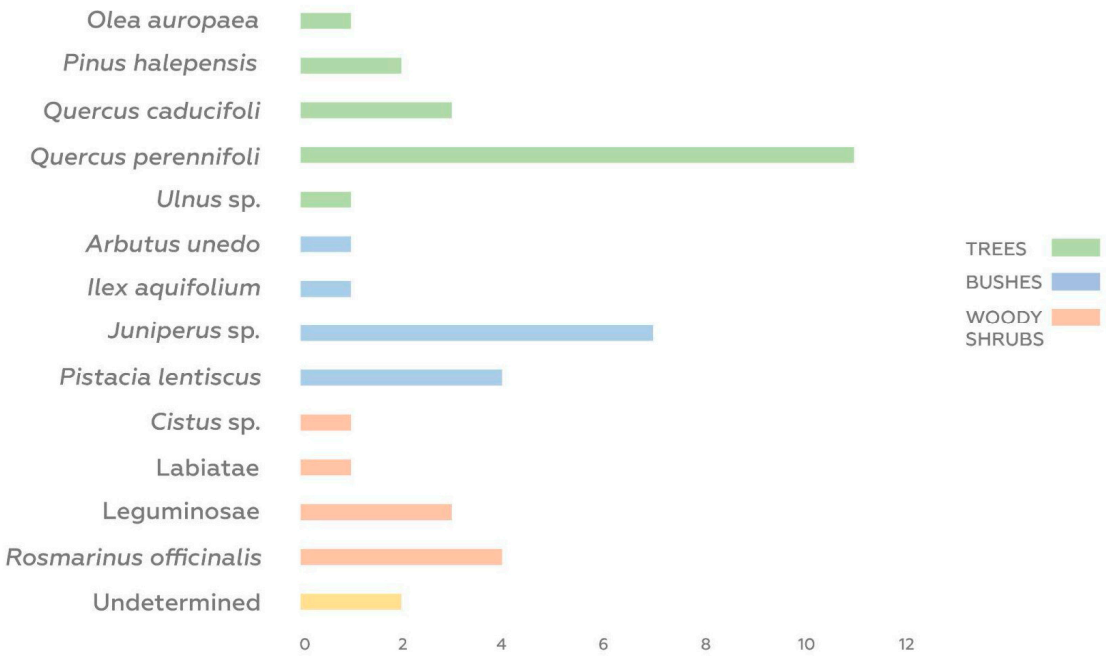

Figure 11. Andalusi anthracological record: Number of stratigraphic units in which different anthracological species have been recorded. Data derived from Table A4 (Appendix A).

The charcoal concentrated in hearth structures reflects their last level of use. The best represented the taxa of evergreen *Quercus*, together with other taxa such as juniper, mastic, *Cistus*, legumes and labiatae such as rosemary. In the dispersed charcoal, the most abundant taxon was still evergreen *Quercus*, together with *Juniperus* and *Rosmarinus*.

At the abandonment level, we worked with a sample of 77 fragments of concentrated charcoal, all identified as deciduous *Quercus*.

Similar to the protohistoric period, the charcoal recovered from the early Middle Ages is indicative of the forest that provided wood, especially holm oak that was used as the primary fuel, together with a high variability of species of shrubs and bushes that grew in low areas and on the sunny slopes of the sierra.

Although the identification of oak is practically non-existent in this period, it does not imply that it disappeared from the natural environment. Most of the charcoal recovered is the result of the last fire tended in the structure, which would have been the last firewood collected, and would not be a valid interpretation from an ecological perspective. However, the study of these levels has provided a diverse anthracological record that complements the data obtained from the dispersed charcoal. By determining which species would best suit specific needs, we were able to determine that they generally formed part of the flora ecosystem close to the site, which therefore demonstrates the use of plant resources from all the biotopes susceptible to exploitation.

3.2.3. The Andalusi Archaeozoological Record

The emirate faunal assemblage analysed to date comprises 3046 remains (Figure 12; Table A6), of which 1281 were identified at the species level, representing 42% of the total [22].

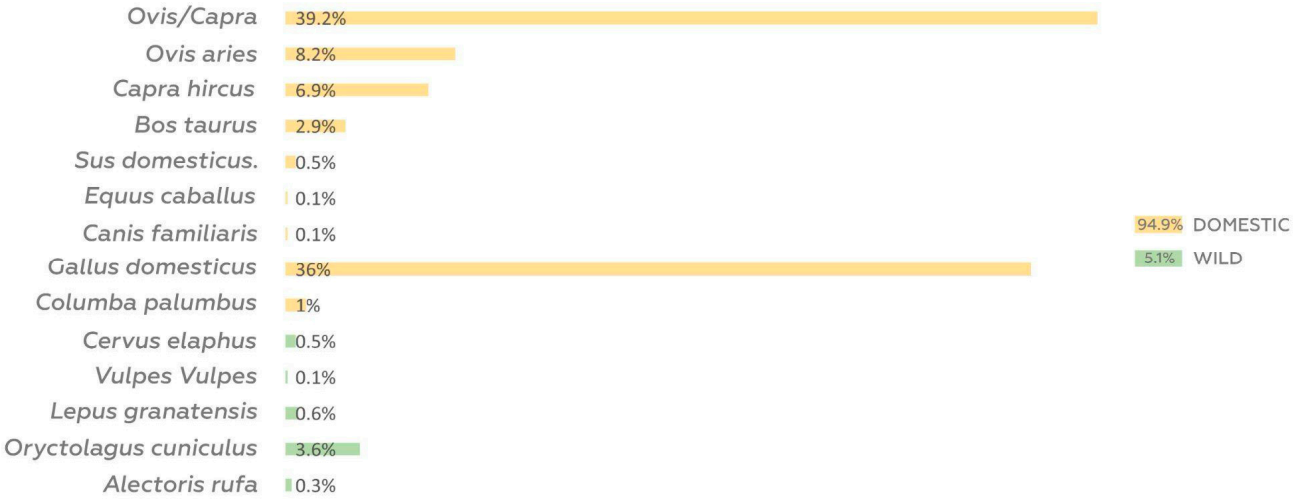

Figure 12. Andalusi archaeozoological record: relative frequency (%) of faunal remains identified at the species level recovered. Data derived from Table A6 (Appendix A).

The study revealed that the majority of the remains, 94.9%, belonged to domestic animals, compared to 5.1% from hunted species, which represent a marginal resource. Caprinae (caprinae + sheep + goats; 54.3%) and chickens (36%) dominate compared to the token presence of cattle (2.9%), pigeons (1%) and suidae (0.5%), with even lower values for horses (0.1%) and canidae (0.1%). The minor presence of hunted animals is represented by the remains of red deer (0.5%), foxes (0.1%), lagomorpha—both hares (0.6%) and rabbits (3.6%)—and partridges (0.3%) (Figure 10; Table A6).

The higher incidence of caprinae and chickens enabled us to extract a greater volume of data for both species. In the former, the two main species appear in balanced proportion, with 105 sheep compared to 88 goat remains. Examination of the state of eruption and wear of caprinae mandibular teeth revealed the dominance of sub-adult individuals slaughtered between the second and third year of life. Additionally, the presence of adult individuals over three years old is noteworthy, as well as the absence of immature young animals (phases A–C). In general terms, the results coincided with the analysis of dental wear stages, examining each tooth individually, as most of the teeth recorded were in the advanced wear stage (>9). Lastly, the state of fusion of the long bones confirmed the same trend: only 34.4% of the finds correspond to juvenile individuals, which indicates a preferential slaughter age of between two and a half and three and a half years.

Regarding chickens, the overwhelming proportion of remains with formed epiphyses indicates the presence of adult specimens, while only 5.5% of the sample belongs to juvenile individuals.

In terms of anatomical distribution, caprinae and chickens are the species that provide us with the most information (Table A8). According to the MAU analysis, the best represented anatomical region within caprinae is the forelimb, although it is fairly balanced with respect to the hindlimb and appendicular limbs, while the anatomical elements of the head reflect a lower index. As for the gallinaceous species, all anatomical regions are represented except the cranial region, possibly due to the higher rate of fragmentation in this area. There is an imbalance between the leg and the wing, with the latter being less represented. For the rest of the species, we can only point out that there is representation of the different anatomical regions. As in the protohistoric phase, the axial skeleton presents a marginal incidence, since most of these remains, due to their level of fragmentation, have been included in the meso-macromammal group.

4. Discussion

4.1. Implications of the Results for the Protohistoric Historiographical Debate

Tossal de la Vila's first period of occupation took place in the general archaeological context of the Iberian Peninsula's Mediterranean seaboard during the late Bronze Age (ca. 1300/1100–750/700 cal BCE) and the early Iron Age (750/700–550 cal BCE). The first phase is characterised by what is known as the north–eastern Urn Fields [46–50], which had an uneven impact in the regions of Aragon, Navarra and Valencia [51–63], while the second, that of the destruction and abandonment, coincided with the Phoenician colonial trade period [64–75].

For a clearer image of the occupation, the recovery of a good sample of archaeobiological remains in the excavated areas provided a fairly specific picture of the economic subsistence and exploitation activities performed by the inhabitants of Tossal de la Vila. Thus, through seed studies, we were able to determine an agricultural model based on the cultivation of wheat and barley with an annual cycle and a systematic exploitation of wild plant resources, especially acorns. The result is in line with other known chronologically related contexts and is characteristic of a phase that precedes the appearance of fruit trees in the early Iron Age [23,76].

In relation to the use of trees, woody shrubs and bushes, the anthracological study reveals that oak/holm oak was primarily used for construction and, by extension, as fuel for households, with a certain homogeneity between the different sectors. The use of woody plants, such as rosemary, seems to be very limited. Comparison with other settlements of a similar chronology suggests that the use of plant species as construction elements and fuel may have been selective, subject to availability in the surrounding environment [77].

The location of Tossal de la Vila deserves a separate mention given that the environment seems somewhat unsuitable for cultivating crops. This suggests that the selection of the location was not based on an agricultural economy as a priority, and other reasons must be considered, such as a preference for the exploitation of woodlands, animal grazing and perhaps the advantages derived from its inaccessibility.

The faunal study shows a clear preference for domestic species over wild species. In the former, caprinae dominate the sample and a mixed herd of goats and sheep were identified from the analysis. However, in general terms, there was a diversified faunal exploitation where suidae, cattle and game, mainly red deer, constitute the bulk of the total. Other species, such as equidae, have a low incidence, with values similar to those found at other sites in the region of Valencia [78,79]. Some researchers [78] suggest that some of the horses exploited for meat were wild.

The reduced incidence of hunting is common to various chronologically comparable contexts in the region of Valencia (Racó dels Cantos I [80]; Torrelló del Boverot, Los Villares and La Frontera [78]; Tossal del Mortòrum [79] and Los Morrones [81]). The values represented in Tossal de la Vila are along the same lines, with hunted animals only representing 10.9% of the total.

At present, it is difficult to determine the exploitation pattern of the most representative herds in Tossal de la Vila (caprinae, cattle and suidae) from the protohistoric period. Only the herd of caprinae enabled us to draw a tentative outline of their age at slaughter and, therefore, of livestock management strategies. However, this must be understood with due caution owing to the low representativeness of the samples. At the moment, the analyses suggest a mixed and relatively balanced exploitation of animals in an optimal state of maturity for meat production and secondary products throughout their lives.

In general terms, the livestock of the late Bronze to late Iron Age settlements in the region of Valencia was based on caprinae, suidae, cattle and equidae, the latter to a lesser extent. The diet was also supplemented with wild animals. The production strategy would be mixed, structured around the production of meat and secondary products, as well as using livestock as transport, pack and draught animals [82]. Despite these commonalities, there is variability in the percentages of the species represented in the different settlements [78,79,81,82], which cannot always be explained or directly attributed

to environmental factors [82]. Other conditioning factors, such as the strategies and needs of each individual group, as well as their corresponding relationships with surrounding groups, must be taken into account when explaining the differences documented between different settlements.

4.2. Implications of the Results for the Andalusi Historiographical Debate

Tossal de la Vila's Andalusi period of occupation falls within the general historiographical question that studies the occupation and fortification of certain high-ground enclaves from late Antiquity to the early Middle Ages, a phenomenon that has clear parallels in the western Mediterranean [83–88]. The site is an example of complex historical dynamics that correspond to diverse social and political realities that are rooted in a myriad of causes [84,89–92]. We owe the definition of this specific case in the extreme north of Šarq al-Andalus to André Bazzana [91,93–95], even though it has not been developed further since the last years of the 20th century.

Notwithstanding, recent and systematic analysis of Arabic written sources and wide advances in archaeological excavations in several of the sites within this territory have made it possible to establish a hierarchy in those settlements not always coincident with Bazzana's first hypotheses. In this sense, sites such as Tossal de la Vila have been identified as fortifications with signs of proto-urbanism, although still without clearly defined functions and economic strategies. In turn, other examples could be linked to enclosures, called *maràbit* in the Arabic sources, large spaces surrounded by dry masonry walls, identical to those of fortresses, in which no permanent settlement areas can be observed. Consequently, we suggest that they were used to install mobile garrisons to control the coast and roads [3,5,96,97] (pp. 223–227; 404–405).

Regarding our site and taking into consideration the anthracological contexts recovered, of note is the strong homogeneous use of forestry resources by the occupants of the emirate hillfort. In this regard, the charcoal recovered from the different hearth structures identified as domestic hearths shows a balanced composition in the elements burnt. Thus, woody bushes and plants such as juniper, scale-leaf juniper, mastic, 'strawberry tree' and rosemary would be used as ignition fuels, while holm oak and cork trunks would provide sufficient raw material to generate long-lasting embers. The conservation of charcoal and ashes is exceptional, as they were recovered in their primary position owing to the orderly abandonment of the settlement, and, in one case, they were still covered by a stone slab.

In contrast, the deterioration levels of the houses, of which the layers of collapse include roof and building materials, show a higher proportion of deciduous *Quercus*, which provides denser and more resistant timber than holm oak or cork oak. There is a notable absence of pine in the samples, both in combustion and construction. This seems to indicate a type of flora that is in strong contrast to the area's current configuration, where pine has acquired a major presence, to the detriment of holm oak and oak groves. The latter is due to the fact that, in general, there has been a change in the landscape in the historical period due to deforestation, fires, etc. and, above all, more recently, to the intense repopulation of pine trees in the area. It is worth highlighting one last important detail: the recovery of charred fragments of olive trees not linked to houses or other living spaces. Although this does not provide a great deal of precision for the analysis of the use of wood resources, it helps to confirm the importance of olive crops throughout the al-Andalus period.

Lastly, the analysis of the faunal contexts from the emirate occupation period reveals consumption patterns based mainly on domestic species, especially through rearing small flocks of sheep, goats and chickens. Regarding caprinae, which is the taxon that provided the greatest volume of data, the analyses show a mixed and balanced flock of sheep and goats, in which the use of secondary products, such as wool and milk, was prioritised over the production of meat, as can be seen from the pattern of slaughter. This same pattern was observed in chicken remains, which revealed an overwhelming majority of adult individuals. Consequently, meat consumption was secondary to egg production. In general terms, it shows a subsistence-oriented production system, similar to those documented in

other contemporary al-Andalus rural contexts [98,99], although with specific characteristics depending on the functional significance of the site.

Within the group of domestic animals, the minuscule proportion of suidae remains in the archaeofaunal assemblage is particularly noteworthy, accounting for around 0.5% of the sample. This situation can easily be explained by the presence of a human community that had adopted dietary guidelines incorporating certain Islamic religious precepts, such as the prohibition of eating pork and wild boar. From the early development of Islam, this was one of the most basic symbols of belonging to the new community of believers. Islam spread progressively in al-Andalus during a long transformation process that developed through the interaction between the different groups settled in the Iberian Peninsula [99] (pp. 663–664). This transformation, which is known generically as the Islamisation of al-Andalus led, in terms of food, to the adoption of a certain orthopraxis specific to medieval Islam. Tossal de la Vila is one of the earliest examples of this transformation, given its chronology and peripheral location.

The archaeozoological studies performed in al-Andalus contexts also highlight the secondary or insignificant role of other domestic species such as cattle [98,99], a situation that is repeated in the case of Tossal de la Vila. However, the question arises whether the very low values reflected in the analysis of this species at the site, even lower than those found at other contemporary sites, could be linked to the military function of the settlement.

In this regard, the evidence that indicates the presence of an armed group at the site, that would have performed tasks such as surveillance and territorial control, could be the reason for the lack of diversity in the herd maintained, as it would have been easier to reduce husbandry to a minimum.

The presence of wild fauna is practically marginal, and only rabbits are significantly represented in consumption remains. Although there is evidence of rabbits breeding in al-Andalus from early times [99], there are reasons that lead us to include them in the hunting category. One reason is their scarce representation in the food remains, and another, the isolation and difficulty to access the nature of the settlement.

The faunal data published on the territorial scope of Šarq al-Andalus in the early Islamic period are limited to those presented here [22] and to those published for Molón de Camporrobles [98]. Therefore, only new, accurately processed data from other rural enclaves in the region can shed light on these and other questions. At present, only more questions are emerging from these initial studies.

In summary, the archaeobiological evidence as a whole reinforces the initial hypothesis that the settlement was a hillfort occupied by a small human community that would have performed surveillance and territorial control functions together with subsistence activities. In this regard, the anthracological record shows homogeneous patterns of exploitation of forestry resources. The diversity of species used is typical of a close supply. The majority of the surrounding arboreal flora, comprising various species of evergreen *Quercus*, was effectively combined with various woody shrubs and bushes to feed the hearths of the various living areas of the hillfort, while the more resistant deciduous varieties, such as oak, were used for roofs and other construction material. As previously highlighted, the sphere of action for supply is relatively close to the settlement, which also seems to indicate that the inhabitants made careful choices aimed at avoiding using supplies from more distant resources.

The archaeozoological evidence also seems to highlight the same careful choices through the intensive exploitation of animals and their by-products, such as milk and eggs as a source of animal protein. Bearing in mind the highly developed level of Islamisation of this population in terms of dietary orthopraxis, and taking into account the geographical and chronological context of the site, the absence of suidae in the diet did not seem to lead to an increase in hunting activities. This seems to indicate that such activities in the settlement were reduced to a minimum. The evidence seems to suggest that economic strategies favoured the simplification of the work processes linked to subsistence. This

would allow for a greater effort to be devoted to the military functions that were expected of a fortification of this type.

5. Conclusions

Owing to our extensive research, we are now in a position to offer concrete answers to the question of why two different human communities, separated by almost two millennia, chose to occupy the same site. In both cases, the underlying cause for choosing the site is linked to subsistence reasons, based on economic strategies that prioritised interest in nearby resources, especially timber. Another common aspect will be the keeping of mixed flocks of sheep and goats, although the landscape of the immediate surroundings seems particularly suitable for the latter. The analysis of the anatomical distribution has allowed us to explore the caprinae and chickens (the latter within the Andalusi phase) with a greater precision, but at a general level we can highlight that the presence of the remains in all the anatomical regions of the different species is indicative of the complete processing of a large number of animals within the settlement within both phases of occupation. However, this is where the coincidences seem to end. In the protohistoric period, the archaeobiological record reveals heterogeneous, diverse economic activities, while evidence from the al-Andalus period seems to suggest that complexity was reduced to much less significant limits.

Thus, the carpological analysis of the plant resources used for food in the protohistoric period highlights a cereal diet based on annual cycle crops, such as durum wheat and domestic barley, although heavily supplemented with the collection of acorns, whether for animal or human use. The considerable distance between the settlement and the probable cereal fields points either to the existence of an exchange relationship between enclaves or the existence of complementary settlements in the valley floor, of which the function would be to cultivate and store crops. Unfortunately, we are not yet in a position to clarify this aspect, although future survey work might shed light on key questions for understanding the survival of the settlement during the late Bronze Age. Similarly, the al-Andalus scenario remains a complete mystery, as no carpological remains have been recovered to date, probably due to the poor conservation conditions of differential taphonomy in the formation of its levels of abandonment and deterioration.

In turn, the livestock strategies between the two periods show some significant differences, which leads us to suggest two clearly divergent options. Hunting did not seem to account for an excessive volume of animal protein intake of either group, although hunting activity was clearly more relevant in the protohistoric period, in which red deer seems to play an important role in the food supply. It seems, therefore, that a conscious and programmed dedication to hunting can be identified, which would supplement a predominant domestic diversified herd, caprinae, the majority, and well-represented suidae and cattle. The age of slaughter, which identified a large number of juveniles, suggests a well-structured livestock scenario, in which breeding and consumption coexisted with other secondary productions.

The al-Andalus scenario is very different in terms of livestock strategies, with an absolute dominance of caprinae and chickens, taxa that were slaughtered at an advanced age. This highlights an economic activity that was totally secondary to other functions and ensured a constant supply of animal protein in the form of milk and eggs, as well as the sporadic consumption of meat from animals that were no longer productive. These characteristics, together with the token hunting of various species and the anecdotal presence of other animals in the domestic herd, lead us to consider that the subsistence practices of the fortified enclave were never considered priority economic activities.

Therefore, when it comes to the reasons that led these two human communities to settle on top of a rocky outcrop at an altitude of almost a thousand metres, a distinction can be made between economic and strategic reasons. Thus, the protohistoric settlement seems to have chosen the enclave primarily for its accessibility to optimal forest resources, the possibility of keeping a small herd of livestock and the development of other supplementary

subsistence activities, such as hunting and gathering. In contrast, the installation and fortification of the enclave in the Andalusi period was due to well-founded military reasons, as it was located at the crossroads between the great emirate cities of Valencia, Tortosa and Zaragoza. The economic activities documented in its interior are the minimum needed for the subsistence of the group, linked practically and exclusively to the supply of firewood for the living spaces and the maintenance of a small group of sheep, goats and chickens to provide permanent food for the garrison. This subsistence strategy was not based on economic design. In fact, it most probably had to be supplemented by contributions of other food sources from nearby peasant communities, through mechanisms that we are not yet able to define precisely.

Therefore, and by way of conclusion, it is worth highlighting the multiple causal structures that arise when faced with the decision of occupying a high-altitude enclave. On the one hand, the example of a protohistoric settlement built in a location that provided certain characteristics for the development of the economic activities contemplated when the settlement was founded. In this case, the biotic resources around the site played a key role in the choice of location. The settlement's survival was based on the occupants' correct evaluation of the sources of supply and their capacity to exploit them. The set of tasks performed, including livestock husbandry, gathering, agriculture and domestic activities, seem to have revolved around varied and well-defined economic strategies, typical of settlements that characterise the late Bronze Age communities. However, it was an economic model that was not perpetuated in the new phase that marked the end of the settlement, the early Iron Age.

In contrast, the al-Andalus hillfort did not seem to take these conditions into account in the choice of the site, which responds to military needs and is an optimal location from a strategic perspective. The needs of its occupants seem to have played a secondary role during the construction of the fortification, with no nearby food sources and not even cisterns for storing water, basic elements for the permanent establishment of a human community. The strategies used to solve these shortcomings must have been different to those employed during the protohistory period, possibly linked to the ability to extract resources from the surrounding territory by mechanisms that are still under study. All the indicators highlight activities oriented towards more than meagre subsistence requirements, with no apparent economic vocation.

Author Contributions: All authors contributed equally; funding acquisition, M.P.-P., J.N. and G.P.-J. All authors have read and agreed to the published version of the manuscript.

Funding: This research received funding from the following projectsand and contracts: M.P.-P has carried out this work within the contract as a postdoctoral researcher at the University of Salamanca. This contract is part of the Margarita Salas grant, financed by the Ministry of Universities (Spain) with Next Generation funds from the European Union. J.N. has worked within the framework of ENALFE: Entre al-Ándalus y la feudalidad. Poderes territoriales y desarrollo de sistemas defensivos altomedievales en el nordeste peninsular (PID2020-114484GB-I00), funded by the Ministry of Science and Innovation; G.P.-J. has worked within the framework of FRUITCOM: Un nuevo modelo agrícola: frutales, hierro y comercio durante el I milenio A.E. (CIDEGENT/2019/003), funded by the Generalitat Valenciana (Regional Government of Valencia).

Data Availability Statement: The results of this research will be compiled from new and published sources. All data are available in the research cited and in this manuscript.

Acknowledgments: The authors would like to thank the Castellón Provincial Council and the Serra d'en Galceran Town Council for their constant support (financial and logistical) both in the development of the archaeological excavation and in the research plan. To M. Moreno-García, head of the Laboratorio de Arqueozoología del Instituto de Historia (IH/CCHS-CSIC), and his team, E. López-Romero and E. Checa, we are very grateful for allowing us to consult the reference collection of this centre. Finally, we would like to thank the reviewers who contributed constructively with critical comments on the final version of the article.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Protohistoric carpological record: number of remains (NR.) and relative frequency (%) of recovered species.

	Total NR.	**%**
Hordeum vulgare subsp. *vulgare*	126	1.3
Hordeum vulgare	1723	17.3
Triticum aestivum-durum	987	9.9
Triticum sp.	1177	11.8
Triticum cf. *diccoccum*	5	0.05
Triticum cf. *Monococcum*	1	0.01
Triticum dicoccum spikelet	1	0.01
Hordeum-Triticum	265	2.6
Hordeum/Triticum frag.	3673	36.8
Fallopia convulvulus	7	0.07
Galium sp.	1	0.01
Leguminosae	1	0.01
Lolium temulentum	15	0.1
Poacea	2	0.02
Prunus spinosa	3	0.03
Quercus sp. cotyledon	865	8.6
Quercus sp. cupula base	10	0.1
Quercus husk frag.	386	3.9
Quercus sp. frag.	701	7
Undetermined fruit	2	0.02
Undetermined mass	29	0.3
Total	9980	100

Table A2. Protohistoric anthracological record: percentages (%) of occupation levels (phase I). Concentrated and dispersed charcoal.

Sector	**UE**	**Charcoal Distribution**	***Pinus pinaster***	***Quercus caducifoli***	***Quercus perennifoli***	***Arbutus unedo***	***Juniperus* sp.**	***Erica arborea***	***Rosaceae maloide***	***Hedera helix***	**Leguminosae**	**Leguminosae tipo*Ulex***	***Rosmarinus officinalis***	**Undetermined**
3	3018	Dispersed		100%										
6	6018			50%	16.7%	20.4%		5.6%					5.6%	1.9%
1	10013				37.2%	2.3%			2.3%	4.7%	9.3%	9.3%	34.9%	
6	6014				45.8%		54.1%							
6	6043				100%									
3	3029-E4-PI02				100%									

Table A2. *Cont.*

Sector	UE	Charcoal Distribution	*Pinus pinaster*	*Quercus caducifoli*	*Quercus perennifoli*	*Arbutus unedo*	*Juniperus* sp.	*Erica arborea*	*Rosaceae maloide*	*Hedera helix*	Leguminosae	Leguminosae tipo*Ulex*	*Rosmarinus officinalis*	Undetermined
3	3009-23	Concentrate		100%										
3	3010-12			100%										
3	3010-28			100%										
3	3010-27				100%									
3	3010-35			100%										
3	3008-39			100%										
3	3008-20		15.8%	47.4%	10.5%								26.3%	
3	3010-01				50%								50%	
3	3009-43				100%									
3	3009-06													100%
3	3046-FP1				100%									
3	3010-09				100%									
7	7006-83P			100%										
3	3030P			97.2%	0.9%				1.9%					
				Trees				Bushes			Woody Shrubs			

Table A3. Protohistoric anthracological record: percentages (%) of occupation levels (phase II). Concentrated and dispersed charcoal.

Sector	UE	Charcoal Distribution	*Olea europaea*	*Pinus halepensis*	*Quercus perennifoli*	*Juniperus* sp.	*Pistacia lentiscus*
4	4012	Dispersed	13.1%		9.8%	11.5%	1.6%
3	3008-A2						
3	3008-A1				28.6%		
3	3023				58.3%		
47	47103-95						
47	47113-FP21						
47	47103-96			99.6%			
47	47103				100%		
47	47121 FP13	Concentrate			100%		
6	6002-50						
6	6002-49						
6	6034 FP5				100%		
5	5115-91					100%	
1	10017V			100%			
				Trees		Bushes	

Table A4. Andalusi anthracological record: percentages (%) of occupation and abandonment levels (phases III-IV). Concentrated and dispersed charcoal.

Level	Sector	UE	Charcoal Distribution	*Olea europaea*	*Pinus halepensis*	*Quercus caducifoli*	*Quercus perennifoli*	*Ulmus* sp.	*Arbutus unedo*	*Ilex aquifolium*	*Juniperus* sp.	*Pistacia lentiscus*	*Cistus* sp.	Labiatae	Leguminosae	*Rosmarinus officinalis*	Undetermined
Occupation	11	11002	Dispersed			51%	47.1%										0.019%
	14	14126			2.3%		59.1%				38.6%						
	1	10014 (PI01)					88.2%				5.9%					5.9%	
	5	5117					100%										
	5	5017 LL11	Concentrate			3.8%	4.1%		7.6%	1.9%	6.7%	5.7%			6.7%	16.2%	4.8%
	5	5101 LL17					12.5%				25%	37.5%			12.5%	12.5%	
	5	5009 LL11					80%				20%		20%	1%			
	5	5079 LL14					21.4%	7.1%			14.3%				7.1%	50%	
	2	2010 LL04					33.3%				11.1%	55.6%					
	5	5091 LL16					80%					20%					
	4	4003-45		74.1%	24.1%		1.7%										
Abandonment	47	47108-94	Concentrate			100%											
						Trees				Bushes				Woody shrubs			

Table A5. Protohistoric archaeozoological record: number of identified specimens (NISP, NISP%) and minimum number of elements (MNE, MNE%). The category "caprinae + sheep + goats" includes the remains identified at a specific level and at the *Caprinae* subfamily level (these values are not included in the total quantifications).

	NISP	%	MNE	%
Caprines (*Ovis/Capra*)	299	58.5%	208	52.6%
Sheep (*Ovis aries*)	13	2.5%	12	3%
Goat (*Capra hircus*)	20	3.9%	17	4.3%
Caprinae + sheep + goat	332	64.9%	237	60%
Cattle (*Bos taurus*)	55	10.8%	49	12.4%
Domestic suidae (*Sus domesticus*)	61	11.8%	56	14.1%
Equidae (*Equus* sp.)	7	1.6%	5	1.3%
Total domestic	455	89.1%	347	87.9%
Red deer (*Cervus elaphus*)	44	8.5%	35	8.9%
Roe deer (*Capreolus capreolus*)	1	0.1%	1	0.2%
Wild boar *(Sus scrofa)*	2	0.3%	2	0.5%
Hare (*Lepus granatensis*)	2	0.4%	2	0.5%
Rabbit (*Oryctolagus cuniculus*)	8	1.6%	8	2%
Total wild	57	10.9%	48	12.1%
Total Identified	512	100%	395	100

Table A6. Andalusi archaeozoological record: number of identified specimens (NISP, NISP%) and minimum number of elements (MNE, MNE%). The category "caprinae + sheep + goats" includes the remains identified at a specific level and at the Caprinae subfamily level (these values are not included in the total quantifications).

	NISP	%	MNE	%
Caprines (*Ovis/Capra*)	501	39.2%	345	37%
Sheep (*Ovis aries*)	105	8.2%	95	10.2%
Goat (*Capra hircus*)	88	6.9%	79	8.4%
Caprinae + sheep + goat	694	54.3%	519	55.5%
Cattle (*Bos taurus*)	36	2.9%	30	3.2%
Domestic suidae (*Sus domesticus*)	7	0.5%	6	0.6%
Horse (*Equus caballus*)	2	0.1%	2	0.2%
Dog (*Canis familiaris*)	1	0.1%	1	0.1%
Chicken (*Gallus* dom.)	461	36%	322	34.4%
Pigeon *(Columba palumbus)*	14	1%	3	0.3%
Total domestic	1215	94.9%	883	94.5%
Red deer (*Cervus elaphus*)	7	0.5%	6	0.6%
Fox (*Vulpes vulpes*)	1	0.1%	1	0.1%
Hare (*Lepus granatensis*)	8	0.6%	5	0.5%
Rabbit (*Oryctolagus cuniculus*)	45	3.6%	38	4.1%
Partridge *(Alectoris rufa)*	5	0.3%	1	0.1%
Total wild	66	5.1%	51	5.5%
Total Identified	1281	100%	934	100%

Table A7. Protohistoric archaeozoological record: anatomical distribution (MNE and MAU; species with extremely low values in the sample are not represented).

Caprinae + Sheep + Goat + Cattle + Domestic Suidae+Red Deer										
Caprines	**MNE**	**MAU**	**Sheep**	**MNE**	**MAU**	**Goat**	**MNE**	**MAU**	**Total MNE**	**Total MAU**
Head	103	16.5	Head	2	0.6	Head	10	2.9	115	20
Axial skeleton	21	1.7	Axial skeleton			Axial skeleton	1	1	22	2.7
Forelimb	18	9	Forelimb	3	1.5	Forelimb	4	2	25	12.5
Hind limb	22	11	Hind limb	3	1.5	Hind limb	1	0.5	26	13
Appendicular limb	44	11	Appendicular limb	4	2	Appendicular limb	1	0.5	49	13.5
Total	**208**		**Total**	**12**		**Total**	**17**		**237**	
Cattle	**MNE**	**MAU**	**Domestic Suidae**	**MNE**	**MAU**	**Red Deer**	**MNE**	**MAU**		
Head	14	2.4	Head	27	5.1	Head	6	3		
Axial skeleton			Axial skeleton	1	1	Axial skeleton	1	1		
Forelimb	8	4	Forelimb	9	4.5	Forelimb	7	3.5		
Hind limb	5	2.5	Hind limb	5	2.5	Hind limb	7	3.5		
Appendicular limb	22	6.5	Appendicular limb	14	3.1	Appendicular limb	14	4.4		
Total	**49**		**Total**	**56**		**Total**	**35**			

Table A8. Andalusi archaeozoological record: anatomical distribution (MNE and MAU; species with extremely low values in the sample are not represented).

Caprinae + Sheep + Goat + Cattle + Rabbit + Chicken										
Caprines	**MNE**	**MAU**	**Sheep**	**MNE**	**MAU**	**Goat**	**MNE**	**MAU**	**Total MNE**	**Total MAU**
Head	124	24.7	Head	8	3.1	Head	8	2.3	140	30.1
Axial skeleton	36	7.6	Axial skeleton			Axial skeleton			36	7.6
Forelimb	51	25.5	Forelimb	33	16.5	Forelimb	27	13.5	111	55.5
Hind limb	59	29.2	Hind limb	13	6.5	Hind limb	10	5	82	40.7
Appendicular limbs	75	18.7	Appendicular limbs	41	14.1	Appendicular limbs	34	12.1	150	44.9
Total	**345**		**Total**	**95**		**Total**	**79**		**519**	
Cattle	**MNE**	**MAU**	**Rabbit**	**MNE**	**MAU**	**Chicken**	**MNE**	**MAU**		
Head	23	3.1	Head	5	2	Head				
Axial skeleton	1	1	Axial skeleton	2	0.07	Axial skeleton	29	14.1		
Forelimb	2	1	Forelimb	6	3	Wing	96	48		
Hind limb	1	0.5	Hind limb	18	9	Leg	197	89.5		
Appendicular limb	3	0.75	Appendicular limb	6	0.6	**Total**	**322**			
Total	**30**		**Total**	**37**						

Table A9. Protohistoric and Andalusi archaeozoological record: metric data in mm [35].

	Bos taurus					
Late Bronze Age—Early Iron Age	P4 lower	L		A		
	UE: 10013-S.1		19.1		13	
	M1 lower	L		A		
	UE: 3036-S.3		19.52		13.5	
	M3 upper	L		A		
	UE: 4004-S.4		27.12		21.57	
	M3 upper	L		A		
	UE: 6043-S.6		26.84		17.82	
	M3 lower	L		A		
	U3: 3010-S.3		33.1		14.5	
	Metatarsus	Bp				
	UE: 6014-S.6		44.2			
	Astragalus	GLI				
	UE: 3010-S-6		63.51			
	PH1	Bp		Bd		GL
	UE: 10013-S.1		25.32		22.9	47.94
	UE: 6035-S.6		31.4		28.21	55.6
	PH2	Bp		Bd		GL
	UE: 6018-S.6		24.6		19.83	35.73
	PH3	Bp				
	UE: 3009-S.3		23.12			

Table A9. *Cont.*

Late Bronze Age—Early Iron Age	*Sus domesticus*						
	M2 lower	L		A			
	UE: 3009-S.3		19.4		11.9		
	M3 lower	L		A			
	UE: 10013-S.1		28.2		15.5		
	M3 lower	L		A			
	UE: 10024-S.1		29.4		14.9		
	Scapula	SLC					
	UE: 6021-S.3		22.3				
	Radio	Bp					
	UE: 6018.S.6		26.1				
	Radio	Bp					
	UE: 3009-S.3		26.81				
	Ulna	BCP					
	UE: 4004-S.4		19.6				
	PH1	Bp		Bd		GL	
	UE: 3009-S.3		16.2		15.4		32.9
Late Bronze Age —Early Iron Age	*Sus scrofa*						
	M3 lower	L					
	UE: 3010-S.3		41.1				
	Astragalus	GIL		GLm		Bd	
	UE: 3009-S.3		50.2		46.9		31
Early Middle Ages	*Sus domesticus*						
	M3 lower	L		A			
	UE: 5078-S.5		31.5		15.6		

References

1. Aguilella, G.; Falomir, F.; Pérez, G.; Laguna, M.C.; García, D.A.; Arquer, N. Tossal de la Vila (la Serra d'en Galceran, Castellón). Un asentamiento en la transición del Bronce Final al Hierro Antiguo. Primeros resultados de las campañas 2012–2014. *Quad. Prehist. Arqueol. Castelló* **2016**, *34*, 5–41.
2. Falomir, F.; Negre, J.; Aguilella, G.; Arquer, N. Noves perspectives en l'estudi del període andalusí als districtes meridionals de Turtusa. Resultats preliminars als jaciments castellonencs del Tossal de la Vila (serra d'en Galceran), Xivert i Santa Llúcia (Alcalà de Xivert). In *Arqueologia Medieval: Fortaleses a la Vall de l'Ebre (Segles VII–XI)*; Brufal, J., Negre, J., Sabaté, F., Eds.; Agira: Lleida, Spain, 2020; pp. 331–354.
3. Negre, J.; Pérez-Polo, M.; Falomir, F.; Aguilella, G.; Medina, P.; Blasco, M. Una lectura contextual del recinto emiral del Tossal de la Vila (Castelló): Algunas reflexiones sobre el origen, morfología y funciones de los asentamientos en altura en el extremo septentrional del Šarq al-Andalus". In *El Sitio de las Cosas: La Alta Edad Media en Contexto*; Publicacions de la Universitat d'Alacant: Alacant, Spain, 2020; pp. 195–217.
4. Negre, J.; Falomir, F.; Pérez-Polo, M.; Aguilella, G. Poliorcética, morfología edilicia y técnicas constructivas en el Tossal de la Vila, un recinto fortificado de época emiral en el extremo septentrional del Šarq al-Andalus. In *Defensive Architecture of the Mediterranean X*; Navarro, J., García-Pulido, L.J., Eds.; Universidad de Granada: Granada, Spain; Universitat Politècnica de València: Valencia, Spain, 2020; pp. 155–162. [CrossRef]
5. Negre, J.; Falomir, F.; Pérez-Polo, M.; Aguilella, G. La mezquita del fortín emiral del Tossal de la Vila (Castellón). Secuencia estratigráfica y diseño arquitectónico de un edificio religioso rural en los albores del islam andalusí. *Lucentum* **2022**, *XLI*, 301–319. [CrossRef]
6. Connolly, R.; Jambrina-Enríquez, M.; Herrera-Herrera, A.V.; Vidal-Matutano, P.; Fagoaga, A.; Marquina-Blasco, R.; Marin-Monfort, M.D.; Ruiz-Sánchez, F.J.; Laplana, C.; Bailon, S.; et al. A multiproxy record of palaeoenvironmental conditions at the Middle Palaeolithic site of Abric del Pastor (Eastern Iberia). *Quat. Sci. Rev.* **2019**, *225*, 106023. [CrossRef]

7. Fuks, D.; Dunseth, Z.C. Dung in the dumps: What we can learn from multi-proxy studies of archaeological dung pellets. *Veg. Hist. Archaeobot.* **2021**, *30*, 137–153. [CrossRef]
8. Scherer, S.; Höpfer, B.; Deckers, K.; Fischer, E.; Fuchs, M.; Kandeler, E.; Lechterbeck, J.; Lehndorff, E.; Lomax, J.; Marhan, S.; et al. Data from: Middle Bronze Age land use practices in the north-western Alpine foreland—A multi-proxy study of colluvial deposits, archaeological features and peat bogs. *Soil* **2021**, *7*, 269–304. [CrossRef]
9. Eixea, A.; Bel, M.Á.; Carrión, Y.; Ferrer-García, C.; Guillem, P.M.; Martínez-Alfaro, Á.; Martínez-Varea, C.M.; Moya, R.; Rodrigues, A.L.; Días, M.I.; et al. A multi-proxy study from new excavations in the Middle Palaeolithic site of Cova del Puntal del Gat (Benirredrà, València, Spain). *Comptes Rendus Palevol* **2023**, *10*, 159–200. [CrossRef]
10. Rondelli, B.; Lancelotti, C.; Madella, M.; Pecci, A.; Balbo, A.; Ruiz Pérez, J.; Inserra, F.; Gadekar, C.; Cau Ontiveros, M.A.; Ajithprasad, P. Anthropic activity markers and spatial variability: An ethnoarchaeological experiment in a domestic unit of Northern Gujarat (India). *J. Archaeol. Sci.* **2014**, *41*, 482–492. [CrossRef]
11. Barrachina, A. L'edat del bronze. Cent anys d'evolució dels estudis castellonencs. In *En els Problemes Arqueològics de la Província de Castelló: 100 Anys Després de Pere Bosch Gimpera*; Oliver, A., Ed.; Diputació de Castelló: Castelló, Spain, 2021; pp. 47–57.
12. Falomir, F. L'edat del ferro als territoris de Castelló. In *En els Problemes Arqueològics de la Província de Castelló: 100 Anys Després de Pere Bosch Gimpera*; Oliver, A., Ed.; Diputació de Castelló: Castelló, Spain, 2021; pp. 59–69.
13. Negre, J. La formació d'al-Andalus des de l'arqueologia: Un debat historiogràfic amb arrels castellonenques. In *En els Problemes Arqueològics de la Província de Castelló: 100 Anys Després de Pere Bosch Gimpera*; Oliver, A., Ed.; Diputació de Castelló: Castelló, Spain, 2021; pp. 91–109.
14. Trigger, B.G. *Understanding Early Civilizations: A Comparative Study*; Cambridge University Press: New York, NY, USA, 2003.
15. Smith, M.E. Braudel's Temporal Rhythms and Chronology Theory in Archaeology. In *Annales, Archaeology, and Ethnohistory*; Knapp, A.B., Ed.; Cambridge University Press: New York, NY, USA, 1992; pp. 23–34.
16. Bailey, G.N. Time Perspectives, Plimpsests, and the Archaeology of Time. *J. Anthropol. Archaeol.* **2007**, *26*, 198–223. [CrossRef]
17. Holdaway, S.; LuAnn, W. *Time in Archaeology: Time Perspectivism Revisited*; University of Utah Press: Salt Lake City, UT, USA, 2008.
18. Smith, M.E. Sprawl, Squatters, and Sustainable Cities: Can Archaeological Data Shed Light on Modern Urban Issues? *Camb. Archaeol. J.* **2010**, *20*, 229–253. [CrossRef]
19. Feinman, G. Comparative Frames for the Diachronic Analysis of Complex Societies: Next Steps. In *The Comparative Archaeology of Complex Societies*; Smith, M., Ed.; Cambridge University Press: Cambridge, UK, 2011; pp. 21–43. [CrossRef]
20. Drennan, R.; Peterson, C. Challenges for Comparative Study of Early Complex Societies. In *The Comparative Archaeology of Complex Societies*; Smith, M., Ed.; Cambridge University Press: Cambridge, UK, 2011; pp. 183–191. [CrossRef]
21. Bartolini, S. On Time and Comparative Research. *J. Theor. Politics* **1993**, *5*, 131–167. [CrossRef]
22. Pérez-Polo, M.; Falomir, F.; Negre, J.; Aguilella, G. Lectura arqueozoológica del fortín emiral del Tossal de la Vila (Castellón): Primeros datos. *Archaeofauna* **2023**. *submitted*.
23. García, D.; Laguna, M.C.; Aguilella, G.; Falomir, F. Arquitectura de terra i pedra en la transició del Bronze final al Ferro antic (segles VIII-VII a.C.). Un cas d'estudi en l'assentament del Tossal de la Vila (La Serra d'en Galceran). In *Actes de les XXI Jornades Culturals de la Plana de l'Arc: (21, 22 i 23 d'octubre de 2016)*; Associació Cultural la Balaguera: La Pobla de Tornesa, Spain, 2018; pp. 7–16.
24. Buxó, R.; Piqué, R. *Objetivos y Propuestas Metodológicas: La Gestión de los Recursos Vegetales y la Transformación del Paleopaisaje en el Mediterráneo Occidental*; Museu d'Arqueologia de Catalunya: Barcelona, Spain, 2003.
25. Chabal, L. Pourquoi et comment prélever les charbons de bois pour la période antique, les méthodes utilisé es sur le site de Lattes (Hérault). *Lattara* **1988**, *1*, 187–222.
26. Grau, E. El uso de la Madera en Yacimientos Valencianos de la Edad del Bronce a Época Visigoda. Datos Etnobotánicos y Reconstrucción Ecológica Según la Antracología. Ph.D. Thesis, Universitat de València, València, Spain, 1991.
27. Lyman, R.L. *Vertebrate Taphonomy*; Cambridge University Press: Cambridge, UK, 1994.
28. Lyman, R.L. *Quantitative Paleozoology*; Cambridge University Press: Cambridge, UK, 2008.
29. Boessneck, J.; Müller, H.-H.; Teichert, M. Osteologische Unterscheidungsmerkmale zwischen Schaf (*Ovis aries* Linne) und Zeige (*Capra hircus* Linne). *Kühn Archiv.* **1964**, *78*, 1–129.
30. Payne, S. Morphological distinctions between the mandibular teeth of young sheep, *Ovis*, and goats, *Capra*. *J. Archaeol. Sci.* **1985**, *12*, 139–147. [CrossRef]
31. Halstead, P.; Collins, P.; Isaakidou, V. Sorting the sheep from the goats: Morphological distinctions between the mandibles and mandibular teeth of adult *Ovis* and *Capra*. *J. Archaeol. Sci.* **2002**, *29*, 545–553. [CrossRef]
32. Zeder, M.A.; Lapham, H.A. Assessing the reliability of criteria used to identify postcranial bones in sheep, *Ovis*, and goats, *Capra*. *J. Archaeol. Sci.* **2010**, *37*, 2887–2905. [CrossRef]
33. Zeder, M.A.; Pilaar, S.E. Assessing the reliability of criteria used to identify mandibles and mandibular teeth in sheep, *Ovis*, and goats, *Capra*. *J. Archaeol. Sci.* **2010**, *37*, 225–242. [CrossRef]
34. Binford, L.R. *Nunamiut Ethnoarchaeology*; Academic Press: New York, NY, USA, 1978.
35. Driesch, A.V.D. *A Guide to the Measurement of Animal Bones from Arcaheological Sites*; Peabody Museum, Harvard University: Cambridge, UK, 1976.
36. Payne, S. Kill-off patterns in sheep and goats: The mandibles from Asvan Kale. *Anatol. Stud.* **1973**, *23*, 281–304. [CrossRef]

37. Grant, A. The use of tooth wear as a guide to the age of domestic ungulates. In *Ageing and Sexing Animal Bones from Archaeological Sites*; Wilson, B., Grigson, C., Payne, S., Eds.; BAR British Series: Oxford, UK, 1982; pp. 91–108.
38. O'connor, T. Process and terminology in mammal carcass reduction. *Int. J. Osteoarchaeol.* **1993**, *3*, 63–67. [CrossRef]
39. Silver, I.A. The ageing of domestic animals. In *Science in Archaeology*; Brothwell, D., Higgs, E.S., Eds.; Thames and Hudson: London, UK, 1969; pp. 283–302.
40. Zeder, M.A. Reconciling rates of long bone fusion and tooth eruption and wear in sheep (*Ovis*) and goat (*Capra*). In *Recent Advances in Ageing and Sexing Animal Bones*; Ruscillo, D., Ed.; Oxbow Books: Oxford, UK, 2006; pp. 87–118.
41. Pérez-Jordà, G. Estudio Arqueobotánico de Los Morrones. In *Los Morrones de Cortes de Arenoso. Un Poblado de la Edad del Hierro en el Alto Mijares. Castellón*; Barrachina, A., Ed.; SIAP. Diputació, Monografies de Prehistòria i Arqueologia Castellonenques: Castelló, Spain, 2020; Volume 15, pp. 183–191.
42. Albizuri, S.; Alonso, N.; López Cachero, F.J. Economia i Canvi Social a Catalunya Durant l'edat del Bronze i la Primera Edat del Ferro. *Arqueomediterrània* **2011**, *12*, 11–36.
43. García Gómez, E.; Pereira Sieso, J. El uso de la bellota en la Prehistoria en la Península Ibérica. In *Cambio Climático y Cultural en la Península Ibérica: Una Perspectiva Geohistórica y Paleoambiental*; Pérez-Díaz, S., Ruiz-Fernández, J., López-Sáez, J.A., García-Hernández, C., Eds.; Servicio de Publicaciones de la Universidad de Oviedo: Oviedo, Spain, 2017; pp. 169–183.
44. Barrachina, C.; De Haro, S. Contribució a l'estudi del medi ambient a partir de les restes de fusta recuperades al jaciment dels Estrets de Vilafamés. In *XII Jornades Culturals de la Plana de L'Arc*; Ajuntament de VilafamésPublisher: Vilafamés, Spain, 2007.
45. Espí, I.; Iborra, M.; De Haro, S. El área de almacenaje del poblado Ibero-Romano del Cormulló dels Moros (Albocàsser, Castelló). *Saguntum* **2000**, *3*, 147–152.
46. Ruiz Zapatero, G. Los Campos de Urnas del NE de la Península Ibérica. Ph.D. Thesis, Universidad Complutense de Madrid, Madrid, Spain, 1983.
47. Ruiz Zapatero, G. Los Campos de Urnas. In *Protohistoria de la Península Ibérica: Del Neolítico a la Romanización*; Almagro, M., Ed.; Fundación Atapuerca: Burgos, Spain, 2014; pp. 195–215.
48. Ruiz Zapatero, G. Bronce Final-Hierro: La naturaleza de los Campos de Urnas. In *XV Coloqui Internacional d' Arqueología de Puigcerdà. La Transició Bronze Final—1a Edat del Ferro en els Pirineus i Territoris Veïns*; Institut d' Estudis Ceretans: Puigcerdà, Spain, 2014; pp. 635–658.
49. López Cachero, J. Sociedad y economía durante el Bronce final y la Primera edad del Hierro en el noreste peninsular: Una aproximación a partir de las evidencias arqueológicas. *Trab. Prehist.* **2007**, *64*, 99–120.
50. Rafel, N. El Bronce Final y la primera Edad del Hierro en la fachada oriental peninsular y las Baleares. In *La Protohistoria en la Península Ibérica*; Ediciones Akal: Madrid, Spain, 2017; pp. 341–440.
51. Ruiz Zapatero, G. Las penetraciones de campos de urnas en el País Valenciano. *Cuad. Prehist. Arqueol. Castellon.* **1978**, *4*, 243–256.
52. González Prats, A. El proceso de formación de los pueblos ibéricos en el Sureste y Levante de la Península Ibérica. *Complutum* **1992**, *2*, 137–150.
53. Mata, C.; Martí, M.A.; Iborra, M.P. El País Valencià del Bronze recent a l'Ibèric antic: El procés de formació de la societat urbana ibérica. In *Models D'ocupació, Transformació i Explotació del Territori Entre el 1600 i el 500 A.N.E. a la Catalunya Meridional i Zones Limítrofes de la Depressió de l'Ebre*; Rovira, J., Ed.; Museu Nacional d´ Art de Catalunya: Barcelona, Spain, 1996; pp. 183–217.
54. Picazo, J. El poblamiento en el Valle Medio del Ebro durante la Prehistoria reciente: Zonas y procesos. *Rev. d´Arqueol. Ponent* **2005**, *15*, 97–118.
55. Picazo, J.; Rodanés, J.M. *Los Poblados del Bronce Final y Primera Edad del Hierro: Cabezo de la Cruz, La Muela, Zaragoza*; Gobierno de Aragón: Zaragoza, Spain, 2009.
56. Fatás, L. La Edad de Hierro en el valle del Matarraña (Teruel). Las investigaciones del Institut d'Estudis Catalans en el Bajo Aragón. *Caesaraugusta* **2016**, *85*, 2016.
57. Rodanés, J.M.; Picazo, J. Interaction and Interchange. The Genesis of the Late Bronze and Early Iron Age in the Middle Ebro Valley. In *Interchange in Pre and Protohistory. Case Studies in Iberia, Romania, Turkey an Israel*; Cruz, A., Gibaja, J.F., Eds.; BAR Publishing: Oxford, UK, 2018; pp. 161–175.
58. Jover, F.J.; Lorrio, A.J.; Díaz, M.Á. El Bronce Final en el levante de la península Ibérica: Bases arqueológicas y periodización. *Complutum* **2016**, *27*, 81–108. [CrossRef]
59. Oliver, A. Aproximación al poblamiento del Hierro antiguo en Castellón. *Trab. Var. SIP* **1992**, *89*, 29–38.
60. Oliver, A. *El Poblado Ibérico del Puig de la Misericordia de Vinaròs*; Associació Cultural Amics de Vinaròs: Vinaròs, Spain, 1994.
61. Gusi, F.; Barrachina, E. L'evolució dels grups culturals del bronze final i del ferro al País Valencià. Estat de la qüestió i problemàtica. In *Actes del XIII Congrés Internacional de Puigcerda Món Ibèric als Països Catalans. Homenatge a Josep Barberà i Farràs (Puigcerdà, 2003)*; Institut d´Estudis Ceretans: Puigcerdà, Spain, 2006; pp. 95–116.
62. Vives-Ferrándiz, J. Negociando encuentros. Situaciones coloniales e intercambios en la costa oriental de la Península Ibérica (s. VIII-VI a.C.). *Cuad. Arqueol. Mediterr.* **2005**, *12*, 15–269.
63. Barrachina, A.M. *Indesinenter: Permanencia y Cambio. El Pic dels Corbs como Modelo de Interpretación de la Edad del Bronce en el Norte del País Valenciano*; Servei d'Investigacions Arqueològiques i Prehistòriques: Castelló, Spain, 2012.
64. Oliver, A.; Gusi, F. *El Puig de la Nau. Un Hábitat Fortificado Ibérico en el Ámbito Mediterráneo Peninsular. Monografies de Prehistòria i Arqueologia Castellonenques 4*; Diputació de Castelló: Castelló, Spain, 1995.

65. Oliver, A.; García Fuertes, J.M.; Moraño Poblador, I. *El Castellet, Castelló de la Plana. Yacimiento Emblemático en la Historiografía de la Edad del Bronce Peninsular*; Fundación Dávalos-Fletcher: Castellón, Spain, 2005.
66. Oliver, A.; Falomir, F.; Aguilella, G. El Puig de la Misericordia, Vinaròs. In *Jornades d'Arqueologia de la Comunitat Valenciana 2016-2017-2018*; Ponce, M., Tendero, F., Alamar, Y., Alapont, L., Eds.; Generalidad Valenciana, Direcció General de Cultura i Patrimoni: València, Spain, 2020; pp. 61–70.
67. Oliver, A. *El Puig de la Nau, Benicarló*; Museu de Bellas Artes de Castelló: Castelló, Spain, 2006.
68. Hernández, F.J.; Cabanes, S. *En Balaguer I (Portell de Morella, Castellón). La Evolución de una Comunidad Rural Desde la Edad del Hierro Hasta la Romanización*; Generalitat Valenciana, Renomar, EIN Mediterráneo: València, Spain, 2010.
69. Aguilella, G. Primeros datos sobre el asentamiento del Hierro Antiguo de Santa Llúcia (Alacalà de Xivert, Castellón). Sector 1, fase 2. *Quad. Prehist. Arqueol. Castelló* **2016**, *34*, 105–118.
70. Aguilella, G. (Ed.) *Tossal del Mortorum. Un Assentament de l'Edat del Bronze i del Ferro Antic a la Ribera de Cabanes (Castelló). Monografies de Prehistòria i Arqueologia Castellonenques 12*; Diputació de Castelló: Castelló, Spain, 2017.
71. Vicente, M.; Pérez Milián, R.; Arquer, N.; Aguilella, G.; Mas, P.; Pérez Jordà, G. El Mas de Fabra (Benicarló, Castellón). Un asentamiento del hierro antiguo en la llanura litoral del Baix Maestrat. *Quad. Prehist. Arqueol. Castelló* **2016**, *34*, 79–104.
72. Aguilella, G.; García-Vuelta, O.; Montero-Ruiz, I.; Vila López, J.M. Oro y bronce en el yacimiento de Santa Llúcia (Alcalà de Xivert-Alcossebre, Castellón): Reflexiones sobre la actividad metalúrgica en los asentamientos del Hierro Antiguo del Levante peninsular. *Quad. Prehist. Arqueol. Castelló* **2020**, *38*, 51–70.
73. Oliver, A. (Ed.) *El Puig de la Misericordia y los Inicios de la Arquitectura de Prestigio en el Llano Litoral de Vinaròs. Un Ámbito Especializado en el Edificio Fortificado del Hierro Antiguo*; Diputació de Castelló: Castelló, Spain, 2021.
74. Barrachina, A. (Ed.) *Los Morrones de Cortes de Arenoso. Un Poblado de la Edad del Hierro en el Alto Mijares*; Monografies de Prehistòria i Arqueologia Castellonenques 15; Diputació de Castelló: Castelló, Spain, 2020.
75. Mateu, R.; Aguilella, G. El Tossal de Subarra (Benlloc, Castelló). L'ocupació de l'assentament entre el Bronze final i el Ferro antic. *Quad. Prehist. Arqueol. Castelló* **2021**, *39*, 13–23.
76. Pérez Jordà, G. La Agricultura en el País Valenciano Entre el VI y el I Milenio a.C. Ph.D. Thesis, Universidad de Valencia, Valencia, Spain, 2013.
77. De Haro, S. Estudio de los carbones vegetales. In *Los Morrones de Cortes de Arenoso. Un Poblado de la Edad del Hierro en el Alto Mijares. Castellón*; Barrachina, A., Ed.; SIAP. Diputació, Monografies de Prehistòria i Arqueologia Castellonenques: Castelló, Spain, 2020; Volume 15, pp. 176–181.
78. Iborra, P. *La Ganadería y la Caza Desde el Bronce Final Hasta el Ibérico Final en el Territorio Valenciano. Serie de Trabajos Varios 103*; SIP: Valencia, Spain, 2004.
79. Tormo, C. La fauna del Tossal del Mortórum. Campañas de excavación 2005–2010. In *Tossal del Mortòrum un Assentament de l´Edad del Bronze i del Ferro Antic a la Ribera de Cabanes (Castelló)*; Aguilella, G., Ed.; SIAP. Diputació, Monografies de Prehistòria i Arqueologia Castellonenques: Castelló, Spain, 2017; Volume 12, pp. 113–128.
80. Sanchis, A.; Tormo, C. Estudio de la fauna, El Racó dels Cantos I. Un asentamiento de la Edad del Hierro. In *Paisaje y Arqueología en la Sierra de la Menarella. Estudios Previos del Plan Eólico Valenciano. Zona II: Refoies y Todolella*; Vizcaíno, D., Ed.; Renomar: Valencia, Spain, 2007; pp. 118–124.
81. Navarrete, V. Los restos de fauna del yacimiento de Los Morrones. In *Los Morrones de Cortes de Arenoso. Un Poblado de la Edad del Hierro en el Alto Mijares. Castellón*; Barrachina, A., Ed.; SIAP. Diputació, Monografies de Prehistòria i Arqueologia Castellonenques: Castelló, Spain, 2020; Volume 15, pp. 192–199.
82. Barrachina, A.; Sanchis, A. Valoración diacrónica de un modelo económico de la Edad del Bronce: La fauna del poblado del Pic dels Corbs, Sagunt (València). *Quad. Prehist. Arqueol. Castelló* **2008**, *26*, 43–94.
83. Brogiolo, G.P.; Gelichi, S. *Nuove Ricerche sui Castelli Altomedievali in Italia Settentrionale*; All'Insegna del Giglio: Florència, Italy, 1996.
84. Schneider, L. Oppida et castra tardo-antiques. À propos des établissements de hauteur de la Gaule Méditerranéenne. In *Les Campagnes de la Gaule à la Fin de l'Antiquité*; Ouzoulias, P., Pellecuer, C., Rayunaud, C., van Ossel, P., Garmy, P., Eds.; APDCA: Antibes, France, 2001; pp. 433–448.
85. Gutiérrez González, J.A. La fortificación pre-feudal en el norte peninsular: Castros y recintos campesinos en la Alta Edad Media. In *Mil anos de Fortificaçoes na Península Ibérica e no Magreb (500–1500): Actas do Simposio Internacional sobre Castelos*; Ferreira, I.C., Ed.; Edições Colibri, Camara Municipal de Palmela: Liboa, Portugal, 2002; pp. 19–28.
86. Catalán, R.; Fuentes, P.; Sastre, J.C. *Fortificaciones en la Tardoantigüedad: Élites y Articulación del Territorio (Siglos V-VIII d.C.)*; La Ergástula: Madrid, Spain, 2014.
87. Quirós, J.A.; Tejado, J.M. (Eds.) *Los Castillos Altomedievales en el Noroeste de la Península Ibérica*; Euskal Herriko Unibertsitatea: Bilbao, Spain, 2012.
88. Gibert, J. *La fi del Món Antic i els Inicis de l'Edat Mitjana a la Catalunya Central. Economia, Societat i Territori entre els Segles V i VIII*; ICAC: Tarragona, Spain, 2018.
89. Castellanos, S.; Martín-Viso, I. The local articulation of central power in the north of the Iberian Peninsula, 500–1000. *Early Mediev. Eur.* **2005**, *13*, 1–42. [CrossRef]
90. Martín, I. Espacios sin estado: Los territorios occidentales entre el Duero y el Sistema Central (siglos VIII-IX). In *¿Tiempos Oscuros? Territorios y Sociedad en el Centro de la Península Ibérica (Siglos VII–X)*; Martín, I., Ed.; Sílex: Madrid, Spain, 2010; pp. 107–135.

91. Bazzana, A. *Maisons d'Al-Andalus. Habitat Médiéval et Structures du Peuplement dans l'Espagne Orientale*; Casa de Velázquez: Madrid, Spain, 1992.
92. Acién, M. De nuevo sobre la fortificación del emirato. In *Mil Anos de Fortificaçoes na Península Ibérica e no Magreb (500–1500): Actas do Simposio Internacional sobre Castelos*; Ferreira, I.C., Ed.; Edições Colibri, Camara Municipal de Palmela: Liboa, Portugal, 2002; pp. 59–75.
93. Bazzana, A.; Guichard, P. Investigaciones arqueológicas en hábitats medievales de la provincia de Castellón de la Plana. *Cuad. Prehist. Arqueol. Castellon.* **1976**, *3*, 297–300.
94. Bazzana, A.; Guichard, P. Campaña 1977 de investigación arqueológica en yacimientos medievales de la provincia de Castellón (La Magdalena; Monte Mollet; Zufera). *Cuad. Prehist. Arqueol. Castellon.* **1977**, *4*, 333–350.
95. Bazzana, A. Investigaciones de arqueología medieval en la provincia de Castellón. Campañas de 1978 y 1979. *Cuad. Prehist. Arqueol. Castellon.* **1979**, *6*, 307–312.
96. Negre, J.; Suñé, J. Territorio, fiscalidad y actividad militar en la formación de un espacio fronterizo. La consolidación de Tortosa como límite extremo del al-Andalus omeya. *Anu. Estud. Mediev.* **2019**, *49*, 705–740. [CrossRef]
97. Negre, J. *En els Confins d'al-Andalus. Territori i Poblament Durant la Formació d'una Societat Islàmica a les Terres de l'Ebre i el Maestrat*; Onada Edicions: Benicarló, Spain, 2020.
98. Lorrio, A.; Almagro-Gorbea, M.; Sánchez de Prado, M.D. *El Molón (Camporrobles, Valencia). Oppidum Prerromano y Hîsn Islámico*; Ayuntamiento de Camporrobles: Valencia, Spain, 2009.
99. García-García, M. Explotación y Consumo de los Animales en el Sudeste de la Península IBÉRICA durante la Alta Edad Media (Siglos VII–XII): Perspectivas Históricas y Arqueozoológicas. Ph.D. Thesis, Universidad de Granada, Granada, Spain, 2019.