Birds of the Roman *uilla* of Almoinhas (Loures, Portugal)

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Resumo A *uilla* romana das Almoinhas localiza-se no *municipium Olisiponense*, nos arredores de Lisboa (Loures) com comunicações marítimas e terrestres excecionais. As escavações arqueológicas confirmaram a presença de um porto, estruturas de produção de sal e una zona de despejo datada dos séculos I a V d.C.

O pequeno conjunto de avifauna de Almoinhas é composto por 23 restos, entre os quais predomina a galinha doméstica (*Gallus domesticus*). O estudo confirma a ideia de que as galinhas eram mantidas localmente. Uma perdiz e uma rapina diurna também fazem parte do conjunto. É difícil avaliar a importância da primeira porque se encontra representada apenas por um único resto ósseo, mas a sua presença pode sugerir a prática pontual de atividades cinegéticas. Quanto à rapina terá integrado o registo arqueológico devido a causas naturais. A ausência de aves marinhas é um pouco inesperada devido à existência de um porto, de atividades pesqueiras e de uma pequena produção de preparados piscícolas. Contudo, este padrão poderá mudar na eventualidade de mais restos de aves virem a ser recolhidos e analisados.

Abstract The Roman *uilla* of Almoinhas is located in the *municipium Olisiponense*, part of the the current Greater Lisbon (Loures), with exceptional maritime and terrestrial communications. Archaeological excavations confirmed the presence of a port with salting and fishing activities, and a rubbish dumping area dated between the 1st and the 5th century AD.

The small bird assemblage is composed by 23 remains with a predominance of chicken (*Gallus domesticus*). The analysis supports the theory that chickens were kept locally. A partridge and a diurnal raptor were also identified. The former is hard to interpret due to the presence of a single bone but it can suggest that at least some hunting activities were taking place. The raptor, however, might have integrated the archaeological record due to natural causes. Considering the close relationship with a port, fishing activities and a small production of salted-fish goods, the absence of aquatic birds is somehow unexpected. Such pattern is prone to change if more bird samples are recovered and analysed.

1. Introduction

Despite the abundance of Roman sites in Portugal (eg. Alarcão, 1988, 1990, 2005; Fabião, 2006), zooarchaeological studies are scarce and chiefly dedicated to the study of mammals. The most recent inventory of bird assemblages from Portuguese archaeological contexts (Pimenta & *alii*, 2015) shows only ten Roman sites with bird bone analyses. We were able to identify seven more sites where avifauna is present: Cerro da Vila, Monte da Nora and Milreu, in the Algarve (Benecke, 2008); Torre de Palma (Mackinnon, 1999–2000) and Creiro (Detry & Silva, 2016), in Northern Alentejo; Rua dos Correeiros and Casa do Governador (Valenzuela, 2014), both in the urban area of Lisbon. The Roman *uilla* of Almoinhas, here presented, is located in the Lisbon Peninsula, in the city of Loures (Fig. 1). Even though, bird remains are sparse, and mentions to their presence on Roman sites frequently lack species identification and a detailed analysis.

Portuguese bird bone assemblages have been recovered from both Republican and Imperial times. Due to the scant number of studies and low representation of avifauna in Republican occupations, it is hard to identify any bird use trends, as well as, any possible changes in consumption and domestication from Republican to Imperial times. Overall, however, it is clear the predominance of chicken (*Gallus domesticus*). Among the wild species, the red-legged partridge (*Alectoris rufa*) shows high representation on sites, like Alcáçova de Santarém (Davis, 2006), Quinta das Longas (Cardoso & Detry, 2005), Cerro da Vila and Milreu (Benecke, 2008); whereas coastal occupations show a larger contribution of aquatic birds, such as Tróia (Nabais, 2014), Figueira Brava (Mourer-Chauviré & Antunes, 2000) or Quinta do Marim (Antunes & Mourer-Chauviré, 1992). The Lisbon Peninsula was consistently occupied during the Roman period (Alarcão, 1994; Fabião, 1993), but there are no published studies of bird bone assemblages. Although zooarchaeological analyses from Casa do Governador and Rua dos Correeiros (Valenzuela, 2014) mention the presence of avifauna, no analysis was conducted and only a general quantification of bird remains was presented. Therefore, it is still unknown what were the bird species presented in *Olisipo* (current city of Lisbon), bird use and management. So far, the avifaunal assemblage recovered from the Roman *uilla* of Almoinhas is the only study available for the Lisbon area. Considering the scant information related to bird use during Roman times in Portugal, and in particular in the Lisbon Peninsula, the contribution of Almoinhas is of most relevance.

The assemblage is small, but aims (1) to identify the species present through a combination of morphological features and osteometry; (2) to recognise the agent(s) of bone accumulation, whether natural, or due to predator/raptor or anthropogenic activities; and (3) to attempt an assessment of bird use and management during the Roman occupation of Almoinhas.

Fig. 1 – Location of Portuguese roman sites where bird bones were found including the *uilla* of Almoinhas, in the Lisbon Peninsula.

2. The site of Almoinhas

Almoinhas is located within the urban perimeter of Loures, in the northern suburbs of Lisbon (Portugal) with the coordinates 38° 49'

25" N, 9° 09' 57" W (Oliveira, 2001) (Fig. 1). During Roman times, it was part of the *municipium Olisiponense*, with a tight relationship with *Olisipo*, and with excellent marine and terrestrial communications. The area had a port and beneficial conditions for fishing and salt production activities, as well as fertile soils favourable to agricultural practices. The site of Almoinhas is generally interpreted as a Roman *uilla* but the status of *uicus* is also a possibility (Oliveira, 2001; Brazuna & Coelho, 2012).

The site was found and excavated by the Loures municipality archaeological services during the late 1990's due to extensive urban development in the area. The vast pottery material recovered during fieldwork dated the site from the 1st to the 5th century AD (Oliveira, 2001). This chronology was later confirmed by the archaeological interventions of Era-Arqueologia, SA. in the 2000's based on the typologies found in the excavation of three pottery production ovens. Other structures are also part of the site, such as a necropolis, several rural facilities, *cetariae* covered with *opus signinum* — indicating the production of salted-fish products —, and a residential nucleus. A rubbish dumping area was identified within the residential nucleus and it was partially excavated by the Loures municipality services between 1995 and 1999 (Oliveira, 2001; Brazuna & Coelho, 2012). A mammal collection of 3 744 remains was recovered from those excavations and revealed the predominance of domestic animals — like cattle (*Bos taurus*), caprines (*Ovis/Capra* sp.) and suids (*Sus* sp.) — with an even skeletal part representation suggesting local production and consumption of such animals. Equids (*Equus* sp.) and dogs (*Canis familiaris*) were also identified but their representation is low. The presence of red deer (*Cervus elaphus*) and rabbits (*Oryctolagus cuniculus*) is not significant and it is difficult to interpret since most of the identifications were based on cranial and appendicular elements (Costa, 2011).

3. Materials and methods

The bird bone assemblage from Almoinhas was collected during the excavation of the Roman rubbish dumping area, between 1995 and 1999. The bones were handpicked and show good preservation allowing taxonomical and anatomical identification for most of the remains. Species identification was conducted at the Archaeosciences Laboratory (LARC CiBio, DGPC), in Lisbon (Portugal), by consulting the bird osteological reference collection (Moreno & *alii*, 2003). Several atlases and bird guides were also used, such as Catry & *alii* (2010), Cohen & Serjeantson (1996), and Svensson & *alii* (2003). Measurements were taken following von den Driesch (1972) and Otto (1981) proposals for the Accipitridae family, in order to differentiate between species with close morphologies.

Bird bones were examined individually and recorded according to their anatomical part, portion of element, lateralisation, age (based on the degree of ossification of long bone epiphyses), and sex (when medullary bone was present, or spurs when Galliforme's tarsometarsals were identified) (Serjeantson, 2009). Despite the small assemblage and even though often criticised, some skeletal part ratios were calculated to better assess skeletal representation: core-to-limb ratio (Bramwell & *alii*, 1987; Bocheński, 2005), wing-to-leg ratio (Ericson, 1987), proximal-to-distal bones ratio (Bocheński & Nekrasov, 2001), and proximal-to-distal wing bones ratio (Bovy, 2012).

Bone surface modification was analysed macroscopically and microscopically when necessary, in order to identify butchery and percussion marks, burning, carnivore and rodent marks (Binford, 1981; Blumenschine & Selvaggio, 1988; Díez & *alii*, 1999; Laroulandie, 2000, 2005, 2010; Nicholson, 1993; Pickering & Egeland, 2006). The type of bone breakage was also examined (Laroulandie & Lefèvre, 2014) to distinguish between fresh and dry fractures.

In order to assess species relative abundance the Number of Identified Specimens (NISP) and the Minimum Number of Individuals (MNI) were calculated (Grayson, 1984; Lyman, 1994). The Minimum Number of Elements (MNE) provides similar results to the NISP and has a predictable relationship between the two measurements (Bovy, 2002, 2012; Grayson & Frey, 2004) and, therefore, it was not computed.

4. Results

A total of 23 bird remains were recovered from the Roman rubbish dumping area of Almoinhas. The bones are well preserved (Fig. 2), characterised by a high degree of bone completeness (39,13% or n = 9 are complete or nearly complete), and a high frequency of remains larger than 5 cm (86,96% or n = 20). Fragmented bones show mainly recent fractures (43,48% or n = 10), which might have resulted from excavation and storage manipulation. Old fractures are underrepresented (17,39% or n = 4) and tend to show a transversal outline (n = 3).

Bone preservation facilitated species identification for most remains, apart from three fragments (Table 1). Chicken (*Gallus domesticus*) is the best represented, and the remains identified as *Gallus* sp. are most certainly domestic. Among the wild species, the partridge (*Alectoris rufa*/*Perdix perdix*) is recognised by the presence of a single remain, whereas one diurnal raptor from the Accipitridae family shows better skeletal part representation. Morphological observation comparing the archaeological material with the reference collection did not allow species separation between the buzzard (*Buteo buteo*) and the western marsh harrier (*Circus aeruginosus*). Therefore, it was necessary to consider osteometry using the data provided by Otto (1981) and the archaeological bones which degree of completeness allowed taking measurements. If the osteometric analysis were to be based on a single humerus, it would seem that *Circus aeruginosus* was the species present in Almoinhas, due to its great proximity with one of the individuals described by Otto (1981) (Fig. 3A). However, the carpometacarpus agrees better with *Buteo buteo* (Fig. 3C), and the ulna has a perfect match with such species (Fig. 3B). The Accipitridae bones seem to be from the same individual, being the buzzard the most probable species considering its common presence in the territory. However, the harrier cannot be excluded due to its highly specialised environmental preference for marshes, which are also found in the Almoinhas surroundings (Catry & *alii*, 2010).

Despite the small bird assemblage, skeletal part ratios are still relevant. Overall, long bones predominate, whereas core bones are underrepresented, such as the sternum, synsacrum, scapula and coracoid (Fig. 4A). Proximal long bones dominate the assemblage, in particular in the cases of chicken and partridge. The latter, however, should be interpreted with caution since it is represented by a single bone. The diurnal raptor is mainly characterised by distal long bones (Fig. 4B) and has a larger representation of wing bones than legs (Fig. 4C). The opposite trend

Fig. 2 – Almoinhas bird bones and bone surface modification. A) Bones of *Buteo buteo*, from left to right: coracoid, humerus, ulna, radius, carpometacarpus, tibiotarsus, tarsometatarsus. B) Tibiotarsus of *Gallus domesticus* with cut mark. C) Coracoid of *Gallus domesticus* with cut mark.

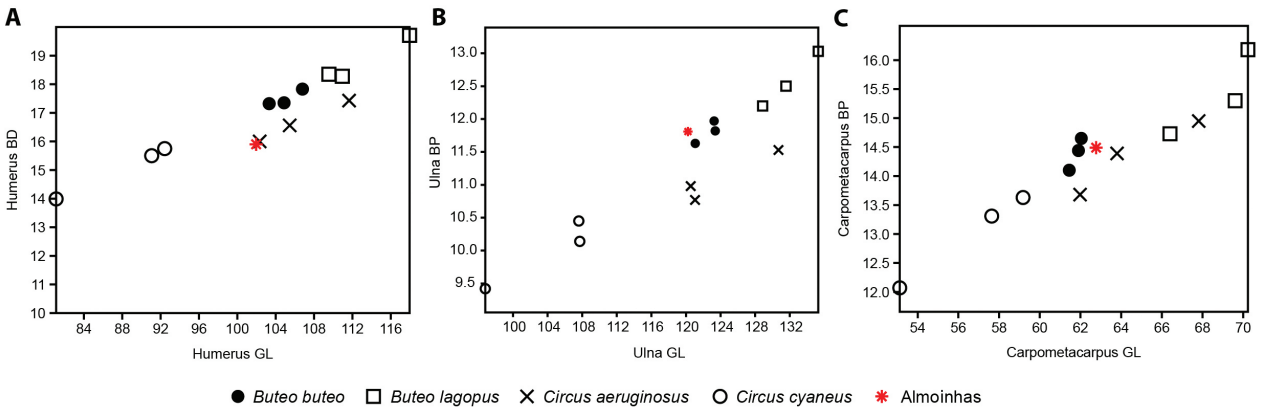

Fig. 3 – Osteometrics for the Accipitridae family comparing birds measured by Otto (1981) and the Almoinhas specimens. BP = Breadth of the proximal end. BD = Breadth of the distal end. GL = Greatest length.

is shown for the partridge, but it is due to the sole presence of a femur. The chicken follows the pattern expected for a complete animal with the same abundance of wing and leg bones, as well as a balanced representation of proximal and distal wing bones (Fig. 4D). The diurnal raptor presents more proximal wing bones than distal wings, whereas data for the partridge is absent.

All bones are from adult animals, since long bone epiphyses seem to be completely formed.

Table 1 – Almoinhas Number of Identified Specimens (NISP), Minimum Number of Individuals (MNI) and skeletal elements found on site.

	NISP	MNI
Gallus domesticus		
coracoid	1	.
humerus	1	.
ulna	1	.
carpometacarpus	2	.
femur	2	.
tibiotarsus	2	.
Sub-Total	**9**	**1**
***Gallus* sp.**		
scapula	1	.
ulna	1	.
tarsometatarsus	1	.
Sub-Total	**3**	**1**
Alectoris rufa/Perdix perdix		
femur	1	.
Sub-Total	**1**	**1**
Buteo buteo/Circus aeruginosus		
coracoid	1	.
humerus	1	.
ulna	1	.
radius	1	.
carpometacarpus	1	.
tibiotarsus	1	.
tarsometatarsus	1	.
Sub-Total	**7**	**1**
Indeterminate		
carpometacarpus	1	.
pelvis	1	.
long bone	1	.
Sub-Total	**3**	**.**
TOTAL	**23**	**4**

The absence of spurs on chicken tarsometarsi and the lack of evidence of medullary bone did not allow gender identifications.

Bone surface modification is scant but present. Butchery marks are represented by two cuts on chicken bones. Both striations are straight and show an oblique orientation. One of them is located on the proximal shaft of a right coracoid and the second was identified on the distal epiphysis of a left tibiotarsus (Fig. 2B and 2C). No carnivore or rodent gnawing marks were detected, and marks of digestion are absent.

5. Discussion

The bird bones identified in the *uilla* of Almoinhas are all from terrestrial animals. This can possibly be due to recovery methods during fieldwork, since at least some remains of aquatic species would be expected in a site with a close relationship with a port and with a small production of salted-fish products. Despite the economic activities related with fish capture and processing, there are Roman sites in inland Portugal, like Conimbriga (Detry & *alii*, 2014) or Quinta das Longas (Cardoso & Detry, 2005), that include aquatic birds in their assemblages. They are mainly from the Anatidae family (ducks and geese), whose domestication is confirmed for Roman times (Albarella, 2005), suggesting the presence of freshwater on site maybe in the form of small lakes or ponds. However, that does not seem to be the case for Almoinhas.

All bird species identified in Almoinhas are local year-round residents, and there is a fairly even distribution between wild and domestic individuals. Domestic species are represented

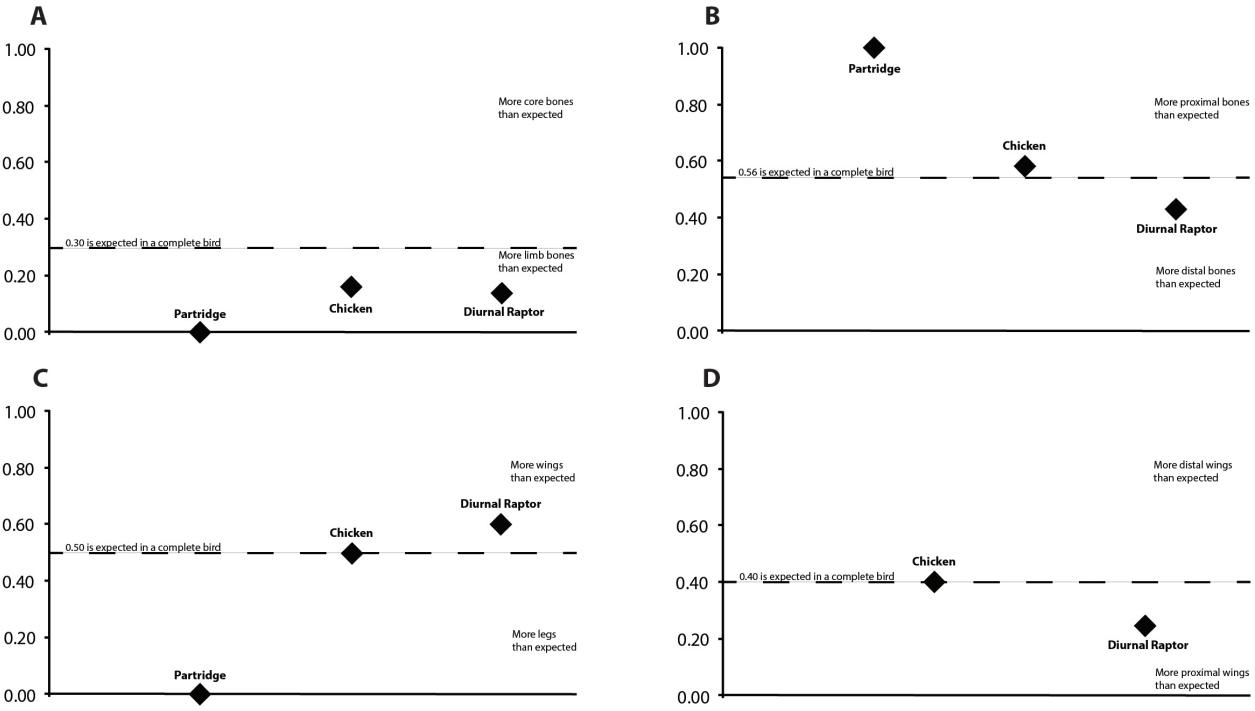

Fig. 4 – Almoinhas birds skeletal ratios. A) Core-to-Limb bones. B) Proximal-to-Distal bones. C) Wing-to-Leg bones. D) Proximal-to-Distal Wing bones.

by chickens and these are the most frequent birds, following the general trend for Portuguese Roman sites. The exceptions to this pattern in the country are the cases of Figueira Brava (Mourer-Chauviré & Antunes, 2000), Quinta do Marim (Antunes & Mourer-Chauviré, 1992), Cerro da Vila, Monte da Nora and Milreu (Benecke, 2008) that are fully represented by wild birds.

Skeletal part analysis indicates the presence of complete chickens in Almoinhas, and cut marks point to an anthropic manipulation related with flesh consumption. Even though no females were identified through medullary bone, it is expected that eggs were being produced and consumed, and feathers might have also been used. Chickens are animals that are easily kept within a family or small community, they can effortlessly survive on food scraps and they provide several valuable products.

Partridges are part of the Roman diet since Tiberian times, as demonstrated by the recipes in Apicius's *De re coquinaria* (Montero, 2004, p. 50). They are common in Portuguese Roman sites with significant high figures in Alcáçova de Santarém (Davis, 2006), Quinta das Longas (Cardoso & Detry, 2005), Cerro da Vila and Milreu (Benecke, 2008). They are generally associated with hunting practices, but it is hard to interpret the presence of this bird in Almoinhas due to the recovery of a single bone. Partridges can be hunted by dogs, foxes, crows and magpies, but evidence of such animals is missing or it is scarce on site, such as the case of dogs (Costa, 2011). Buzzards and harriers do not feed on partridges, but preferably on small mammals (Catry & *alii*, 2010).

Diurnal raptors are not generally part of human diets and the preference of certain skeletal parts is not attested (as could be the case for the use of feathers). To roman ideology such birds tend to be related with gods and auspices (Montero, 2004), but no evidence supporting these practices was found in the *uilla* of Almoinhas. Therefore, the presence of diurnal raptors on site is considered to be accidental. The bones seem to belong to a single animal that might have died naturally, and ended up integrating the archaeological deposit.

6. Conclusion

To conclude, the bird assemblage from Almoinhas is completely formed by terrestrial birds. The absence of aquatic birds is somehow unexpected considering the relationship with a port and the identification of a small production of salted-fish products. Chickens are the most predominant in the studied assemblage,

and they might have been kept locally and slaughtered according to daily needs. Other products, such as eggs and feathers, might have been used, even though no females were identified. Partridges are expected due to their recurrent presence in other Portuguese Roman sites. Nonetheless, it is hard to establish if they were being hunted and consumed in Almoinhas, due to the scant evidence recovered. Their presence, however, does not seem to be due to carnivore or raptor activity considering the lack of digestion and carnivore marks. Conversely, the presence of a diurnal raptor might be due to an accidental death on site. Considering the small bird bone assemblage analysed, such patterns are prone to change if more material is recovered and analysed. Nevertheless, the present study is the first of its kind to the Lisbon area and it attempts to shed light on bird use and consumption in *Olisipo* and its surroundings that were heavily populated during Roman times.

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