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Urban medieval and post-medieval zooarchaeology in the Basque Country: meat supply and consumption

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Abstract: This paper examines the zooarchaeological evidence from six Basque towns (Bilbao, Vitoria-Gasteiz, Salvatierra-Agurain, Balmaseda, Orduña and Durango), and compares it with historical written sources. The key aims are a better understanding of urban diet, the provisioning of meat to towns, and the relationship between town and country, in the 12th to 18th centuries. Taxonomic frequencies, kill-off patterns, butchery practices and biometrical data are examined in a diachronic perspective. The results reveal that, although there are some signs of economic specialization, patterns of urban consumption remained fairly stable. It is suggested that the strict taxation and legislation for meat supply and the ownership of livestock by urban elites meant that urban demand for meat was too tightly regulated to bring about substantial changes in the mechanisms of livestock breeding and supply. The economic system appears to have mainly been geared towards the socio-economic needs of the countryside, despite the central role of some of the Basque towns in international trade.

Keywords: livestock, meat, town, Middle Ages, Modern Era.

1. Introduction

Although publications of faunal remains from rescue excavations are still uncommon in Spain, medieval and post-medieval faunal analyses are becoming increasingly important in the research agendas of both academic and commercial archaeologists. However, the zooarchaeology of urban environments remains a relatively unexplored subject, despite its potential to deal with important issues such as urban provisioning of meat, social differentiation and the relationship of towns with

their hinterlands (O'Connor, 1992). In order to explore these aspects, the faunal evidence from several Basque towns is analyzed and reviewed in this paper.

The historical period considered here is represented by the transition from the late medieval (12th-15th centuries) to the post-medieval period (16th-18th centuries). This is a period in history that saw the birth of modern economies and societies (e.g. Anderson, 1974; Braudel, 1996) and it is therefore especially relevant to us. Zooarchaeological analysis is particularly suited to investigate the study of animal production and consumption, and how these were transformed as part of a progressively more complex and specialized economic system. Archaeological investigations of such processes, as well as of the late medieval roots of modern economic systems, are still uncommon in Europe (Johnson, 1996; Mullins, 2004), although a recent surge of interest in this topic has emerged (e.g. Tourunen, 2008; Thomas & Fothergill, 2014).

The European region where this process has been most intensively studied by zooarchaeologists is England. Although English post-medieval faunal assemblages are still largely ignored when it comes to analysis and publication (Broderick, 2014), the subject has received some attention in the recent past (i.e. Albarella, 1997; Davis & Beckett, 1999; Thomas, 2009). However, this has only scratched the surface of what is clearly a more complex and widespread area of investigation. Works dealing with English late medieval and post-medieval faunal assemblages have played a pioneering role and are commonly referred to even when different geographic areas are discussed (i.e. Doll, 2003; Murphy, 2007; Tourunen, 2008). Perhaps unwisely, this has led to the establishment of an Anglo-centric model for the zooarchaeology of the period. According to this model, most late medieval/early post-medieval changes in animal husbandry can be associated with improvements in yield and productivity in response to an increasing urban demand. Evidence of these major innovations in livestock keeping includes the following: development of new animal breeds, introduction of more sophisticated agricultural machinery, development of new foodstuff and feeding techniques, enhancement of meat and dairy production, progressive substitution of cattle with horse as the main animal for traction, and increase in size of the main domesticates (Langdon, 1986; Albarella, 1997, 2004; Davis, 1997; Davis & Beckett, 1999; Thomas, 2005, 2009; Sykes, 2006; Vann & Grimm, 2010; Thomas *et al*., 2013).

However, it is still unknown whether these innovations also occurred elsewhere in Europe, even in the Atlantic areas that had intensive commercial links with England during the Late Middle Ages and the Modern period. Moreover, these transformations have often been considered as necessary requirements for the development of the new manufacturing processes and, therefore, it has been assumed that the Industrial Revolution needed to be preceded by an Agricultural Revolution. Nevertheless, English zooarchaeological research shows that the process was complex, had different timings and strengths, and was therefore far from being 'revolutionary' (Prothero, 1912; Kerridge, 1967; Beckett, 1990; Thomas, 2005). This paper intends to contribute to the understanding of such topics, as well as urban provisioning and the interaction between town and country in their historical context. It is based on the results of archaeological work carried out in the last two decades in the Basque Country.

The Basque Country is an area located on the north Cantabrian coast of the Iberian Peninsula, extending approximately 7240 km² (Figure 1). It is divided into two main geographic areas. The Atlantic area is characterised by deep river valleys that reach the sea close to the Cantabrian Mountains (provinces of Bizkaia and Gipuzkoa). Important ports such as San Sebastián and Bilbao are located near these river mouths. In the Middle Ages and the Modern period forests and common lands in this region frequently witnessed conflicts associated with the raising of livestock, agrarian practices and industrial production (ironwork and naval in particular). In contrast, the southernmost area of the Basque Country (the province of Álava), where the city of Vitoria-Gasteiz is located, is characterized by an extended plateau and medium-range mountains with abundant foddering areas, sometimes shared with communities living in the Atlantic area (Díaz de Durana, 1986; Aragón, 2006).

Between 1130 and 1383 more than 60 towns were founded by royal or seigniorial initiatives in the three Basque Provinces. Generally, these towns were small; three fourths of them extended for less than 3 hectares and never developed into real cities. They represented territorial and political centers, but did not develop a fully urban lifestyle. Only a few of the Basque towns were fully urbanized, although they were still relatively small. With the exception of Vitoria (20.7 hectares), all Basque towns between the 12th and the 18th centuries were between 5 and 7 hectares in size. In the Late Middle Ages some of them, such as Bilbao, San Sebastián, Orduña, Bermeo and Balmaseda, were, however, linked to international trade networks. Others, such as Salvatierra and Durango, had powerful control of their territories (Urteaga, 2006).

In the last 25 years, a remarkable number of rescue excavations has been carried out in the Basque towns. Consequently we now have a fair amount of zooarchaeological evidence about consumption patterns and the mechanisms of urban meat supply in the north of the Iberian Peninsula.

2. Material and methods

Data have been gathered from all available evidence, published or not, from urban sites in the Basque Country. Animal bone assemblages from several excavations in six main towns of the Basque Country - Vitoria-Gasteiz and Salvatierra-Agurain (in the province of Álava), and Bilbao, Orduña, Balmaseda and Durango (in the province of Bizkaia) (Figure 1) – are considered. These archaeological interventions were funded by construction companies that hired archaeological private companies to carry out the excavations. The only exception to this is the excavation of the Catedral de Santa María, Vitoria-Gasteiz, which was excavated as part of a research project led by the University of the Basque Country. The names of the different interventions with their references are listed in Table 1.

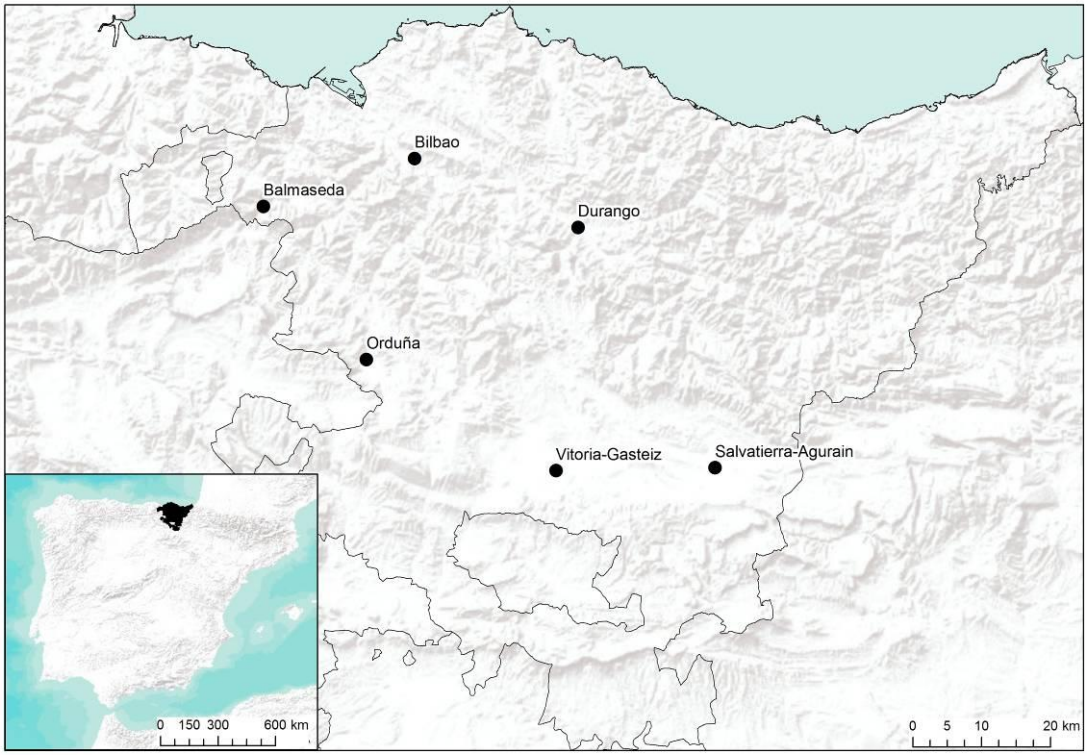

Figure 1. Location of the towns mentioned in the text.

Town	Site	Centuries	Reference
Salvatierra-Agurain (interior, 5.4 Ha)	Zapatari 33	mid.13-mid.16	Grau-Sologestoa, 2009 & 2014
		mid.16-18	
	Zapatari 35	13-14	Grau-Sologestoa, 2014
	Santa Clara	13-14	Grau-Sologestoa, 2013
		16-17	
Vitoria-Gasteiz (interior, 20.7 Ha)	Correría 131	12-13	Grau-Sologestoa, 2013
	Casa del Cordón	15-17	Castaños *et al*., 2011
	Catedral Santa María	12	Castaños, 2013
	Casco Viejo (Correría 103+Pintorería 6+Pintorería 52)	14-16	Castaños *et al*., 2012
		16-17	
	Correría 108	13-14	Castaños *et al*., 2013
		15-18	
Balmaseda (interior, 5.3 Ha)	Cubo 3-5-7	11-13	Fernández *et al*., 2011
Durango (interior, 5.1 Ha)	Torre de Láriz	post-medieval	Yravedra 2005
	Kalebarria	post-medieval	Yravedra 2006
Bilbao (estuary, 6 Ha)	Edificio de la Bolsa	14-15	Castaños, 1998-9
		16-17	
	Artekale	16-17	
	Carnicería Vieja	17-18	
	Tendería	16-18	
Orduña (interior, 6 Ha)	Zaharra	13-15	Cajigas *et al*., 2003-7
		16-18	

Table 1. Sites considered, with their chronology and references.

Most faunal remains were recovered from middens, pits and ditches filled with material that has been interpreted as kitchen waste. Faunal evidence potentially related to other types of refuse (for example, the faunal remains recovered at Las Escuelas 2-4 in Vitoria-Gasteiz are probably associated with a horn-working workshop) has been excluded from this review. All material discussed in this paper was hand-collected, with no sieving having been carried. This generates a potential bias in the record that will be considered in the interpretation. Though the assemblages also include some material from other periods, the analysis and discussion will exclusively focus on the late medieval and post-medieval contexts, which are relevant to the research questions addressed as part of this paper.

For this analysis, taxonomic and anatomical frequencies, kill-off patterns, butchery practices and the size and shape of the animals are analyzed and discussed.

Town	Site	*Bos taurus*	*Ovis/Capra*	*Sus domesticus*	*Equus*	*Gallus gallus*	Others	Total NISP
Salvatierra-Agurain	Zapatari 33	230	858	132	10	24	30	1284
	Zapatari 35	29	116	26	2	38	0	211
	Sta. Clara	84	263	25	0	6	5	383
Vitoria-Gasteiz	Correría 131	55	120	47	1	8	6	237
	Catedral Sª María	54	107	13	4	4	3	185
	Casco Viejo	508	635	95	0	53	12	1303
	Correría 108	260	376	54	2	15	0	707
Balmaseda	Cubo 3-5-7	103	115	56	17	2	3	296
Bilbao	Ed. Bolsa	128	42	18	0	1	0	189
Orduña	Zaharra	145	222	29	23	7	8	434

Table 2. NISP of main domesticates and others in late medieval contexts.

In Tables 2 and 3, the Number of Identified Specimens (NISP) of the main domesticates for each site is shown; the late medieval (12th-15th centuries) data are shown in Table 2, while the post-medieval (16th-18th centuries) data are shown in Table 3. In total, 8034 NISP are considered: 5229 NISP date to the late medieval period and 2805 NISP to the post-medieval period. Some assemblages are quite small; we have decided to consider for the analysis in section 3 only those sites with a NISP larger than 95 (therefore including Zapatari 33 in Salvatierra-Agurain). The faunal assemblages from two sites in Durango are not included in the analysis due to their imprecise dating and small size, and Carnicería Vieja, in Bilbao, is only considered in the analysis in combination with other sites from this city, but not on its own, due to its small size.

Raw data regarding other aspects of the zooarchaeological analysis (kill-off patterns, anatomical distribution, etc.) are not provided, but will be discussed. The interested reader can consult the original reports to obtain these raw data and for more complete explanations of the adopted methods. It will suffice here to say that a selective diagnostic system of recording was adopted, based on a modified version of Albarella & Davis (1994).

Town	Site	*Bos taurus*	*Ovis/Capra*	*Sus domesticus*	*Equus*	*Gallus gallus*	Others	Total NISP
Salvatierra-Agurain	Zapatari 33	18	47	27	1	1	1	95
	Sta. Clara	70	373	41	1	19	13	517
Vitoria-Gasteiz	Casa del Cordón	199	243	31	2	12	10	497
	Casco Viejo	50	52	7	0	0	0	109
	Correría 108	158	298	40	3	9	4	512
Durango	Torre de Láriz	41	18	6	0	N/A	2	67
	Kalebarria	48	0	1	4	N/A	0	53
Bilbao	Ed. Bolsa	233	126	38	0	6	2	405
	Artekale	88	46	9	0	1	3	147
	Carn. Vieja	19	9	1	0	0	1	30
	Tendería	42	47	13	0	4	0	106
Orduña	Zaharra	80	157	17	6	7	0	267

Table 3. NISP of main domesticates and others in post-medieval contexts.

3. Results

3.1. Taxonomic frequencies

In the following figures, the results of the analysis of the taxonomic frequencies are explored. In Figure 2, the proportion of the main taxa is shown, combining NISP from all late medieval and post-medieval sites. In Figure 3 the taxonomic relative frequencies are presented separately for different towns, while in Figure 4 frequencies for individual sites within each town are plotted (without Balmaseda, as for that site we have no assemblage dated to the post-medieval period).

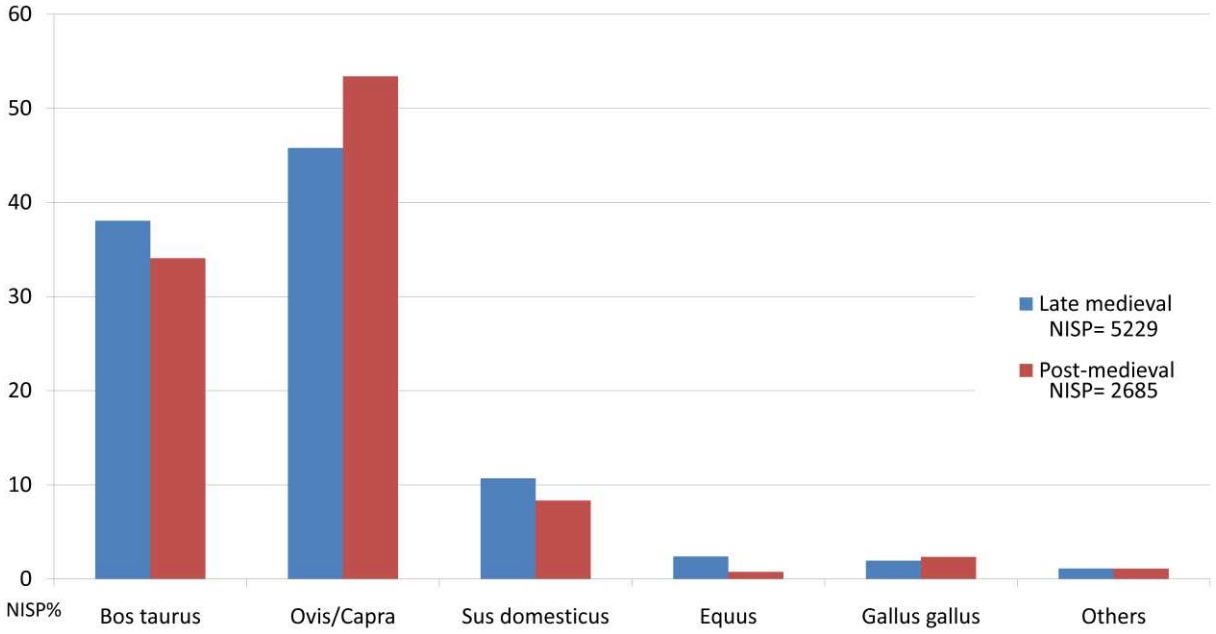

Figure 2. Relative frequencies (average % by NISP) in late and post-medieval towns in the Basque Country.

Figure 2 shows that there is little change between the Late Middle Ages and the post-medieval period. Overall, the proportions of sheep/goat and chicken increases slightly, while the proportion of other domesticates (cattle, pig and horse) decreases. Sheep/goat are, however, the predominant taxon throughout, with more than 40% of the specimens attributed to these animals in both periods. The NISP of goat is not always reported, but when the sheep/goat ratio is provided, sheep invariably predominates.

The lack of substantial change is not an artifact of the pooling of data from different areas, as it is confirmed by the trend for individual towns (Figure 3), though we have no post-medieval data from Balmaseda. Slight diachronic changes can be observed for all towns, but the overall impression is one of continuity. The data also show that there are substantial differences between towns, which are further explored in Figure 4. By looking at each particular site, some slight changes are visible between the two periods, although, again, these do not seem to be very substantial. This shows that the overall continuity pattern highlighted in Figures 2 and 3 by and large holds, even when individual sites within towns are considered.

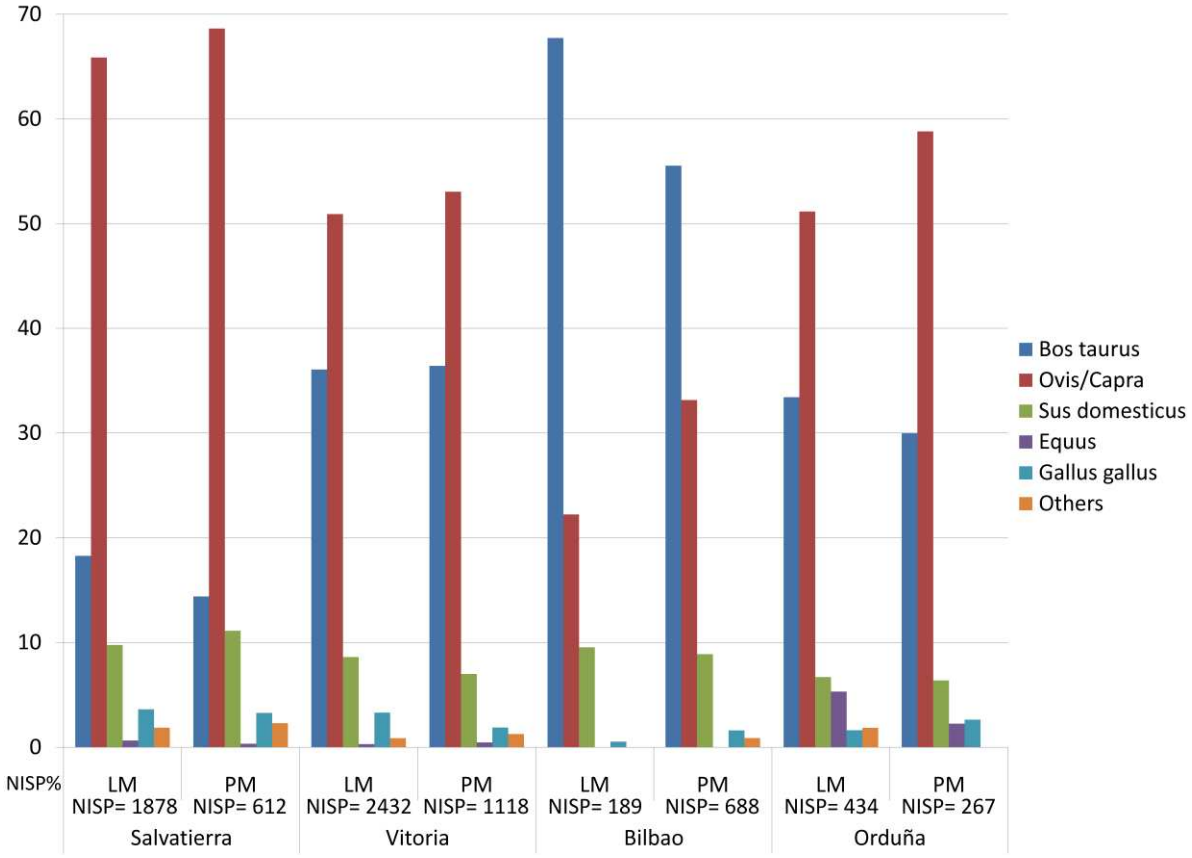

Figure 3. Relative frequencies (% by NISP) in late and post-medieval times in each Basque town. LM: late medieval; PM: post-medieval.

When different sites and towns are compared the pattern that emerges most clearly is that Bilbao has, on average, more cattle than the other towns, and is in fact the only place where cattle is consistently predominant. This is the case for both the late medieval (one site) than the post-medieval (two out of

three sites) periods. Salvatierra-Agurain is the area with the highest sheep/goat representation, while Vitoria-Gasteiz is intermediate, i.e. sheep/goat is predominant but not to the extent of Salvatierra-Agurain. Pig is almost invariably the least represented of the three main livestock types.

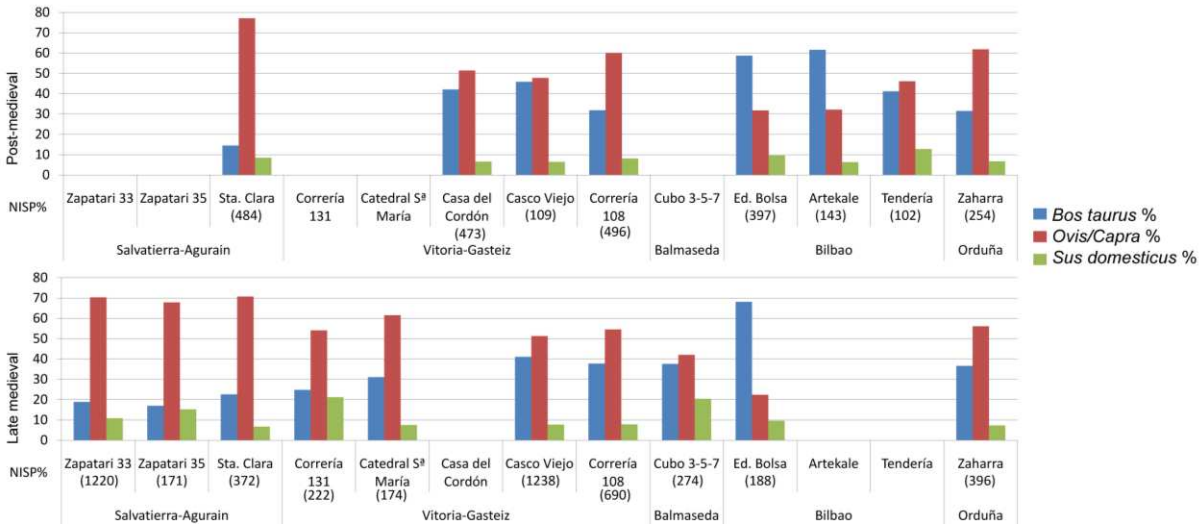

Figure 4. Relative frequencies (% by NISP) of main domesticates in late and post-medieval times in each site with more than 100 NISP (cattle+sheep/goat+pig). In brackets, NISP of cattle, sheep/goat and pig.

3.2. Kill-off patterns

Ageing data can be used to detect husbandry strategies. We must, however, consider that data from urban sites will largely reflect the consumers' end of the husbandry production process – animals kept for reproduction purposes will mainly be found in the countryside. Nonetheless, the age at death of animals consumed in towns can still help in understanding important aspects of the mechanisms of meat supply. The comparison of the kill-off patterns of the main domesticates between various faunal assemblages from different Basque towns is not an easy task, partly due to the use of different ageing methods by different zooarchaeologists, and partly to the small size of some of the assemblages. Moreover, raw ageing data are rarely available in animal bone reports and, therefore, our analysis will have to be based on a comparison of the general conclusions drawn by individual zooarchaeologists.

An attempt to summarize the available evidence considers 11 sites that provided ageing information (Zapatari 33 and 35, Santa Clara, Correría 108 and 131, Casa del Cordón, Catedral de Santa María, Casco Viejo, Cubo 3-5-7, Zaharra and Bilbao, where different sites in the city were combined by Castaños 1998-9). Ageing observations made by different authors have been re-ordered into five distinct age categories (Albarella 2004): mainly juveniles (unrepresented in our sample), immatures/subadults, wide range (i.e. similar proportions of immatures to elderly), adults with juveniles/subadults and mainly adults/elderly. The proportion of sites in each age category is shown for the three main domesticates in Figure 5.

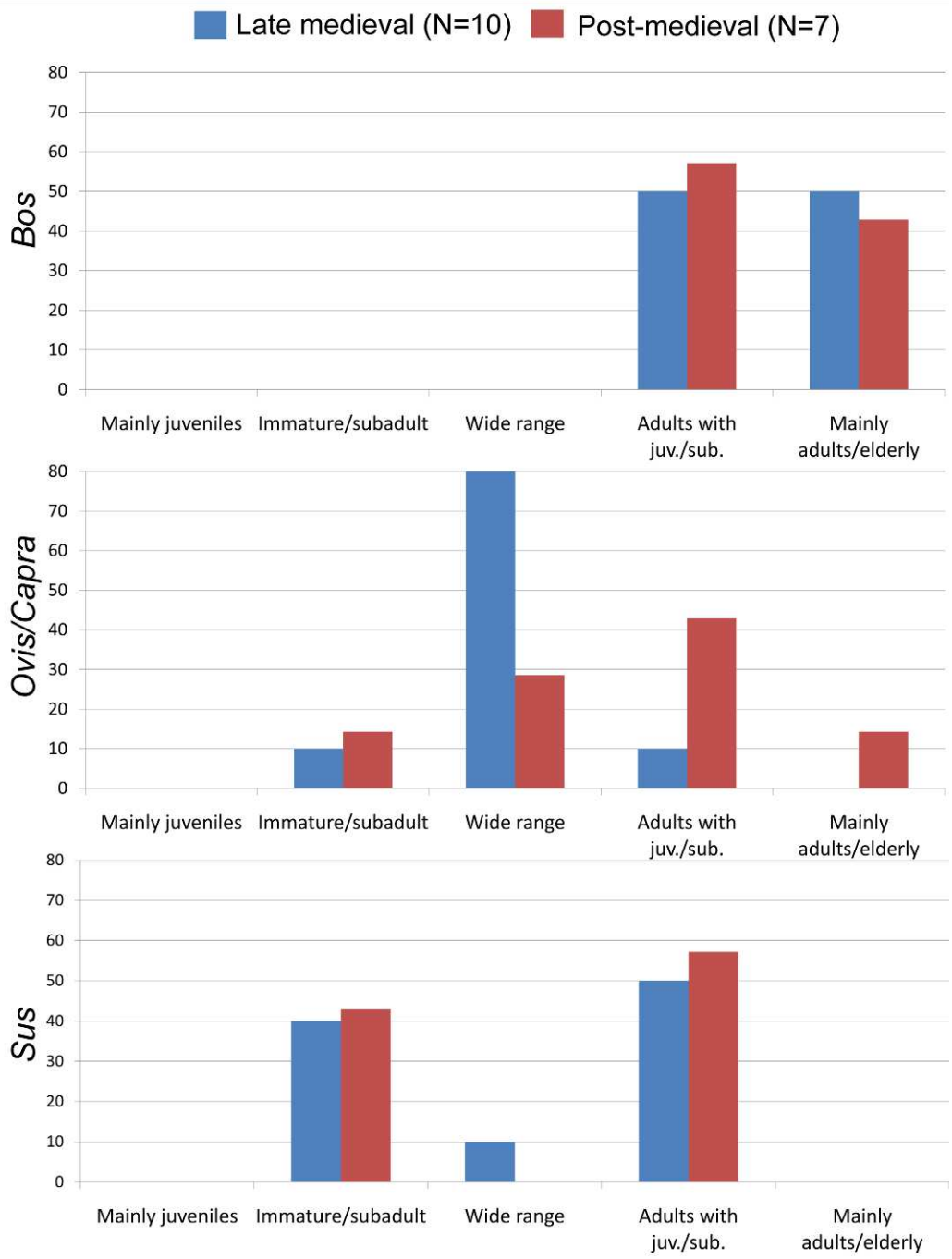

Figure 5. Distribution of cattle, sheep/goat and pig (from top to bottom) age groups at late and post-medieval urban sites (proportion of assemblages by %) in the Basque Country. 10 assemblages are dated to the late medieval period (Zapatari 33 and 35, Santa Clara, Correría 108 and 131, Catedral de Santa María, Casco Viejo, Cubo 3-5-7, Bilbao, Zaharra), and 7 assemblages are dated to the post-medieval period (Zapatari 33, Santa Clara, Casa del Cordón, Correría 108, Casco Viejo, Bilbao, Zaharra). Age categories are based on those defined in the site reports and may be subject to variation according to the author of the faunal study.

The kill-off patterns for the three taxa appear to be substantially different, which is not surprising due to their different uses and therefore husbandry regimes. For cattle and pig there is little variation between the two periods. Cattle are generally slaughtered late, with the majority of cattle remains belonging to adult or elderly animals in most Basque towns. This suggests that most cattle slaughtered

in urban sites had been used mainly for traction, or perhaps for milking. Pigs were slaughtered – on average – at younger ages, which is typical of animals almost exclusively reared for meat production.

The kill-off pattern of sheep/goat shows that these animals were generally slaughtered at a wide range of age categories, suggesting a mixed use of them mainly for meat and wool production, but perhaps also milk (though there is no abundance of juveniles). This pattern is, however, mainly typical of the late medieval period, while in post-medieval times there is a greater tendency towards a cull at an older age. One site (Casa del Cordón, in Vitoria-Gasteiz) even reports a majority of adult/elderly animals. It is possible that this indicates a greater degree of specialization in the later period, probably linked to wool production.

Ageing data are rarely reported for equids at the examined sites, due to their marginal proportion in the assemblages. All reported remains (e.g. at Orduña), however, belong to adult or elderly animals. In the case of domestic fowl, where its ageing data have been reported, most remains seem to be fully developed and, therefore, they probably belong to chickens that they were mainly kept for egg production (for example, in late medieval Zapatari 33 or in late and post-medieval Santa Clara). The only exception to this is represented by late medieval Zapatari 35, in Salvatierra-Agurain, where half of the chicken bones appear to be immature, indicating an emphasis on meat production.

Sex ratios can provide important information regarding the purpose of livestock raising, but this is infrequently reported and cannot therefore be take into account in this review.

3.3. Butchery

The analyses of body part frequencies and butchery marks may shed light on the ways carcasses were managed. This type of evidence is hard to compare across sites and, therefore, the comparison is based on the interpretation that zooarchaeologist made of their data, rather than our own analysis of these data.

Most anatomical elements appear to be present, with teeth the most common, and foot bones rather under-represented. The most frequent taxon is sheep/goat and, as an example, in Figure 6, the frequency of its body parts expressed in relation to the most common one by MNI (Minimum Number of Individuals) is shown for those sites which have been studied by us. As it can be observed, at every site all body parts occur, with the MNI being provided by dental elements, which are more durable. The lower frequency of postcranial bones, especially foot bones, can be explained by taphonomic factors such as differential preservation, the effect of butchery and recovery bias, rather than by a deliberate the selection of certain body parts. The pattern resembles the one identified at Bilbao (Castaños, 1998-9: 207).

Many different types of butchery have been documented in most of the sites considered here, including skinning, dismembering, consumption of the meat, and extraction of horn, tongue and brain. The extraction of the marrow has also been suggested, for example at Orduña (Cajigas *et al.,* 2003-7: 289-

90). In some cases, evidence for standardized forms of butchery has been identified, such as the division of the entire animal carcass into two halves along the sagittal plane (Figure 7), for example at Santa Clara, Bilbao (Castaños, 1998-9: 210) and Catedral de Santa María (Castaños, 2012: 314). When the evidence of body parts is taken together with the analysis of butchery marks, it seems clear that these faunal assemblages are mainly related to kitchen waste.

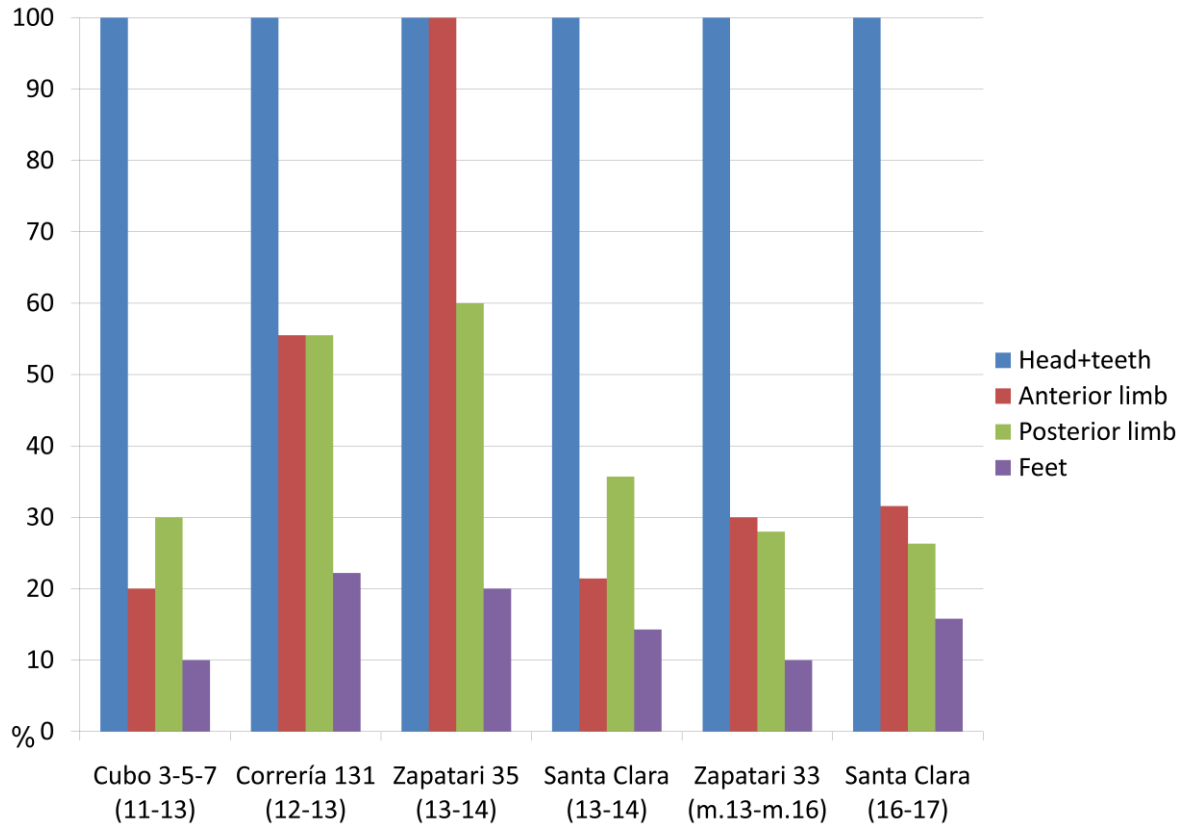

Figure 6. Frequency (%) of sheep/goat body parts in relation to the most common one by MNI. In brackets, chronology of each site. MNI as provided by head+teeth: Cubo 3-5-7, 10; Correría 131, 5; Zapatari 35, 5; Santa Clara (13-14), 14; Zapatari 33, 9; Santa Clara (16-17), 19.

Figure 7. Vertebrae chopped in order to halve the carcass (left, late medieval), and sheep cranium with cut marks (right, post-medieval) from Santa Clara (Salvatierra-Agurain). Photos by I. Grau-Sologestoa.

3.4. Biometry

Biometrical data are analyzed to explore possible changes in the size of animals through time in late and post-medieval Basque urban sites. For this analysis, only measurements of sheep/goat have been taken into account, as this is the most common taxon, providing the largest sample. Those specimens that could be identified as 'goat' have been excluded, therefore the analysis largely concerns only 'sheep'; since, however a few goat specimens may still be 'hidden' within the sample, we have preferred to maintain the 'sheep/goat' label for this part of the analysis too. To increase sample size the analysis relies on the logarithmic scaling of measurements (the so called 'LSI') – for details see Simpson *et al*., (1960), Payne & Bull (1988), (Meadow, 1999) and Albarella (2002). It would have been preferable to plot measurements that are aligned along different axes (i.e. lengths, widths and depths) separately (Meadow, 1999; Albarella, 2002), but this would have substantially reduced the sample size. However crude the analysis may be, we opted for the greater reliability of a larger sample size than for the greater accuracy provided by the separation of measurements according to their axes. Consequently all postcranial bone measurements were pooled together, but we excluded tooth measurements that definitely develop in a way that is very poorly correlated to postcranial bones. To be on the safe side, a test (not illustrated) was carried out using only width measurements, and this provided very similar results. It is however clear that future research will need to rely on larger datasets in order to provide more refined information without excessively sacrificing sample size.

In Figure 8, the log ratio analysis of all sheep postcranial measurements from Basque urban sites is shown, in order to explore potential variation in size between the late Middle Ages and the post-medieval period. It shows that, in the two periods, size and variation are very similar (the mean is identical). There is no perceivable change in the size of sheep from Basque urban sites between late and post-medieval times. When each town is considered separately (Figure 9), slight differences can be noticed, but the overall pattern remains the same, particularly when the small samples are disregarded.

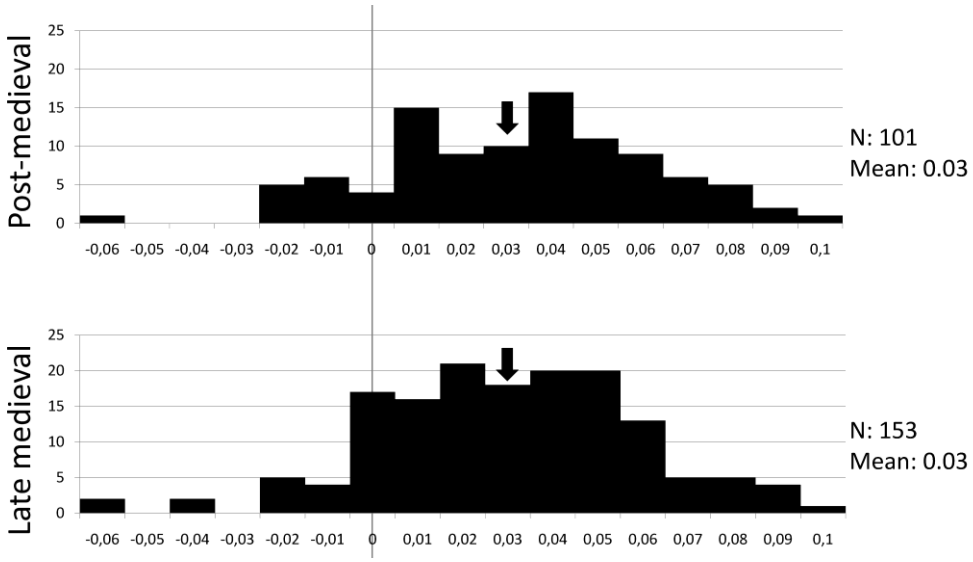

Figure 8. Log ratio histograms combining sheep/goat postcranial measurements from Basque towns, dated to the late and post-medieval periods. Only fused specimens are plotted. The standard is represented by the continuous line at '0'. The arrows represent the mean of each group. The following measurements have been used: GLP of scapula; BT and HTC of humerus; GL, SD, Bd, 3 of metacarpus; Bd and Dd of tibia; GL of calcaneum; GLl, Bd and Dl of astragalus; and GL, SD, Bd, 3 of metatarsus (von den Driesch, 1976; Payne & Bull, 1988; Davis, 1992). These measurements are compared to the standard of Shetland female sheep suggested by Davis (1996). Reports for Catedral de Santa María in Vitoria-Gasteiz and Zaharra in Orduña do not provide raw biometrical data, so these have not been included.

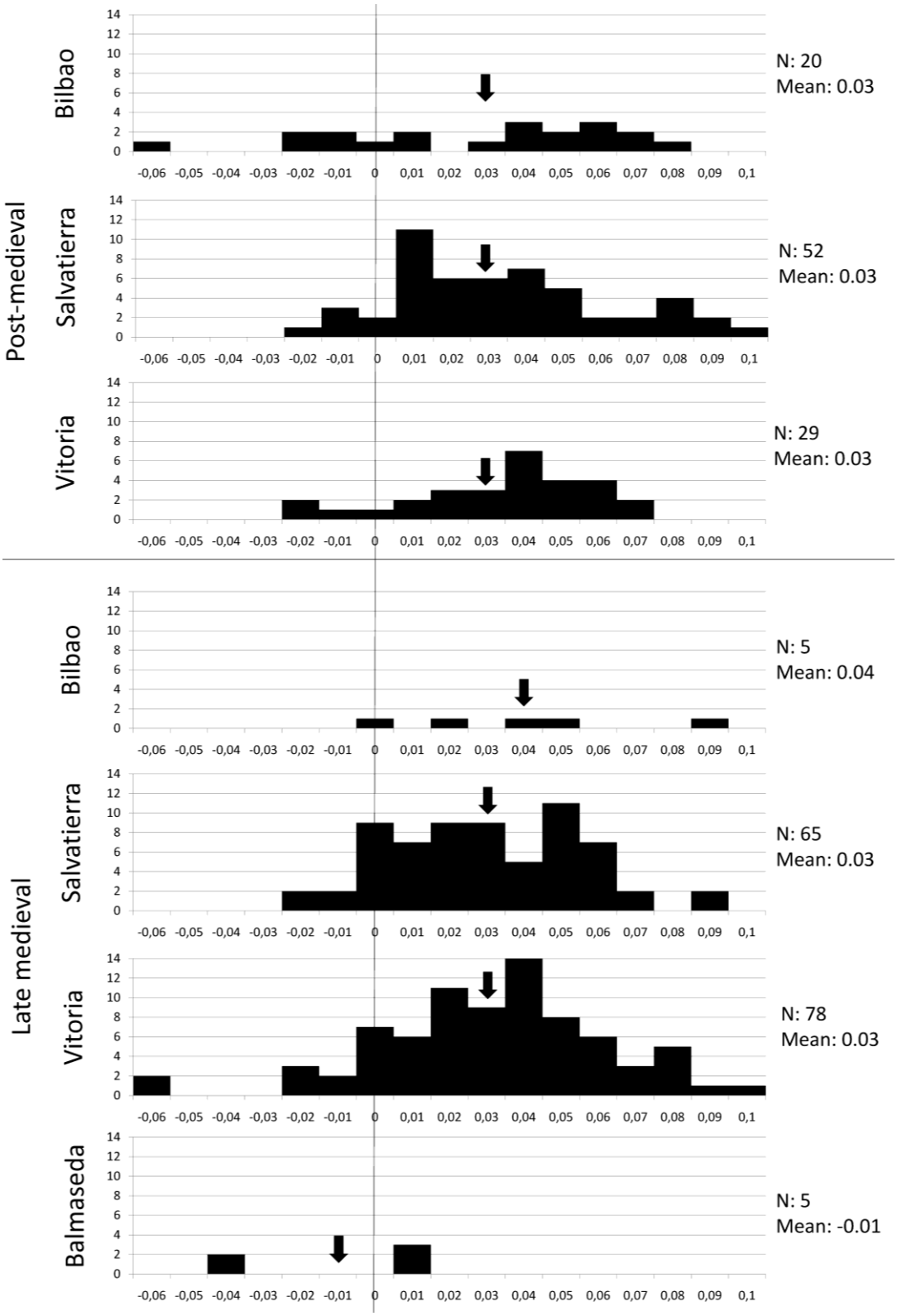

Figure 9. Log ratio histograms combining sheep/goat postcranial measurements from individual Basque towns, dated to the late and post-medieval periods. The earliest assemblage is at the bottom and the most recent at the top of the figure. Only fused specimens are plotted. The standard is represented by the continuous line at '0'. The arrows represent the mean of each group. The measurements used are those mentioned in the caption of Figure 8.

3.5. Town and country

A comparison between the zooarchaeological evidence from rural sites and urban sites is useful at this point. There are a number of late medieval rural faunal assemblages that have been studied in the Basque Country, and a comparison of rural and urban sites has already been published (Grau-Sologestoa, 2013), but we do not have yet any post-medieval rural faunal assemblage. Available late medieval faunal assemblages recovered from rural sites in the Basque Country include Aistra (Grau-Sologestoa, 2014), Zaballa (Grau-Sologestoa, 2009, 2012, 2014), Zornoztegi (Grau-Sologestoa, 2009, 2014) and Desolado de Rada (Castaños & Castaños 2003-2007). Late medieval faunal remains in the Basque Country suggest that sheep/goat (especially sheep) predominated in both rural and urban sites (Figure 10). This predominance, however, is much more marked in rural sites. This may be related to a greater popularity of beef in the urban populations (as suggested for England; Albarella, 2004).

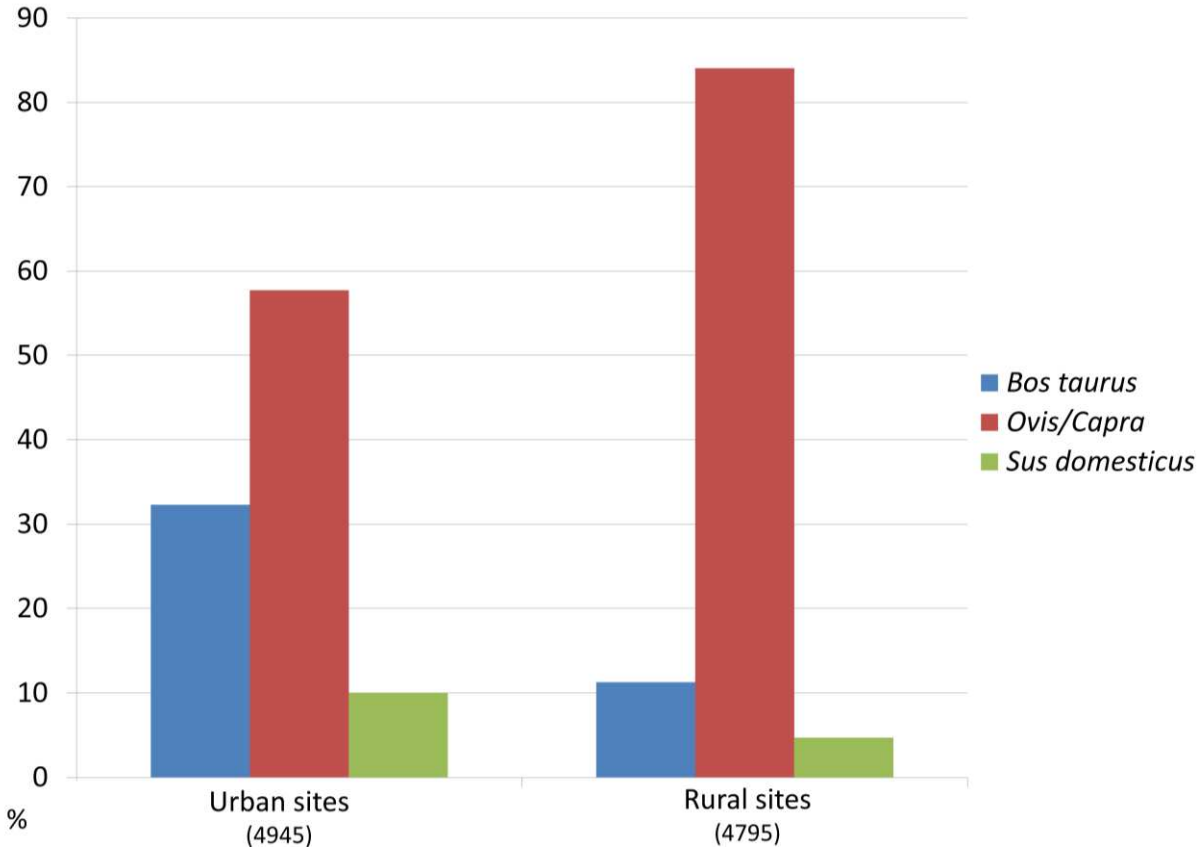

Figure 10. Taxonomic frequency (% by NISP) of the main domesticates in rural sites (3 sites) and urban sites (10 sites) during the Late Middle Ages in the Basque Country. In brackets, NISP (cattle+sheep/goat+pig).

Kill-off patterns do not substantially vary between rural and urban sites, with cattle and caprines being slaughtered rather late, and pigs at an earlier age (Grau-Sologestoa, 2013). There is, however, a minor trend towards earlier urban kill-off patterns for pigs and sheep/goat.

4. Discussion

In this paper, aspects of animal husbandry, meat consumption and supply in several Basque towns, ranging from the late medieval to the post-medieval period, have been explored. Previous zooarchaeological research that has explored the existing relationship between urbanization processes

and provisioning systems has shown the complexity of the economic, social and political mechanisms that shaped the urban pre-industrial economies and determined the composition of faunal assemblages (Zeder, 1988; Crabtree, 1990: 157-171; O'Connor, 1992; Clark, 1992). Interpretations cannot rely on modern market logics and require detailed scrutiny of the archaeological and historical evidence. Social and political relationships between a town and its hinterland, the role of intermediaries, and the interactions that took place within urban systems are key elements for understanding urban consumption patterns.

The study of the Basque towns is determined by two main factors. The first is the conceptual complexity of even defining urban dynamics in this territory. The various urban centers were very different from each other; in particular, coastal and interior towns participated in long-distance trading networks in a very different way. In general, most towns had a rather rural character and were small; therefore, their political agency and their capability to model landscape and social practices in the rural environment were likely to be limited. The small scale of the Basque towns does not necessarily mean that they were simple in socio-political or economic terms (Quirós & Santos, 2015), yet the limited size of their populations unquestionably had an effect on the nature of the demand of goods produced in the countryside.

The second important factor to consider is that available evidence, although growing, is still limited. The development of zooarchaeological analysis dealing with medieval and post-medieval urban assemblages in the Basque Country has been remarkable in the last two decades (see, in comparison, Audoin-Rouzeau, 1993 or Morales, 2002), but still only a few towns have been examined. Knowledge of the smallest towns in particular is entirely lacking. The towns discussed in this paper were significantly different from each other - Salvatierra and Orduña were power centers in an agrarian area, Balmaseda, Durango and Vitoria were important market and manufacturing centers, while Bilbao was the most complex, due to its role within international trading networks (García de Cortázar, 2004; Martínez, 2005).

The main pattern emerging from the analysis presented in this paper has been the stability of urban consumption patterns through time. This is at odds with the significant changes in animal husbandry in the Basque Country in the late medieval period and, mainly, in the post-medieval period, suggested by documentary evidence (García de Cortázar *et al.*, 1985; Díaz de Durana, 1986; Aragón, 2006 and 2009). Three main factors are likely to have contributed to the evidence that has emerged from the zooarchaeological analysis: husbandry regimes that prioritized the consumption of locally produced meat, the role of urban oligarchies in livestock raising, and the lack of a strong sustained demand of meat in towns.

Most written sources suggest that cattle was predominant in comparison to sheep during the late and post-medieval periods (García de Cortázar *et al.*, 1985; Aragón, 2006). In Gipuzkoa, it has been observed that sheep became the main livestock only after the 18th century, while cattle extensive raising declined, having predominated from the Late Middle Ages (Aragón, 2009). Although available

documentary evidence for other Basque areas is not so explicit, one can predict that similar trends could have existed. However, the zooarchaeological evidence examined here suggests a predominance of cattle only in Bilbao, while sheep/goat was better represented in all other towns. This may be due to an overrepresentation of cattle in the written documents, owing to the social and economic value that cattle had, or, attributable to socio-political dynamics that interceded between producers and consumers.

The urban market in the Basque Country was clearly taxed and extremely regulated (Arizaga, 1985) and, because of this, very informative documentary evidence is available. Late and post-medieval urban ordinances and regulations can be understood in two different ways: as a reflection of active regulating practices, or as a reflection of practices that were commonly occurring and needed to be limited. Historians that have analyzed late and post-medieval urban ordinances have concluded that the main purpose of these regulations was to guarantee a regular supply to towns because of the vulnerability of the Basque urban system (Arizaga, 1985). This resulted in rules aimed at guaranteeing the monopoly of urban slaughter houses and butcheries, at regulating the quality of the meat, and at controlling prices, weights and measurements. The majority of such rules were protectionist, designed to guarantee urban provisioning. Therefore, the consumption of livestock raised in the town's hinterland, or within the town itself, was prioritized, and wholesale trade and speculation were prohibited. Even when it was necessary to turn to external supply, what kind of animals and where should they come from was clearly regulated. For example, the 1508 ordinances of the town of Plentzia, located close to Bilbao, established that when it was not possible to supply the town with cattle and sheep from Castile they could be brought in from other places, including Asturias (Enriquez Fernández, 1988, n. 21). In the 1502 ordinances of the town of Lekeitio, which and when animals could be sold is very clearly stated, including the prohibition of selling cattle from France (Enriquez Fernández *et al.*, 1992: 187). In Gipuzkoa, the seasonal supply of livestock coming from Extremadura, Asturias or La Rioja through the town of Vitoria was regulated (Aragón, 2009: 310-315).

Overall, either for political or economic reasons, the consumption of locally produced meat was prioritized, which had important repercussions in husbandry strategies. Most ordinances seem to regulate more strictly and tightly the supply of cattle, which could explain why caprines show a more mixed kill-off pattern compared to cattle. The zooarchaeological evidence shows that sheep husbandry became more specialized towards wool production, perhaps because of an increasing exportation of this product to other countries. The remarkable proportion of sheep in both periods, but especially during the post-medieval period, highlights a possible tendency for economic specialization towards wool production, supported by the kill-off patterns. The supply and breeding of pigs in Basque towns was also regulated, like in other European cities (Jørgensen, 2013); this is the case in Vitoria, where the raising of pigs within the town is mentioned in the written sources (Díaz de Durana, 1984: 174).

Moreover, the regulation of prices and market dynamics can partially explain the standardized butchery practices, as suggested by the anatomical distribution of the cut marks, their location, orientation and precision. This process of standardization is also probably related to the establishment

of professional butcher guilds and to the great development of metallic tools in this period (Seetah, 2007: 26-28).

The owning and raising of livestock by urban elites in the towns' hinterland could also explain the observed limited change in urban meat consumption. For example, at the town of Salvatierra, urban elites owned a considerable number of animals that were given as usufruct to the peasants living in the villages near the town, and of course they had a great interest in prioritizing the selling of this livestock and no other by the town's butchers (Goicolea, 2007).

Another important factor that determined urban consumption patterns in the Basque Country is the small scale of husbandry practices. This made it difficult for one farm to supply more than one town, and possibly prevented the existence of a sustained urban demand for livestock raised solely for meat, at least until late modern times. The faunal evidence examined in this work reinforces the idea that urban demand adapted to a predominantly rural economic system, rather than the contrary, as suggested for England. Thus, most cattle were used for traction (and perhaps for milk production) and most sheep were raised for wool, and they ended up being consumed in towns only when they were no longer of use in the countryside.

The results of our analysis suggest that meat consumption patterns were similar in urban and rural sites. Interestingly, such analogies between the urban and rural consumption patterns have been mentioned in other cases, such as Boston (USA) (Landon, 1996), where, in the 17th-18th centuries, the occurrence of strong similarities in the zooarchaeological evidence of the city and its rural hinterland was suggested. The strong increase in long and medium-distance trade that the city underwent during these centuries did not involve the development of a specialized production aimed to supply the urban market. Only after the end of the 18th century and during the 19th some farmers began specializing in provisioning Boston's urban market, in a very different social and political context (Landon, 1996).

It is noteworthy that the Basque town which shows a distinct consumption pattern due to cattle predominance, Bilbao, is also the one that participated more intensively in the international trading networks. The central role of this town in commercial activities determined its social composition and this, perhaps, could be linked with a higher demand of beef than in other Basque towns. Conversely, there are no obvious geographical or environmental factors that should have favored cattle breeding in the Bilbao area.

The stability in sheep size between the late and post-medieval Basque towns is at odds with a recent biometrical survey of the Iberian Peninsula, which demonstrated a trend towards size increase in this species, probably associated with their enhanced role as wool and meat providers (Grau-Sologestoa, 2015). Although the lack of evidence from post-medieval rural sites somewhat prevents us from understanding the Basque phenomenon fully, the post-medieval urban pattern does appear to be indicative of a peculiarity of the agrarian economy of the region. This can probably once again be explained by the fact that in the post-medieval period there was still a strong connection between

towns and their countryside, and the urban demand for meat was insufficient to dictate the forms of animal husbandry in rural areas. In other Iberian areas where higher demographic densities could be witnessed, the situation was different and may have stimulated more intensive breeding programs aimed at an increased yield.

5. Conclusions

All the zooarchaeological evidence examined here suggests that animal husbandry and livestock production were strongly affected by social and political factors that generated consumption patterns which were not driven by a strong urban demand for meat. The Basque urban communities consumed rural products, but it is not clear whether towns were re-distributing those, as it has been suggested for other European contexts (Lauwerier, 1997: 483). Basque urban demand for meat was not strong enough to create specialized livestock production in rural areas. On the contrary, it seems that most meat consumed in towns was that of old animals that had been reared in the countryside mainly for secondary products and services (wool, milk, traction).

Nevertheless, the comparison of urban and rural zooarchaeological evidence is currently hampered by the lack of studied rural assemblages dated to the post-medieval period. Moreover, a greater number of urban faunal assemblages is needed to investigate consumption patterns from a social perspective; the urban population was highly stratified and this should reflect differences in the zooarchaeological record. Also, a greater understanding of the particular contexts where the faunal remains were recovered is needed.

It should also be noted that this paper has focused exclusively on domestic livestock but other aspects of the zooarchaeological evidence can be equally interesting. For example, Basque towns may have had more regular access to marine resources than rural sites, but this is an area in which evidence is almost completely lacking. Future excavations will need to include sieving programs if the role of fish in trade and diet can ever be clarified.

Despite these limitations this paper has, however, demonstrated that the existing zooarchaeological evidence is of great value for our understanding of economy and society in the medieval and post-medieval Basque Country. It has shown that the English model of post-medieval livestock improvement cannot uncritically be applied to all European areas and that zooarchaeological data can valuably complement historical data and also, in some cases, contribute to rectify the biases that are inevitably inherent in the written sources.

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