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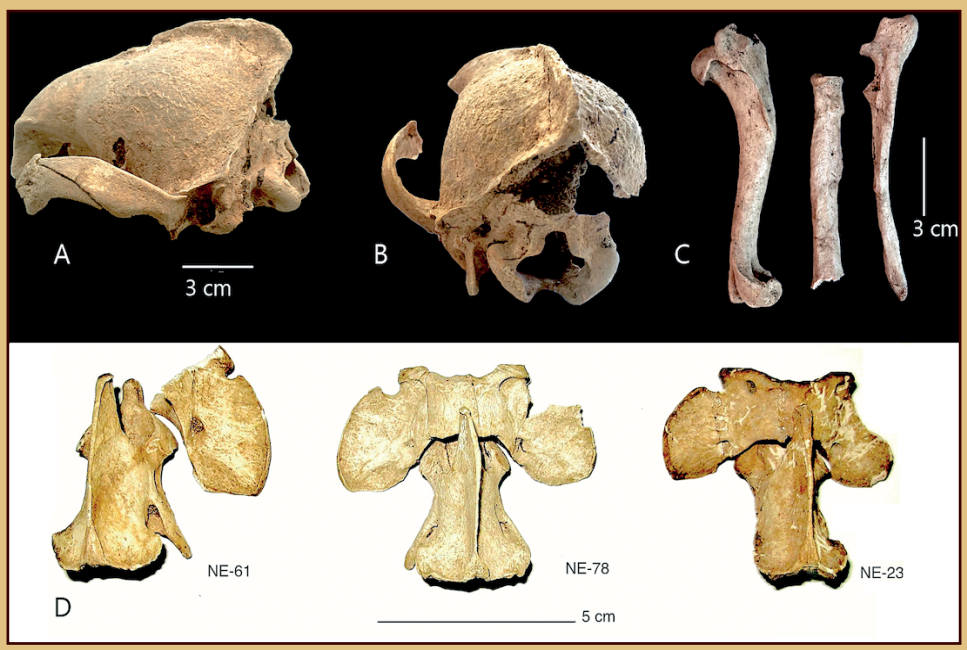

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Gallus gallus at the Late Antiquity site of El Castillón (Santa Eulalia de Tábara, Zamora, Spain)

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ABSTRACT: A large number of zooarchaeological remains have been documented at El Castillón archaeological site (Province of Zamora, north-western Spain) and dated to Late Antiquity, in the 5th and 6th centuries cal AD. While most of them belong to domestic mammals, and a few to wild ones, remains of other vertebrates have been reported, among them birds. This article details the archaeofaunistic investigation of the galliform remains documented at the site. It focuses on the anatomic analysis of age profiles and taphonomic and biometric aspects. Through this research, we may conclude that the village practised poultry livestock and that domestic chicken was part of the inhabitants' diet.

KEYWORDS: BIRDS, GALLUS, LATE ANTIQUITY, NORTH SUBPLATEAU, ARCHAEOZOOLOGY, TAPHONOMY

RESUMEN: En el poblado tardoantiguo de El Castillón (Provincia de Zamora) se ha documentado un gran número de restos arqueozoológicos en contextos datado entre los siglos V y VI cal AD. Si bien los más abundantes pertenecen a mamíferos domésticos y en menor medida salvajes, también se han documentado restos de otros vertebrados, entre los que destacan las aves. En este artículo se aborda el estudio arqueofaunístico de los restos de galliformes, haciendo hincapié en análisis anatómicos de los perfiles de edad, tafonómicos y biométricos. A través de esta investigación se puede concluir que en el poblado existió una explotación avícola y que las gallinas domésticas formaron parte de la dieta de estos grupos.

PALABRAS CLAVE: AVES, GALLUS, TARDOANTIGÜEDAD, SUBMESETA NORTE, ARQUEOZOOLOGÍA, TAFONOMÍA

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INTRODUCTION

The fall of the Western Roman Empire marked the start of a slow process of social and economic change. From the early fifth century, the Visigoths settled in the Iberian Peninsula, in small towns in locations of particular strategic and economic value. Over the years, these places became the basic units of agricultural production in the first stages of the Middle Ages.

In recent years, zooarchaeological studies focused on historical periods (particularly Late Antiquity and the Medieval periods) have been paramount to understand the economy and society of the inhabitants of the Iberian Peninsula in those times (e.g. Valenzuela & Navarro, 2007; Colominas, 2009; Grau-Sologestoa, 2009, 2013a, 2013b, 2015, 2018; Martínez-Sánchez & Carmona, 2013; Quirós, 2013; García-García, 2016, 2019; Colominas *et al*., 2017, 2021; Grau-Sologestoa & Quirós, 2017; Valenzuela *et al*., 2017; Grau-Sologestoa & García-García, 2018; Gallego-Valle *et al*., 2020).

Across the peninsula, different researchers have analysed the fauna at archaeological sites, focusing not only on livestock, but also on hunting, fishing and shellfish gathering (e.g., Cardoso & Detry, 2005; Castaños & Bueno, 2006; Castaños *et al*., 2012; Malalana *et al*., 2012; Valenzuela & Ramis, 2012; Grau-Sologestoa, 2015; Castaños & Castaños, 2016-2017; García-Petit, 2017; Rufí *et al*., 2018; Portero *et al*., 2019; Sainz-Aja *et al*., 2020). Archaeozoological research currently being carried out on the period of Late Antiquity is beginning to show that the characteristic livestock was formed primarily of sheep, swine and cattle, following the Roman tradition. Together with these animals, poultry also began to acquire importance in Late Antiquity.

Remains of *Gallus gallus* are increasingly frequent at Iberian sites between the fourth and sixth centuries AD. However, the keeping of poultry had not become widespread until Roman times, when those birds began to form an essential part of livestock (Corbino *et al*., 2016). Information about poultry-keeping in later times is limited.

These studies have not documented a great deal of osseous evidence of birds (domestic or otherwise), but among them, galliforms stand out. Some specific zooarchaeological studies on the matter have been published (e.g. Hernández, 1993; Fernández Rodríguez, 2003; Moreno-García & Pimenta, 2010; Bordegarai & Baños, 2011; Grau-Sologestoa, 2013a, 2013b; Vigil-Escalera *et al*., 2014; García-García, 2016, 2019).

The present paper studies the archaeofaunal remains of galliforms found in the different areas that have been excavated archaeologically at the Late Antique site of El Castillón (north-western Spain). It focuses on the importance of *Gallus gallus*, their possible production and breeding, and the role the species played in the internal economy of the settlement.

THE ARCHAEOLOGICAL SITE OF EL CASTILLÓN

El Castillón is located some 5 kilometres from Santa Eulalia de Tábara, Zamora, in the northwest of the Iberian Peninsula. It is on the western bank of the River Esla (Figure 1) and, so far, it has been determined that the site covered nearly 3 hectares. It used to be surrounded by a wall, except on the eastern side, which was protected by the river valley. The site was excavated between 2007 and 2019. A total of 12 surveys yielded different structures and large amounts of material. Some of the highlights include animal and pottery remains, particularly those found in the surveys S1, S8, S3 and S7, which date back to Late Antiquity (Sastre *et al*., 2015, 2018; Sastre, 2017). Numerous zooarchaeological remains in a good state of preservation were unearthed in them, mostly belonging to domestic caprines, bovines, suids and equids. Other animals were classified as canines and poultry. Hunting (e.g., red deer and rabbits) and fishing were common near the site (Álvarez-Fernández & Portero, 2015; Álvarez-Fernández *et al*., 2019/2020; González-Cabezas, 2018). The general inventory of the remaining faunal bones at El Castillón is not yet available.

In the metal-working area (Surveys S1 and S8), located in the northeast part of the site, several oval furnaces have been documented and linked to slag and pottery. There are no conclusive timelines regarding this part of the site. Through pottery styles, it has been determined these structures belong to the 5th century AD (Sastre *et al*., 2015, 2018; Sastre, 2017).

In the living area (particularly the centre of the village, S3) a large rectangular structure was documented. It consisted of eight sections, each

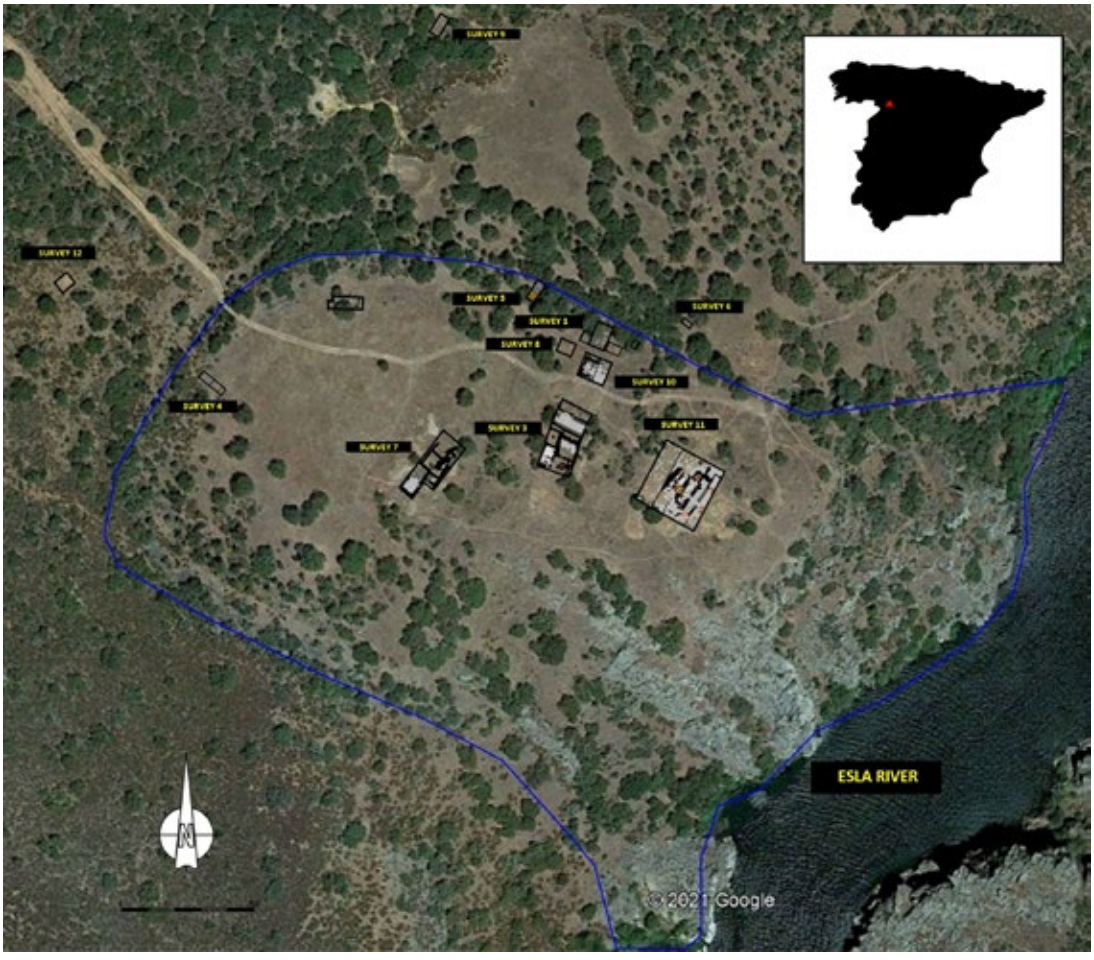

FIGURE 1

El Castillón (Santa Eulalia de Tábara): location in the Iberian Peninsula and general plan of the surveys carried out at the site.

with its own ample rooms. At the time, researchers had access to radiocarbon dating of *Ovis aries* remains found in Room 3 (Sastre, 2017). Within our investigation, a date has been determined for a *Gallus gallus* humerus with cut marks found in Room 5. All the results suggest both spaces were inhabited during the 5th and 6th centuries AD (Table 1).

In the southeast area of the settlement, researchers documented S7, a large compartmentalised structure consisting of five rooms with remains of *Gallus gallus* in them. Radiocarbon dating was

Area	Room	S.U.	Lab Code	Sample	14C Age	Cal AD Range 2δ(%)	References
Survey 3	8	306 6	Beta- 402987	Bone (*Ovis aries*)	1670± 55	250-295 (13.7) 311-540 (81.7)	Sastre, 2017
Survey 3	5	362	OxA-40559	Bone (*Gallus gallus*)	1493±17	550-607 (92.4) 627-635 (3)	This paper
Survey 7	2	701 2	Beta- 432438	Seed (*Triticum aestivum-vulgare*)	1450±30	571-651 (95.4)	Sastre, 2017

TABLE 1

AMS Radiocarbon dates for El Castillón and their calibration (2σ, 95.4%). Calibration was carried out with OxCal v4.4 (Bronk Ramsey, 2009) and the IntCal20 calibration curve (Reimer *et al*., 2020). S.U.: Stratigraphic Unit.

performed on a wheat grain found in Room 2. It determined that the house belonged to the 5th and 6th century AD (Sastre, 2017), contemporary with the bone found in Room 5 in S3 (Table 1).

METHODS

The archaeofauna remains from El Castillón are stored in the Department of Prehistory, Ancient History and Archaeology at the University of Salamanca. First, out of all the zooarchaeological finds, bird bones were classified independently. A specific study of the *Gallus gallus* remains was then carried out.

The methodology upon which the zooarchaeological study was based is described by Lyman (1994, 2008) and Reitz & Wing (1999). The remains were classified using the reference collection in the Department mentioned above and in the Aranzadi Science Society (San Sebastián), assisted by various avian taxa osteological studies (Erbersdobler, 1968; Stewart & Hernández, 1997; Tomek & Bocheński, 2009). Remains were anatomically classified, differentiating cranial (skull and jaw), axial (furcula, vertebrae, ribs, keel, coracoid, scapulae, pelvis and synsacrum) and appendicular skeleton (humerus, radius, ulna, carpometacarpus, proximal phalanges, femur, tibiotarsus/fibula, tarsometatarsus and distal phalanges) (Livingston, 1979; Baumel *et al*., 1993; Cohen & Serjeantson, 2015). No remains attributable to Phasianus have been detected in the assemblage on the basis of comparative measurements and anatomical differences (Erbersdobler, 1968; Tomek & Bochenski, 2009).

Number of identified specimens (NISP) and minimum number of individuals (MNI) were quantified according to the most abundant anatomical parts, the side they belong to and the age at which individuals died (Grayson, 1984; Lyman, 2008).

The age was estimated according to fusion of long bones (Thomas *et al*., 2016). In the case of pathologies, the criteria of Gál (2008) were followed.

Taphonomic analysis was performed with handheld magnifying glasses (5x, 10x and 15x) and a Leica EZ4 binocular microscope (8 – 32x). All documented alterations were classified according to the agents that caused them: human groups, carnivores, and natural causes (e. g. Behrensmeyer, 1978; Yravedra, 2006).

Anthropic marks were catalogued according to the process through which meat was obtained and consumed. Bone location, orientation and morphology were studied (Blasco, 1992; Fisher, 1995; Colominas *et al*., 2013). As a result, a difference has been made between: (1) generic cut-marks, with a morphology, orientation and position on any bone that could not be associated with butchery tasks; (2) dismembering, when anatomical parts of the animal have been separated to prepare them in smaller portions, dissection marks and incisions in strategic points to obtain complete portions; (3) disarticulation marks, incise and/or repeated in the epiphysis and metaphysis, or in the myotendinous articulations and proximities, with any orientation and morphology, in order to obtain specific parts of the animal; (4) chop-marks, an impact with a V-shaped cross-section made in the bone cortex by a heavy instrument; and (5) scraping, marks made by cutting that are possibly repeated and sinuous, mainly on the long bone shafts and metaphysis or on flat bones in order to extract the meat and probably made during consumption.

Temperature changes on the bone cortical were taken into account, considering the degree of thermal exposure and colouring (Albizuri *et al*., 1993; Stiner *et al*., 1995).

Carnivore marks were classified according to morphological criteria: (1) furrowing, (2) puncture, (3) pit, (4) pitting, (5) socores, (6) digestion and (7) gnawing. (Haynes, 1980; Selvaggio, 1994).

Measurements were taken on coracoids, humeri, radii, ulnae, femora, tibiotarsi and tarsometatarsi following Erbersdobler (1968) and Driesch (1976). PAST 3.23 (Hammer *et al*., 2001) was the software used for Mixture Analysis, Scatter Plot, Student t-test, F-test and Welch t-test. Statistical analyses were performed on a <0.05% significance level.

To understand practical applications, the research used theoretical fundamentals and applied methods from similar works on *Gallus gallus* (Bôkôny & Bartosiewicz, 1983; Clavel *et al*., 1996; Lepetz, 1996; Dong, 1997; De Cupere *et al*., 2005; Sainz-Aja *et al*., 2020).

Measurements obtained at El Castillón were statistically compared to those from the Iron Age onwards studied by Thesing (1977), mostly in Central Europe, and Clavel *et al*. (1996) in northern France. The aim was to determine whether sizes documented for this sample from the Iberian Peninsula are consistent with the European ones. Both of

those studies indicated an increase in chicken size between the Iron Age and the Roman period, a decrease during the Early Middle Ages and another increase until the present. Towards the end of the Middle Ages, sizes returned to Roman period values.

RESULTS

At El Castillón site (Metal-working area and Living area; surveys S1, S8, S3 and S7), a total of 754 bird remains have been documented, 610 of which are identifiable. They belong to an MNI of 87 individuals. Most samples belong to *Gallus gallus* (NISP=566; MNI=67); amounting to 92.7% of all identified remains (Table 2). Other poultry species have been documented (*Anser anser*), as well as wild species (*Anas platyrhynchos, Alectoris/Perdix, Corvus* sp., *Columba* sp. and *Gyps fulvus*). The final anatomical inventory of *G. gallus* reached a total of 92 tibiotarsi, 75 tarsometatarsi, 69 femora, 52 humeri, 49 coracoids, 40 ulnae, 38 radii, 31 scapulae, 20 os coxae, 19 synsacra, 14 sterna, 8 cranial bones and 5 carpometacarpi. The record also includes phalanges and other bones in the axial skeleton attributed presumably to domestic chicken.

Most of these 566 remains of *G. gallus* were recovered in the area of the dwelling. 70.3% of all the galliform remains were documented in S3 (Table 2) (NISP=398; MNI=48). Within this area, by far the largest number were found in Room 5 (NISP=270) and these amount to 47.7% of all the remains at the site (Table 2). A further 22.6% were documented in S7 (NISP=128; MNI=12). The two rooms with the largest number in that area are Room 5 (NISP=84; MNI=5) and Room 2 (NISP=41; MNI=4) (Table 2). The assemblage is completed with 40 bones found in the metallurgical area (MNI in S1=5 and in S8=2). These two surveys yielded the fewest remains.

Most of the remains belong to adult individuals. Juvenile and immature remains have been found also documented. Thus, S3 is the area that is best represented by adult and juvenile individuals and is the only place where remains of an immature age have been found. Area S7 also yielded a large number of adults and, to a lesser extent, juveniles. It can be confirmed that the area of the dwelling provided about 93.2% of the adult individuals. The other 6.7% were found in the metallurgical area (Table 3).

The appendicular skeleton has contributed the largest number of remains but the axial skeleton is also well represented. Thus remains from the appendicular skeleton make up to 66.9% of the *G. gallus* record, and the axial skeleton comprises 31.8%.

			Gallus gallus		
Area	**Activities**	**Rooms**	**NISP**	**%**	**MNI**
S1	**Metallurgic**		37	6.53%	5
S3	**Habitation context**	**Room 1**	59	10.42%	6
		Room 2	9	1.59%	3
		Room 3	1	0.17%	1
		Room 4	1	0.17%	1
		Room 5	270	47.70%	26
		Room 7	23	4.06%	4
		Room 7-8	2	0.35%	1
		Room 8	33	5.83%	6
S7	**Habitation context**	**Room 1**	1	0.17%	1
		Room 2	41	7.24%	4
		Room 3	1	0.17%	1
		Room 4	1	0.17%	1
		Room 5	84	14.84%	5
S8	**Metallurgic**		3	0.53%	2
		Total:	566	100%	67

TABLE 2

El Castillón (Santa Eulalia de Tábara): NISP, NISP% and MNI of *Gallus gallus remains* by surveys and rooms.

Area	Adult	Young	Immature	Area	Appendicular	Axial	Cranial
S1	33	4		**S1**	31	6	
S3	374	22	3	**S3**	277	114	8
S7	120	6		**S7**	70	58	
S8	3			**S8**	1	2	
Total	530	32	3	**Total**	378	180	8

TABLE 3

El Castillón (Santa Eulalia de Tábara): NISP of *Gallus gallus*: attending to age (left); and main anatomical categories (right) per survey.

The anatomical parts corresponding to the cranial skeleton are quite scarce, only 1.41% of the total, and were only found in some parts of S3. The remains that have been preserved are mostly relatively intact cranial vaults (Table 3).

Six remains with traces of fracture calluses have been found in Rooms 1, 5 and 8 in S3 and two remains were documented in Room 5 in S7.

The bones are very well-preserved and largely complete (they usually include a part that can be measured) and their shapes have not altered with time. However, a large number of biostratinomic and diagenetic alterations are seen on them. All the remains in both test pits display root marks and are affected by manganese. Several bones exhibit concretions, weathering, water erosion, iron oxides and trampling (Table 4).

Anthropic alterations are also seen in the avifauna assemblages. 16.7% of the *G. gallus* bones are affected directly by one type or another of cutmark. The survey S3, as in the case of the previous analyses, is the area with the most anthropic marks, which amount to 72.6% of all those recorded.

Room 5 in S3 has contributed the largest number of anthropogenic alterations, with a total of 49, which corresponds to 51.5% of all those documented (Table 5). A significant number have also been found in S7: 17.8%. The metallurgical area has not provided many, even though 24.3% of the remains found there are altered anthropically. No evidence of these alterations has been documented in S8.

Thermo-altered remains with dark brown, black, and white colouring come from Rooms 5 and 7 (Table 5). They are not very abundant in the record and only represent 2.1% of the total. However, it should be noted that some long bones with differential alterations to the area of their epiphyses have been documented.

Area	Rooms	Alterations
S1		a:1, c:5, d:3, z:3, y:2, x:3
S3	**Room 1**	a:1, b:3, c:4, z:2
	Room 2	c:1
	Room 4	c:1, u:1
	Room 5	a:3, b:14, c:24, d:5, e:3, m:4, z:17, y: 5, x:7, w:1 v:3 t:1
	Room 7	a:1, b:2, c:2, m:1, z:2, y:2
	Room 8	b:1, c:4, y:1, x:1, t:1
S7	**Room 2**	a:1, b:1, c:3, d:1, m:6, z:1, x:3, t:1
	Room 5	a:2, b:3, c:6, m:1, z:1, w:1
	Total	a:9, b:24, c:50, d:9, e:3, m:12, z:26, y:10, x:14, w:2, v:3, u:1, t:3

TABLE 4

El Castillón (Santa Eulalia de Tábara): NISP of *Gallus gallus* with anthropic modifications (a: Cut Marks; b: Dismembering; c: Disarticulation; d: Chop Marks; e: Scrapes & m: Burned) and caused by carnivores (z: Furrowing; y: Puncture; x: Pit; w: Pitting; v: Scores; u: Digested & t: Gnawed) by surveys and rooms.

The marks produced by carnivores are not very common either, as they have only been detected on 10.4% of the remains. Nonetheless, a wide range

Area	Roots	Manganese	Concretion	Weathering	Water alt.	Iron alt.	Trampling
S1	37	34	17	3	4	1	2
S3	383	280	119	74		25	9
S7	124	90	80	25	1	1	7
S8	3	2	2	1			

TABLE 5

El Castillón (Santa Eulalia de Tábara): NISP of *Gallus gallus* with natural modifications by survey. alt.: alteration.

	n	Min.	Max.	Mean	Stand. Dev.
CRA-GB	4	23.39	24.91	24	0.729
CRA-SBO	4	11.16	13.11	12.05	0.994
CRA-GH	3	18.48	19.07	18.86	0.329
CRA-LP	2	31.14	39.11	35.12	5.635
COR-GL	29	42.68	57.83	48.29	3.420
COR-Lm	29	39.36	56.01	45.62	3.310
COR-Bb	35	7.08	15.55	12.42	1.814
COR-BF	33	4.93	13.37	10.2	1.557
SCA-GL	5	54.98	63.47	60.67	3.344
SCA-Dic	26	8.83	12.49	10.59	0.736
SCA-KC	7	1.36	4.53	2.3	1.054
HUM-GL	25	56.54	74.87	64.23	4.589
HUM-Bp	30	14.12	17.2	16.97	1.189
HUM-DiP	22	5.82	20.24	15.53	3.348
HUM-Bd	39	5.48	15.84	13.08	1.785
HUM-SC	49	4.57	8.86	5.45	0.792
RAD-GL	18	42.54	68.38	59.29	6.154
RAD-Bd	27	4.76	7.06	5.99	0.635
RAD-SC	37	1.65	3.39	2.21	0.364
ULN-GL	16	57.48	70.57	63.62	4.368
ULN-Bp	18	7.17	8.74	7.9	0.538
ULN-Dip	18	8.31	12.75	11.19	1.202
ULN-Did	30	6.72	9.96	8.61	0.689
ULN-SC	41	3.4	4.79	3.88	0.252
CMC-GL	3	34.3	35.45	34.76	0.608
CMC-L	3	30.36	33.93	32.31	1.806
CMC-Bp	3	9.41	9.96	9.66	0.278
CMC-Did	3	7.25	8.44	7.81	0.598
PEL-AA	1			3.26	
PEL-DiA	16	4.44	6.67	5.19	0.577
PEL-BA	1			4.66	
FEM-GL	19	61.88	80.48	71.57	5.178
FEM-Lm	19	58.08	74.37	67.24	4.614
FEM-Bp	41	10.78	16.89	13.68	1.500
FEM-Dp	40	7.75	14.04	9.66	1.148
FEM-Bd	32	10.88	15.55	13.34	1.269
FEM-Dd	31	9.45	12.55	11.01	0.834
FEM-SC	65	4.7	7.21	5.85	0.559
TBT-GL	14	90.8	109.88	97.81	4.730
TBT-La	13	86.88	105.48	94.64	5.661
TBT-Dip	23	10.84	18.02	16.11	1.575
TBT-Bd	43	8.73	11.71	10	0.750
TBT-Dd	39	8.1	12.66	10.36	0.949
TBT-SC	84	3.69	6.36	4.84	0.543
TMT-GL	40	58.75	84.64	68.71	6.442
TMT-Bp	55	9.97	14.44	11.7	1.022
TMT-Bd	54	10.13	13.78	11.73	0.874
TMT-SC	77	3	8.03	3.88	0.857

TABLE 6

Measurements in mm of *Gallus gallus* remains from El Castillón (Santa Eulalia de Tábara) after Driesch (1976): number of bones, minimum, maximum, mean and standard deviation.

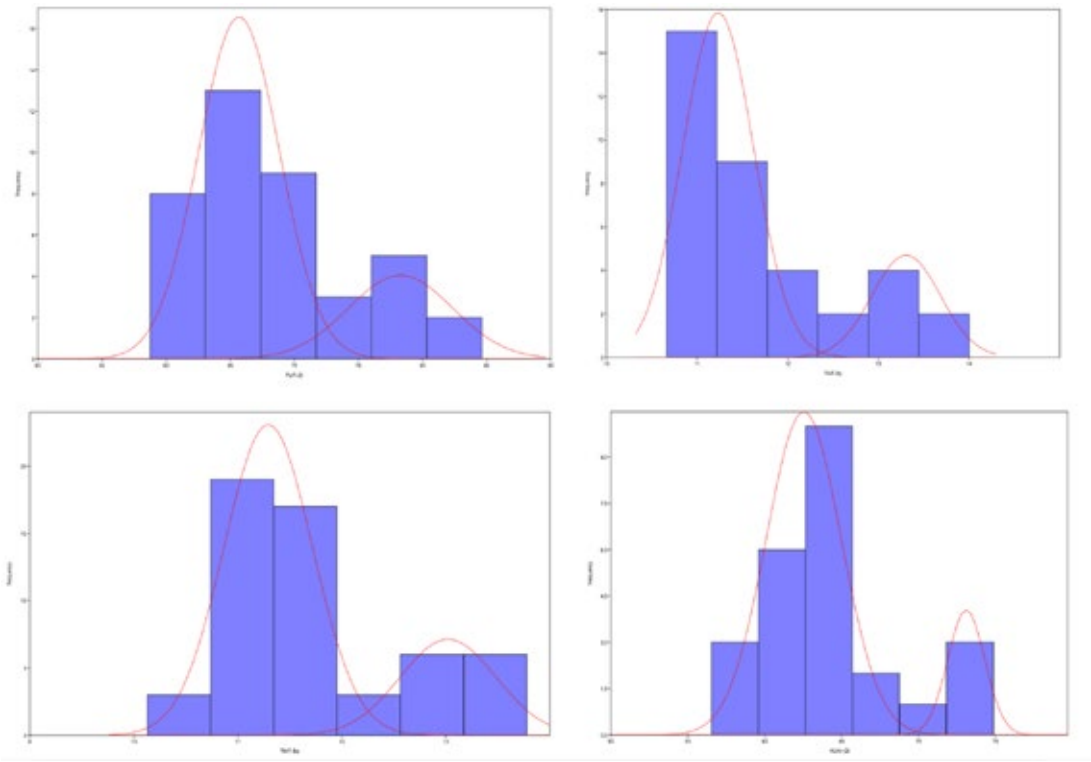

FIGURE 2

El Castillón (Santa Eulalia de Tábara): mixture analysis of *Gallus gallus* tarsometatarsal length (upper left), size of the proximal tarsometatarsus epiphysis (upper right), size of the distal tarsometatarsus epiphysis (lower left) and humerus length (lower right). All measurements in mm.

of marks have been identified (furrowing, punctures, pits, pitting, scores, digested remains and gnawing). Once more, S3 is the area in the site with the largest number of such damage, as 74.5% of the carnivore marks were found there. Room 5 has yielded 57.6% of this type of alteration (Table 5). In the other dwelling, S7, only 11.8% of the animal marks have been identified, and in the metallurgical area they are similarly scarce and only documented on remains from S1 (Table 5).

All the measurements obtained in the osteometric analysis are given in Table 6.

A Mixture Analysis (maximum likelihood estimation) (Dong, 1997) of four measurements, TMT-Gl, TMT- Bp, HUM-Gl and TMT-Bd (Figure 2), indicates that there are two subpopulations, which have been interpreted as males and females. Estimated percentage of the subpopulation with the smaller size (females) is between 75% and 77.7%, while males make up between 22.2% and 25%. A scatter plot of TMT-GL against TMT-Bp measurements (95% confidence ellipses) and two categories: presence or absence of spur, shows there are two differentiated subpopulations, presumably of males (22.2%) and females (77.8%). The former all have spurs, except for two individuals (Figure 3).

Average maximum length of several *Gallus gallus* bones from El Castillón has been compared with Thesing's results (1977) through a Student t-test. Whenever the F-test has produced significant results in the variances, a Welch t-test has been used. The results obtained are shown in Table 7.

CONCLUSIONS

The osseous remains of birds (both domestic and wild) are being documented in increasing numbers at Late Antique sites in the Iberian Peninsula. They are not abundant at all the sites and often the assemblages contain fewer than 100 specimens. In

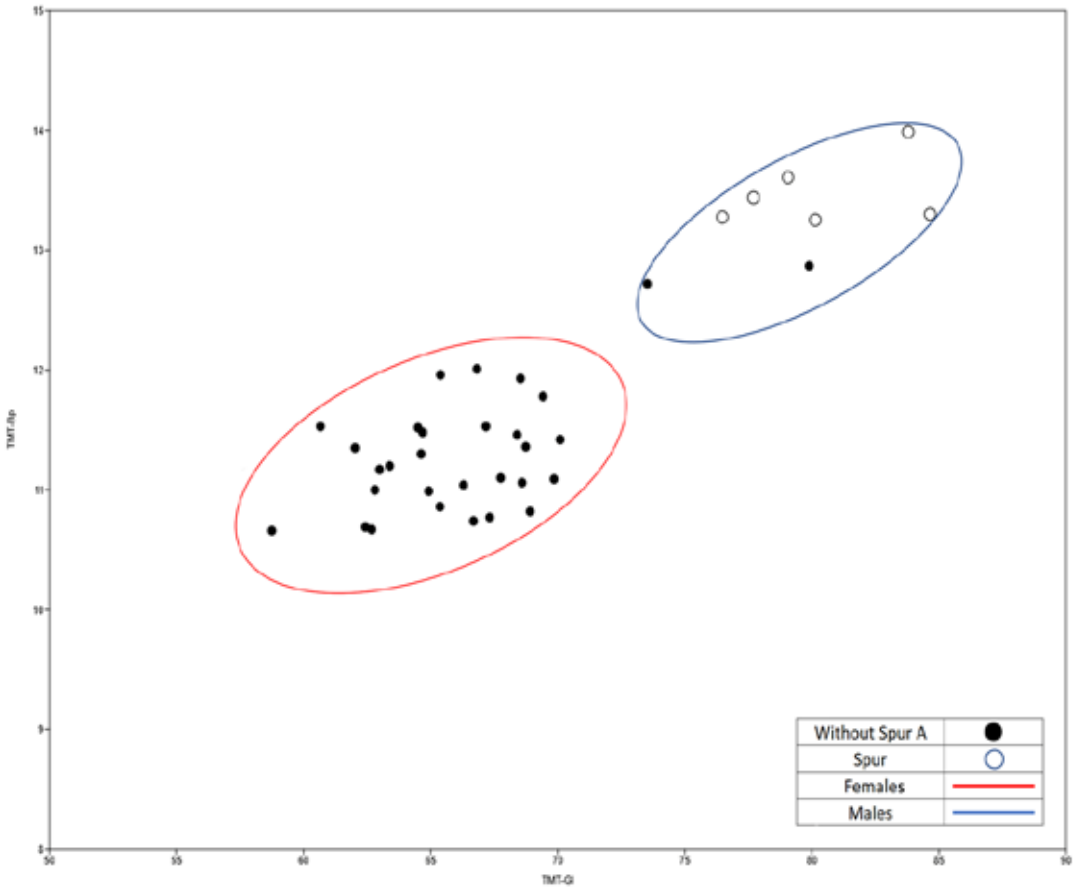

FIGURE 3

El Castillón (Santa Eulalia de Tábara): scatter-plot analysis (95% confidence ellipses) of *Gallus gallus* tarsometatarsus length versus tarsometatarsus proximal width. Symbology according to the presence of a spur. All measurements in mm.

contrast, at some specific sites large numbers of remains have been found and studied to species level. These sites include Bílbilis, Zaragoza, in the Late Roman Empire (Castaños & Bueno, 2006); Mavilla, Álava (Bordegarai & Baños, 2011); Gózquez, Madrid (Vigil-Escalera *et al*., 2014); Beja, Alentejo (Moreno-García & Pimenta, 2010); Campo Castillo, Santo Domingo, Armañá and Casa Martelo in Lugo, A Coruña and Pontevedra; Astorga, León (Fernández Rodríguez, 2003); Tolmo de Minateda, Albacete; Cercadilla, Madinat Ilbira and Arrabal de Sanqunda, in Córdoba and Granada (García-García, 2016, 2019); San Martín de Dulantzi and Zapatari in Álava (Grau-Sologestoa, 2013a, 2013b); Poblado San Esteban, Teruel (Hernández, 1993), and especially Beja, with Late Middle Age and early Modern Age settlements (Moreno-García & Pimenta, 2010). El Castillón is an exceptional case as 566 remains of *Gallus gallus* have been documented in the Visigothic settlement, which makes it one of the largest assemblages of Late Antique avifauna in the north-west of the Iberian Peninsula.

A wide distribution of remains and taphonomic alterations can be observed. Survey S3 is probably the most important test excavation because it has provided most of the remains at the settlement, in accordance with the hypothesis of Sastre (2017), who stated that the house was used as a store for different kinds of objects. Furthermore, within S3, Room 5 was the most important area in the fifth century AD as regards the number of bones and the taphonomic marks on them. Sastre (2017) suggests that as well as the house being used as a store, this

El Castillón	COR-GL	HUM-GL	RAD-GL	ULN-GL	FEM-GL	TBT-GL	TMT-GL
	3.42074 (29) 48.29	4.58961 (25) 64.23	6.15458 (18) 59.29	4.36872 (16) 63.62	5.17809 (19) 71.57	4.73033 (14) 97.81	6.44295 (40) 68,71
I	5 (15) 48.3	3.72 (17) 65.06	4.79 (6) 58.38	4.67 (13) 64.63	4.71 (22) 73.19	9.72** (10) 110.36	5.21 (8) 65.41
II	4.55 (65) 53.59//	6.03 (121) 70.62//	5.91 (60) 63.17//	6.84 (74) 68.84//	7.46 (91) 76.78//	12.43** (87) 110.45/	6.2 (142) 74.1//
III	3.94 (39) 52.1//	6.52 (25) 70.31//	6.04 (5) 61.9	7.8 (20) 67.33//	6.54 (32) 76.45//	10.74** (30) 108.75/	4.79 * (57) 75.59/
IV	2.71 (12) 50.51/	2.83 (5) 65	3.36 (5) 57.72	4.36 (6) 65.92//	7.45 (7) 76.93/	6.17 (8) 103.04/	5.69 (14) 72.64/
V				6.12** (6) 72.13/			
VI		3.34 (4) 73.05//					
VII	3.84 (96) 46.29/	5.67 (180) 64.49	5.36 (69) 56.74	5.81 (110) 62.83	5.4 (116) 70.54//	6.68 (105) 98	5.03* (107) 66.87
VIII	2.99 (31) 50.7//	6.16 (32) 66.2	4.7 (11) 60.5	4.67 (32) 63.18	5.69 (35) 71.7	9.68** (29) 104.8/	6.09 (30) 71.48
IX	4.73 (10) 49.93	5.71 (46) 69.1//	4.8 (10) 65.85//	5.84 (22) 67.95//	5.82 (40) 75.91//	8.67* (18) 104.91/	7.36 (23) 73.02//
X	4.24 (39) 48.4	4.72 (117) 65.2	5.04 (22) 58.1	4.44 (67) 64.5	5.4 (118) 72.2	7.65 (74) 101.4	5.16 (73) 67.96
XI	3.57 (4) 52.13/				5.19 (11) 71.4		

TABLE 7

F-test for variance and t-test for mean differences between *Gallus gallus* bone lengths at El Castillón and the values (periods I to XI) given by Thesing (1977). F-test: * - significant, ** - highly significant. t-test: / - significant, // - highly significant. For all rows: standard deviation, (n) and mean values are given. If F-test is significant, Welch's t-test, instead of Student's t-test, is used. I – Hallstatt-Latene, II – Early and Middle Roman Imperial, III - Roman Imperial, IV- Late Roman, V - Outside Roman Empire area, VI- Roman/Medieval, VII – Early Middle Ages, VIII. Middle Ages, IX – High Middle Ages, X – Late Middle Ages, and XI – Late Middle Ages / Early modern period. COR-GL: coracoid greatest length; HUM-GL: humerus greatest length; RAD-GL: radius greatest length; ULN-GL: ulna greatest length; FEM-GL: femur greatest length; TBT-GL: tibiotarsus greatest length; TMT-GL: tarsometatarsus greatest length.

room specialised in butchery tasks. However, these interpretations must be confirmed in the future, once the complete archaeozoological study has been carried out.

Survey S7 contributed fewer remains although it might be ventured that it was an important place for the preparation, consumption and discard of animal food. The metallurgical area did not provide a significant number of remains and may have been used to discard different kinds of materials.

El Castillón has yielded all three death ranges of *Gallus gallus* (Table 3), but the most common are the adult individuals. Most remains with cut marks found at the site belong to adults, although juveniles and immature specimens are also present.

Owing to the good state of conservation of the remains, it was possible to obtain osteometric data. Two possible populations were discriminated against: male and female. Hens are more numerous than cockerels, which suggests that the exploitation of the poultry was carried out differently for each sex. The birds were well looked after and protected from possible pathologies until their death, as shown by the presence of some bones with fibrocartilaginous calluses totally healed.

It is possible that the population of *Gallus gallu*s was bred to be consumed at the site itself because, even though the population was discriminated in terms of sex, it is not differentiated in the number of cut-marks. Adult individuals of both sexes display anthropic alterations. This suggests that the hens gave eggs (although no remains of shells have been found) and cockerels were used for breeding, and once they had fulfilled their function, both of them were consumed.

The management of the different sexes can be difficult to interpret as poultry livestock includes

such techniques as the fattening of capons and poulardes. The presence of the latter cannot be ruled out but so far, no populations can be attributed to those poultry procedures. The ages do not coincide because most of the remains come from well-formed adults and no direct evidence of castration or fattening have been documented. Nonetheless, the osteometric analysis is in a preliminary stage and no criteria able to detect differences have been established. In addition, the spurs are well formed and not rounded, except for two individuals shown in Figure 3 that do not display this osseous characteristic. The reason is not known, but this is probably because of a taphonomic modification or bone fracture.

The consumption patterns and cut-marks clearly indicate a selection, or at least a discard, of some parts of the birds rather than others (Figure 4). Cranial elements are represented, but are not significant numerically or taphonomically. Therefore, the birds would have been decapitated and the heads used for other forms of consumption (in a broth) and then discarded. As occurs today, the birds were plucked, as no evidence of skinning them has been found and it is thought that the skins were consumed.

The appendicular parts form a large proportion of the record. In the first stage of the preparation of the food, the parts of least interest as regards their quantity of meat, such as the legs, would have been separated. This explains the high frequency of tarsometatarsi and cut-marks in their proximal epiphysis. The axial parts with cuts are also abundant, in the area of the coracoids, scapular and coccyx, which may indicate the process of dismembering and dividing up the body carefully into whole anatomical sections. The appendicular skeleton was later disarticulated and divided into even smaller portions to be consumed separately, as shown by the large proportion of cut-marks on articulations and bone shafts.

It has been observed that several remains were exposed to fire (Table 4). The bone colours vary from brownish (<400º) and black and grey hues (≥ 400º) to whitish colours indicating calcination. This may suggest that the bones were thrown into the fire to clean up the rooms, although the colouring may be related to the preparation of the meat for consumption.

FIGURE 4

El Castillón (Santa Eulalia de Tábara): location of cut marks on the *Gallus* skeleton, graphic labels show no. of remains/ no. of cut marks (image credits: www2.hawaii.edu). Two visual examples of cut marks are given (x8 magnification).

Osteometric data also allows the comparison of the size of *Gallus gallus* at the site with the sizes determined at other European sites. Samples from the Hallstatt-La Tene protohistoric periods are not significantly different from the ones at El Castillón, excluding the tiobiotarsi. Nevertheless, those attributed to early and middle Roman Imperial periods do show highly significant differences in seven and six measurements. Towards the end of the Roman period, tendencies change, and although there are significant differences in five measurements, one is less pronounced. The samples corresponding to the Early Middle Age and Middle Age show significant differences in three and two measurements compared to El Castillón, and those from the High Middle Age show highly significant differences in six measurements. However, the samples from the Late Middle Ages are not significantly different from the ones found at El Castillón. Although further *Gallus gallus* biometric studies need to be completed in the Iberian Peninsula, the sizes of our samples fit with the Central European framework (Thesing, 1977; Clavel *et al*., 1996) of increasing size up until the Roman period (e.g., Castaños & Bueno *et al*., 2006), followed by a later reduction at the time of El Castillón. In any case, it should be noted that those measurements depend on the relative number of males and females. A sample with more males will show larger biometrics than one where females are predominant. However, in conclusion, the birds found at El Castillón were similar in size to those documented in Central Europe after the Roman period.

Gallus gallus remains with alterations due to carnivores are prominent (Table 4). Canine and feline remains have been documented in the archaeofauna study at the site (Álvarez-Fernández *et al*., 2019/2020), so it can be confirmed they were kept as pets or working animals. There is also evidence of foxes, so it cannot be ruled out that the marks were produced by them (O'Connor, 2017).

As a final conclusion, we can say that the excavation at El Castillón settlement has yielded a large collection of avifaunal remains, one of the largest late antique assemblages in Southwestern Europe. Over 500 *Gallus gallus* specimens stand out among the documented remains. Their preliminary study suggests that the inhabitants of the settlement complemented their meat-rich diet, mostly based on domestic caprines, with poultry, from which they obtained meat and eggs.

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