

# ARCHAEOFAUNA

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**La Romanización de la  
Península Ibérica, una visión  
desde la Arqueozoología**



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**Silvia Valenzuela-Lamas, Lúdia Colominas y Carlos Fernández Rodríguez**

# ARCHAEOFAUNA

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# Roman Conquest and Changes in Animal Husbandry in the North-East of the Iberian Peninsula: Searching for Patterns, Rates and Singularities

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**ABSTRACT:** The conquest of the northeast of the Iberian Peninsula by the Roman Empire brought about changes to the socio-political and socio-economic organization of the communities settled in this territory. These changes, however, did not take place all at once, but rather happened throughout the 200 years following the conquest. Bearing this in mind, the aim of this article is to characterise the changes that underwent in livestock management practices in the north-eastern area of the Iberian Peninsula as a result of its Roman conquest, analysing the type and timing of these changes, and evaluating how they affected the different animal species that comprised the livestock at the time.

The study of faunal remains recovered from 11 sites located in the northeast of the Iberian Peninsula and dated between the fifth century BC and third century AD, and their comparison to the existing archaeozoological data for the area under study, have enabled us to document that the changes in livestock practices did not all arise at the same time and neither did they affect all taxa equally. These results are correlated with the possible roles played by both the local communities and Rome in the achievement and acceptance of these changes.

**KEYWORDS:** LIVESTOCK, ROMAN CONQUEST, LOCAL COMMUNITIES, NORTH-EAST OF THE IBERIAN PENINSULA

**RESUMEN:** La conquista del nordeste de la Península Ibérica por parte del Imperio Romano comportó cambios en la organización socio-política y socio-económica de las comunidades asentadas en este territorio. Estos cambios, sin embargo, no se produjeron a la vez, sino que se sucedieron a lo largo de los 200 años que siguieron a la conquista. Teniendo en cuenta estas consideraciones, el objetivo de este artículo es caracterizar los cambios que se produjeron en las prácticas ganaderas en la zona nororiental de la Península Ibérica a raíz de su conquista por parte del Imperio Romano, analizando el tipo y el ritmo de estos cambios, y evaluando cómo afectaron a los diferentes animales que conformaban la cabaña ganadera.

El estudio de restos de fauna recuperados en 11 yacimientos ubicados en el nordeste de la Península Ibérica y datados entre el siglo V a.C. y el siglo III d.C., y su comparación con los datos arqueozoológicos existentes para el área bajo estudio, han permitido documentar que los cambios en las prácticas ganaderas no se produjeron a la vez y no afectaron a todos los taxones por igual. Estos resultados se vinculan con el posible rol que tuvo tanto la población local como Roma en la consecución y aceptación de estos cambios.

**PALABRAS CLAVE:** GANADERÍA, CONQUISTA ROMANA, COMUNIDADES LOCALES, NORESTE DE LA PENÍNSULA IBÉRICA

## INTRODUCTION

According to written sources, the second Punic War was fought between 218–201 BC. These dates are traditionally considered the starting point in a long process of profound transformations in the socio-political and socio-economic organisation of the communities established in the north-east of the Iberian Peninsula, which led them, at the end of the first century BC, to be incorporated into the Roman political and social system. These changes, however, did not take place all at once.

During the first few decades following the conquest, only Roman military and fiscal control was in place given that the indigenous settlement structure still continues to be documented. The study of the territory's occupation, however, has enabled the recording of the abandonment of some *oppida* and rural establishments, and the strengthening of others. This diverse evolution is related to both the repercussions of the actual conquest process and the response by local communities, more or less favourable to the pact and to being incorporated into the Roman model (Olesti, 2000; Nolla *et al.*, 2010). It is from the mid-second and beginning of the first centuries BC when important settlement pattern changes first begin to be noted, with a proliferation of a scattered, and eminently rural, population.

The construction of a road network and the founding of the first cities is also noted, many times linked to the abandonment of the most important *oppida*. This restructuring has been linked to a change in the use of the territory as a result of a new economic framework (Casas *et al.*, 1995; Curià & Picazo, 1999; Burch *et al.*, 2000; Olesti, 2000; Nolla *et al.*, 2010) archaeologically also documented by the dispersal of small clusters of silos fields, by the spread of new crops, the growth of storage in *dolia*, and the appearance of local wine amphorae (Prevosti, 2004–2008; Castanyer & Tremoleda, 2005). It was not until the second half of the first century BC, however, with the granting of special legal statutes to some nuclei, that this area was fully integrated into the Roman political and social system.

Therefore, 200 years went by from the time this area was conquered to the moment it was fully incorporated as a Roman province; 200 years in which changes both in the socio-political and socio-economic organisation of the settled communities in this territory took place. Bearing all this in mind, the

aim of this article is to characterise the changes that took place in livestock management practices in the north-east of the Iberian Peninsula as a result of its Roman conquest, evaluating the timing of these changes and analysing how they affected the different animal species that comprised the livestock population at the time.

In order to fulfil these objectives, archaeozoological data from 11 sites located in the north-eastern area of the Iberian Peninsula and occupied between the fifth century BC and third century AD are presented. These data will be compared to already-published data for the region. This contextualisation will allow us to document whether or not a general change dynamic took place, if the noted changes followed certain patterns, and how they were related to the previously noted transformations which followed the territory's conquest.

## MATERIALS AND METHODS

The faunal remains recovered from 11 archaeological sites located in the north-east of the Iberian Peninsula are studied in this paper (Figure 1, Table 1). All the samples are the remains of meat production and consumption. These assemblages have not suffered significant taphonomic biases that might alter the interpretations made here nor distort the results from the comparative analyses (Colominas, 2009).

The study of the faunal remains is divided according to three time categories: the Middle Iberian Period (mid-fifth to third centuries BC), the Romanization period (second to first centuries BC), and the Early Roman Period (first to mid-third centuries AD). The category "Romanization period" is only used here to label the time between the onset of the second Punic War and the start of the Roman Empire, without any connotation. The samples studied for each of the periods include settlements with different functions, such as *oppida*, villages, rural settlements, villas and cities. It is also worth noting that the Romanization period sample includes settlements with continuous occupation from the previous period and others newly-created (Table 1).

In order to characterise livestock strategies undertaken during the time periods under study, the archaeozoological analysis has centred on the study of taxonomic representation frequencies and age-at-death estimations of the main domestic taxa (*Ovis*



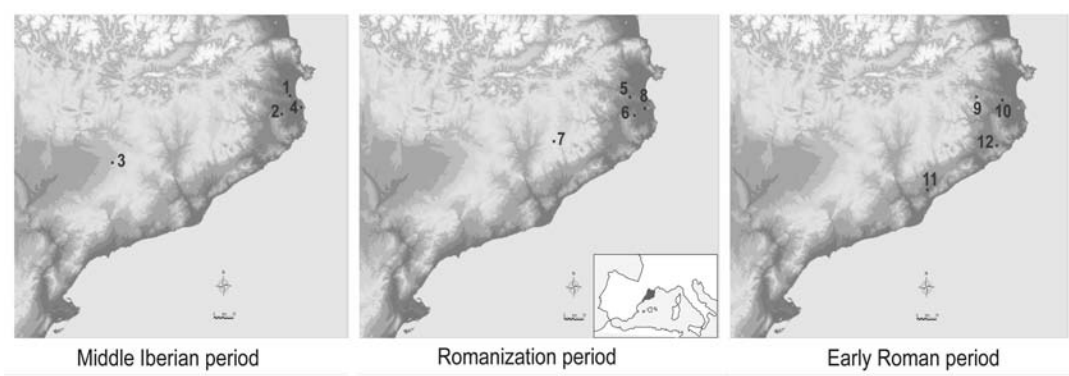


FIGURE 1  
Location of the sites by period. Complementary information can be found in Table 1.

Period	n° fig 1.	Sites	Type	Chronology of the samples	NISP	%sheep/ goat	%pig	%cattle
Middle Iberian period	1	Pontós	fortified village	5th-3rd c. BC	2129	44,8	31,1	19,6
	2	St. Julià Ramis	town	5th-3rd c. BC	624	30,1	23,4	28,2
	3	Molí d'Espigol	town	5th-3rd c. BC	2475	62,3	18,3	11,5
	4	St. Sebastià Guarda	town	5th-3rd c. BC	2613	43,8	19,1	32,9
Romanization period	5	Pontós	agricultural centre	final 3rd-2nd c.BC	1311	56,5	19,0	20,9
	6	St. Julià Ramis	town	2nd-1st c. BC	636	29,7	24,2	23,9
	7	Camp de les Lloses	metalurgical centre	2nd-1st c. BC	2221	27,8	17,9	13,4
	8	Olivet d'en Pujol	support facility centre	1st c. BC	1354	21,1	19,6	58,8
Early Roman period	9	Vilauba	villa	mid. 1st-3rd c. AD	2376	15,5	15,9	23,8
	10	Empúries	city	1st-3rd c. AD	1633	26,3	53,2	4,7
	11	Baetulo	city	2nd c. AD	1274	9,1	44,0	41,7
	12	Vila dels Ametllers	villa	1st-3rd c. AD	461	11,9	17,1	31,7

TABLE 1  
General overview of the samples discussed in the present study. NISP = number of identified specimens. The sites are dated by relative chronology using ceramic typologies.

aries, *Capra hircus*, *Sus domesticus* and *Bos taurus*). The taxonomic variability has been based on the relative frequency or the presence/absence of taxa. Age-at-death estimations have been carried out based on the growth and wear of mandibular teeth following the works by Grant (1982) and Payne (1985).

This study has also attempted to characterise the size and shape of the animal population by means of an osteometric analyses of the archaeozoological remains. The osteometric analyses were carried out using the log-ratio technique as a way of identifying general changes through time (Simpson *et al.*, 1960). The measurements used for sheep, goats and cattle were obtained from appendicular skeleton elements. Scapula and ulna measurements were not used because they are particularly age dependent (Albarella, 2002). For pigs, however, only measure-

ments from the molars were used because of a lack of appendicular-skeleton element measurements. The standard used to calculate the log-ratio of cattle measurements is that obtained from the measurement of a modern bull from Camargue (France) (Helmer, 1979). For sheep and goats, measurements of a modern mouflon from Corsica were used (Helmer, 1979) and for pigs the standard obtained from the study of the Neolithic assemblage of Durrington Walls was used (Albarella & Payne, 2005).

RESULTS

Presented below are the study of the taxonomic representation frequencies, the age-at-death estimations and the osteometric analyses of sheep, goats,

pigs and cattle as the four main taxa involved in the livestock practices carried out by the communities established in the north-east of the Iberian Peninsula between the third century BC and third century AD.

Firstly, the data from the 12 contexts under study are presented and their results later contextualised with regard to the wider north-eastern peninsular region.

### *Frequency of Taxa*

Comparisons between the relative frequencies for the four main species for each of the time periods under study show clear fluctuations throughout the sequence.

During the Middle Iberian period, ovicaprine remains predominate (52.5%), followed by those of pigs (24.1%) and cattle (23.3%). No substantial changes are documented during the Romanization period: ovicaprine remains predominate (49.1%), followed by those of pigs (26.8%) and cattle (24%). During the Early Roman period, however, the remains of pig (46.6%) go on to become the most abundant taxon in terms of number, followed by the remains of cattle (29.8%) and, in third place, those of ovicaprines (23.5%). In terms of the ovicaprine remains, a clear predominance of sheep remains over goat remains is observed during the Middle Iberian period (61.5% of the remains identified as belonging to sheep or goat). No substantial changes are documented during the Romanization period (67.7% of the remains identified as belonging to sheep or goat). This predominance decreases during the Early Roman period, with similar frequencies documented for sheep and goat (51.8% and 48.2% respectively) during this time.

This change in taxonomic representation frequencies is noted equally at all the settlements under study (Figure 2). The four Middle Iberian settlements correlate with the ovicaprine category. A similar trend is noted at the four Romanization period settlements. It is worth highlighting, however, that the settlements that least correlate with the ovicaprine category are the two newly-created, Camp de Les Lloses and especially Olivet d'en Pujol, which correlate with the cattle category. The four Early Roman settlements, however, correlate with the pig and cattle categories. Therefore, the representation frequency change documented from the

Early Roman period is mainly caused by a decrease in the economic importance of sheep in favour of that of pigs.

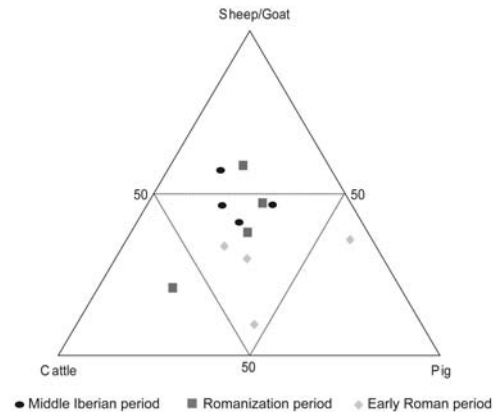


FIGURE 2

Ternary Plot showing relative percentage of sheep/goat, pig and cattle bones from the assemblages under study by periods.

### *Kill-off Patterns*

In order to visualise the kill-off patterns by period at each of the sites, and in order to assess if any differences exist between them, a Correspondence Analysis (CA) was carried out. CA was considered the most suitable tool to achieve this goal since different assemblages and variables need to be analysed together. The simultaneous consideration of multiple-category variables can reveal relationships that would otherwise not be detected in a series of pair comparisons of variables (Clouse, 1999; Smith & Munro, 2009). The followings CA characterise each site and the age of slaughter of each of the taxa by their frequency. In terms of age-at-death, a distinction was made between infant, juvenile, sub-adult, adult and old individuals.

Figure 3A is a plot of both sheep kill-off patterns and sites for the first two factor axes. The contribution of these two factor axes to the total variance is 74.6%. The first factor axis (48.9% of the total variance) discriminates between the settlements based on time period. Most of the settlements from the Middle Iberian and Romanization periods are found precisely along the figure's margins. At the same

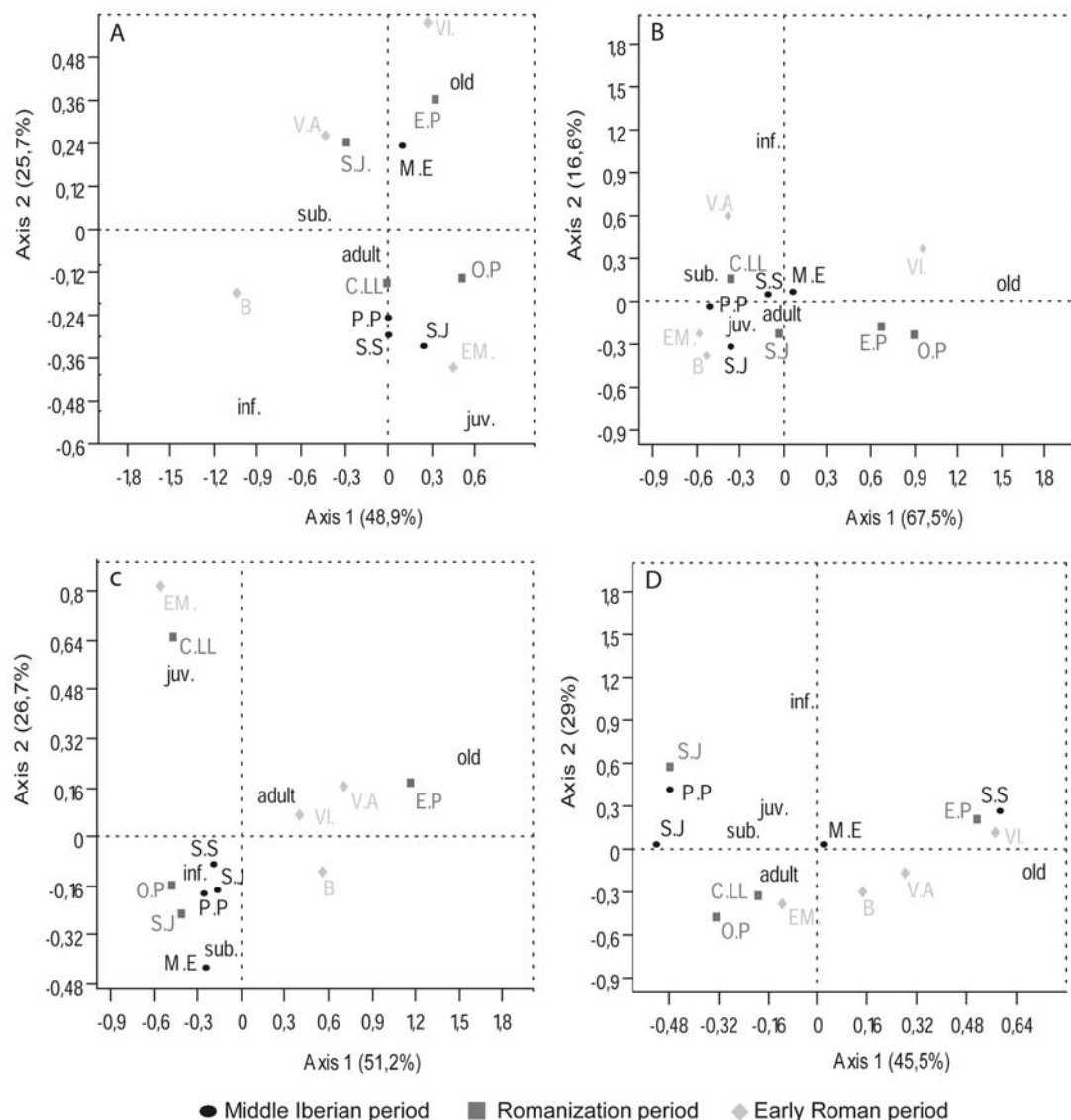


FIGURE 3

Plots of the Correspondence Analysis (CA) of sheep (A), goat (B), pig (C) and cattle (D) kill-off patterns by site and period. Inf. = infant, juv. = juvenile, sub. = sub-adult, adult = adult, old = old.

time, the Middle Iberian and Romanization settlements are associated with the juvenile, adult and old individual variables. During the Early Roman period, on the other hand, each settlement is located in a different quadrant, associated to a different age. The second factor axis (25.7% of the total variance) precisely discriminates between Early Roman settlements considered as villas, which are associated

with the sub-adult and old age categories, and cities, which are associated with the juvenile and infant categories. From these results we can infer that in all Middle Iberian and Romanization period settlements a predominance of sheep slaughtered both as juveniles, adults and in old age is documented. During the Early Roman period, however, slaughter patterns are very much linked to the settlement's function.



The first two factor axes of the goat kill-off patterns and sites plot (Figure 3B) show similar results. The first factor axis (67.5% of the total variance) correlates the majority of the Middle Iberian settlements with those from the Romanization period, located on the left-hand side of the first axis. The Early Roman settlements, however, are located along the figure's margins. In terms of age variables, all Middle Iberian settlements are associated with juvenile, sub-adult and adult categories. In the Romanization period, some settlements also correlate with the old age category. For the Early Roman period the same pattern as that for sheep is documented. The second factor axis (16.6% of the total variance) again discriminates between the settlements regarded as villas, which are associated with sub-adult and old age categories, and cities, which are associated with the juvenile category. From these results we can infer that Middle Iberian settlements show a predominance of goats slaughtered as juveniles, sub-adults and adults. For the Romanization period an increase in the slaughter of old age individuals at the expense of juveniles is noted. During the Early Roman period, slaughter patterns are linked to the settlement's function.

The plot of both pig kill-off patterns and sites for the first two factor axes (Figure 3C) shows that the first factor axis (51.2% of the total variance) correlates the settlements according to time period. All Middle Iberian settlements correlate amongst themselves and with the infant and sub-adult age categories. A certain degree of diversity is observed in the Romanization period, given that the rural settlement of Pontós is associated with the old age category and Camp de les Lloses with the juvenile. The second factor axis (26.7% of the total variance) again shows that during the Early Roman period there is a difference between settlements regarded as villas, which are associated with the adult age category, and the cities, which are associated with the juvenile and sub-adult age categories. From these results we can infer that during the Middle Iberian and Romanization periods pigs were slaughtered mostly as infants, juveniles and sub-adults. It is worth highlighting, however, the results obtained from Mas Castellar de Pontós, which show an important predominance of slaughtered old-age individuals. During the Early Roman period, slaughter patterns are very much linked to the settlement's function.

Figure 3D shows the plot of both cattle kill-off patterns and sites for the first two factor axes. The contribution of these two factor axes to the total variance is 74.5%. The first factor axis (45.5% of the total variance) shows a diversity in associations during the Middle Iberian and Romanization periods. There are settlements that cluster together with the juvenile and sub-adult age categories, such as the two occupations of Sant Julià de Ramis and Pontós village. Others are associated with the adult and even old-age categories, such as Camp de les Lloses or Sant Sebastià de la Guarda. For the Early Roman period, on the other hand, all settlements are grouped around the adult and old-age categories. These results suggest that during the Middle Iberian and Romanization periods cattle were slaughtered as juveniles, sub-adult and adults. During the Early Roman period, however, they were not slaughtered until they were adults or of old age, independently of the settlement's function.

### *Body size*

As a third variable to evaluate, we now proceed with the data from the osteometric analysis of the remains of the four main taxa.

The osteometric log-ratio analysis of post-cranial measurements of sheep remains from the 12 contexts in chronological order shows a change in the physical characteristics of these animals across the three periods under study (Figure 4A). No significant changes are observed amongst the values that constitute the Middle Iberian sample. The values are similar between themselves, with a mean that ranges between -0.07 and -0.04. On the other hand, the Romanization period assemblage shows differences between settlements. The values from Pontós and Sant Julià de Ramis are similar to those documented during the Middle Iberian period. Small differences are observed in the assemblage from Camp de les Lloses, where the smaller values are not documented. The most important change, however, is documented at Olivet d'en Pujol, with a mean of 0. This small increase in the values, mostly documented at Olivet d'en Pujol, is the trend observed in all the assemblages that comprise the Early Roman period sample, with a mean ranging between -0.03 and 0. These results show that even during the Romanization period, changes in sheep morphology were taking place, but mostly within the newly-created settlements.

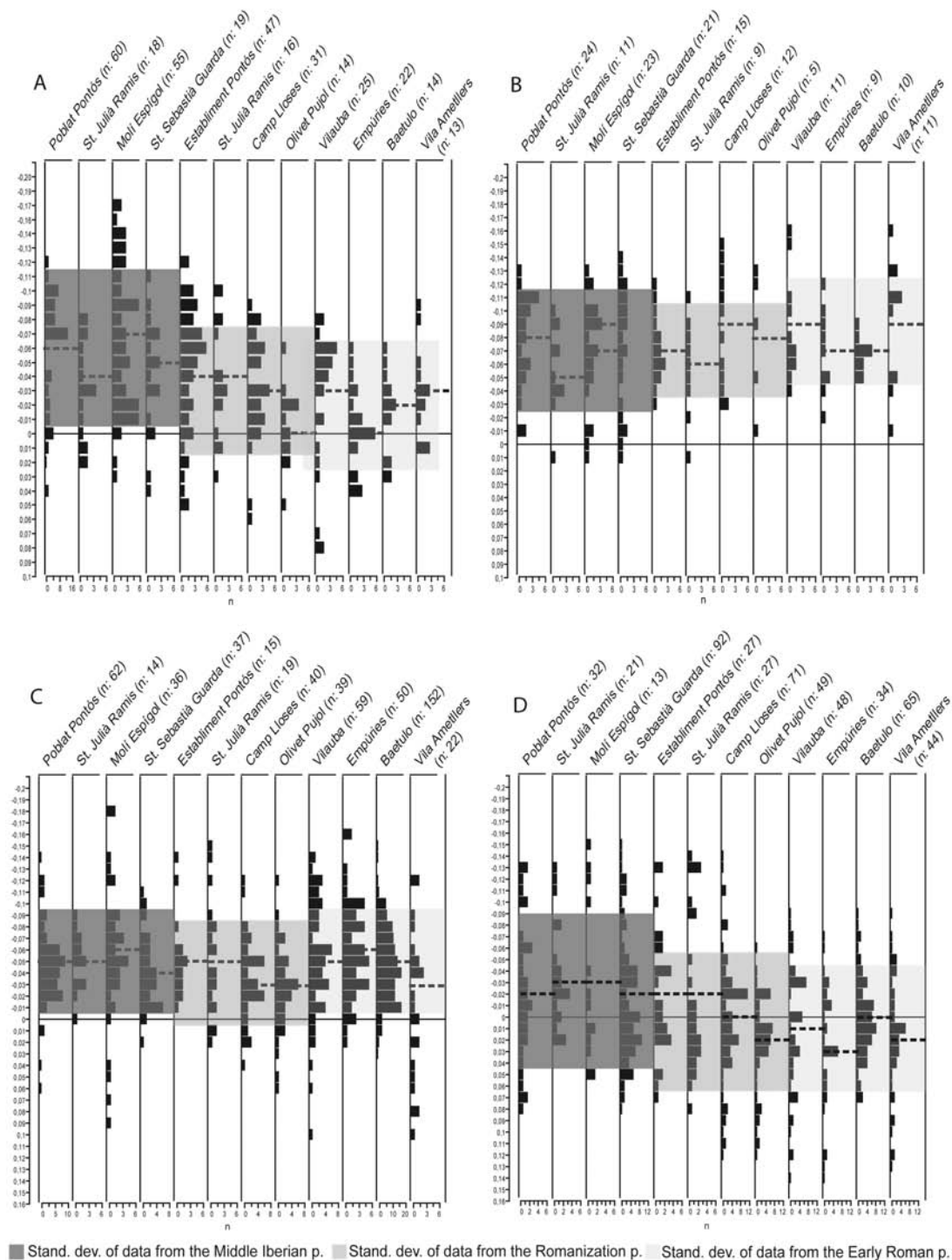


FIGURE 4

Log-ratio diagrams of sheep (A), goat (B), pig (C) and cattle (D) measurements per site in chronological order. The dashed line denotes the mean for each sample and the shaded area represents the standard deviation.

Figure 4B shows the chronologically-ordered osteometric log-ratio analysis of post-cranial measurements of goat remains from the 12 contexts under study. Very variable values are documented for the same period, possibly because the number of measurements that comprise each of the samples is very small. Therefore, these results need to be considered as a first approximation. What we can note is the lack of a significant change in the morphology of these animals during the time period under study.

This continuity can also be observed amongst the pigs (Figure 4C). The osteometric log-ratio analysis of molar measurements by site shows a very similar mean and standard deviation across time periods. In this way, changes in the morphology of this taxon during the time span under study can neither be documented.

The most significant change is noted in the values for cattle (Figure 4D). The chronologically-ordered osteometric log-ratio analysis of post-cranial measurements of cattle remains by site shows similar values for all the Middle Iberian sites, with a mean that only ranges between -0.03 and -0.02. On the other hand, values for the Romanization period differ amongst themselves. The values from the rural site of Mas Castellar are similar to those documented during the Middle Iberian period. In the sample from Camp de les Lloses we observe a slight increase in values. The most important change, however, is documented again in the sample from Olivet d'en Pujol, with much more positive values and a 0.03 mean. The values documented at Olivet d'en Pujol are the values observed in all the settlements that comprise the Early Roman period sample, with a mean that ranges between 0.03 and 0.05, very different to the Middle Iberian values. These results show that even during the Romanization period changes in the morphology of cattle were taking place, but mostly within the newly-created settlements.

### *The northeast Iberian context*

We will now contextualise the data presented so far in order to evaluate if the changes documented are part of a general, northeastern Iberian dynamic or whether they are the result of more specific, local-level changes.

Before we proceed, it is worth noting that, despite the large number of sites excavated in this re-

gion for this time period, few archaeozoological studies have been carried out on their recovered faunal material. It seems, however, that this lack of interest for the information that can be obtained from the study of faunal remains is beginning to change as attested by the publication of special issues such as this one. Another issue worth highlighting is how difficult it is to undertake these comparative studies given that many of the studies only analyse a very small number of remains or involve 'unusual' assemblages; others do not look at slaughter patterns or do not make use of osteometric data.

Bearing these limitations in mind, in order to carry out this contextualisation exercise it was only possible to use data on taxonomic frequencies from 14 Middle Iberian sites, three from the Romanization period and nine from the Early Roman period (Table 2). It was only possible to obtain osteometric data from eight Middle Iberian sites, two from the Romanization and five from the Early Roman periods. It has not been possible to use data on slaughter patterns due to a lack of studies dealing with this matter on a quantitative scale.

The relative taxonomic frequencies of the four main species for the northeastern Iberian Peninsula assemblages shows clear differences during the three time periods under study. During the Middle Iberian period ovicaprine remains predominate (49.3% of total), followed by those of cattle (26.4%) and pigs (13.9%). During the Romanization period, pigs go on to become the second most represented animal (26.8%) at the expense of ovicaprines (33.1%), whose overall presence falls although they continue to be the most represented taxon. Cattle frequencies do not change significantly (25.4%). The fall in the relative frequency of ovicaprines continues during the Early Roman period (24.3%), with pigs becoming the most represented taxon during this time (25.5%). Cattle relative frequencies also fall during this period (17.3%).

These trends are noted for all the settlements under study (Figure 5). The Middle Iberian assemblages correlate with the ovicaprine category as ovicaprine remains make up more than 50% of the sample in most of the assemblages studied. Amongst the Romanization period assemblages, a certain degree of spread is noted. The samples from Alorda Park and Bosc del Congost (settlements with continuous occupation from the Middle Iberian onwards) correlate with the ovicaprines. On the other

hand, the sample from Monteró, a newly-created settlement, correlates primarily with the pigs. Amongst the samples from the Early Roman period this spread toward the pig category is much more noticeable. There are no assemblages where ovi-caprine remains comprise 50% of the sample.

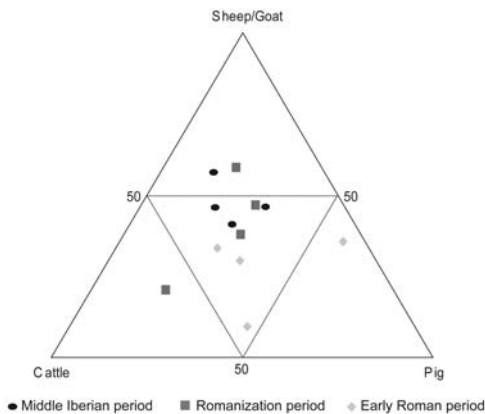


FIGURE 5

Ternary Plot showing relative percentages of sheep/goat, pig and cattle bones from the comparative assemblages by period.

The osteometric data obtained from published studies (see Table 2) also show differences amongst the values comprising each period. Figure 6A shows how the values for sheep are similar in the Middle Iberian and Romanization periods. It is worth highlighting that the only two studies for the Romanization period containing osteometric data are those for Bosc del Congost and Alorda Park, settlements with a continued occupation from the previous period. A change in the morphology of these animals, however, is noticeable from the Early Roman period. For the goats, no significant size changes are observed between the different time periods (Figure 6B). The decrease in the variability interval documented for the Romanization period sample could be the result of the small number of specimens comprising this sample. This continuity can also be observed in the size of pigs (Figure 6C). The increase of the variability interval in the Early Roman sample, however, needs to be noted. The data for the cattle show a clear increase in the size of these animals (Figure 6D). This change is observed from the Early Roman period onwards. In this case, the sample from the Romanization period again only comprises values

from two settlements with a continuous occupation from the previous period.

## DISCUSSION

The results obtained from the analysis of the 11 sites under study in this paper and their contextualisation with relevant data from the northeast of the Iberian Peninsula, has allowed us to document the important changes that took place in livestock management practices during the time period under review here. These changes, however, did not take place simultaneously and did not affect all taxa equally.

The most significant change is documented amongst the cattle, with the presence of larger individuals as early as the Romanization period, but only within newly-created settlements. No significant changes are documented in settlements showing continuous occupation from the Middle Iberian period. This morphological change is documented in all the Early Roman settlements under study. During the Early Roman period there is an increase in the economic importance of this taxon and an increase of adult-aged slaughters.

The results obtained for sheep also show an increase in their body size within the newly-created settlements of the Romanization period. This increase in body size is also documented in all Early Roman settlements. A decrease in the economic importance of this taxon is also noted during the Early Roman period as well as specialised slaughter patterns in relation to the settlement's function.

The only change observed amongst goats is, from the Early Roman period, the specialised patterns in their slaughter according to the settlement's function. No significant changes have been documented in these animals' body sizes nor in their relative frequencies, neither during the Romanization nor Early Roman periods.

The results obtained for pigs show an increase in the economic importance of this taxon, mainly after the Early Roman period. It is worth highlighting, however, that at some settlements created during the Romanization period, such as Monteró, this economic importance is also observed. No significant changes, however, have been noted in their slaughter patterns nor in their morphological characteristics.

Sites	Type	Period	NISP	Ost. Studies	References
Bauma Serrat Pont	rockshelter	Middle Iberian	603	*	Alcalde et al., 1994
Ca n 'Olivé	oppidum	Middle Iberian	2179		Albizuri, Nadal, 1999
Illa d'en Reixach	oppidum	Middle Iberian	(3564)		Casellas, 1993
L'Esquerda	oppidum	Middle Iberian	370		Martí, 1994
Moleta del Remei	oppidum	Middle Iberian	2637		Albizuri, Nadal, 1999
Peña del Moro	oppidum	Middle Iberian	1158		Miró, Molist 1982 a
Turó del Vent	oppidum	Middle Iberian	2300	*	Miró, Molist, 1982 b
Alorda Parck	oppidum	Middle Iberian	528	*	Valenzuela, 2008
Turó font canya	siló field	Middle Iberian	1005	*	Valenzuela, 2008
Olèrdola	oppidum	Middle Iberian	132	*	Valenzuela, 2008
Vilars	oppidum	Middle Iberian	1599		Alonso et al., 1996
Bolvir	oppidum	Middle Iberian	191	*	Colominas, Nadal, 2011
Saus	siló field	Middle Iberian	809	*	Colominas, Saña, 2011
Olius	siló field	Middle Iberian	2398	*	Colominas, 2013b
Bosc del Congost	siló field	Romanization	701	*	Colominas, Saña, 2009
Monteró	castellum	Romanization	164		Saña, Valenzuela, 2007
Alorda Parck	oppidum	Romanization	749	*	Valenzuela, 2008
Collet Sant Antoni	workshop	Early Roman	312	*	Saña, Tormero, 2005
Ermedàs	workshop	Early Roman	430	*	Colominas, 2009
Tàrraco (Vila - roma)	city	Early Roman	427		Miró, 1989
Tolégassos	villa	Early Roman	(9000)		Casas, Soler, 2003
Antigons	villa	Early Roman	1214	*	Valenzuela, 2010
Torre Andreu	villa	Early Roman	83		Casellas, 1993
Vilablareix	villa	Early Roman	134	*	Colominas, 2010
Vinya del Vinyet	villa	Early Roman	756	*	Colominas et al., 2006
La Llosa	villa	Early Roman	515		Padrós, 2010

TABLE 2

General information on the samples used in the comparative analysis. NISP = Number of Identified Specimens. Numbers in brackets refer to the Total Number of Remains.

Therefore, during the first decades following the conquest some changes in livestock practices were already taking place. These changes were abrupt, given they are already noted during the Romanization period, and heterogeneous as they are only noted within newly-created settlements and only affected certain taxa. These changes are reflected archaeologically by a change in cattle and sheep size.

Other changes, however, were more gradual, but, at the same time, more general and structural given that they are documented from the Early Roman period onwards, they can be observed at all the settlements under study here and affected all four species equally. These changes are reflected archaeologically by a change in the animals' relative taxonomic frequencies and the age brackets in which they were slaughtered.

These results are therefore showing that the rate of the transformations described in the introduction

as a result of the conquest of northeastern Iberia, which began with a first phase that only entailed fiscal control of the territory, followed by a second phase where economic exploitation took place and which finished with a third involving political inclusion, also affected livestock management practices. A first phase has been documented in which cattle and sheep were imported and/or improved zootechnically. It is thought that the reason would have been to obtain greater returns from the exploitation of these two taxa (Lauwerier, 1988; Dobney *et al.*, 1996; Forest & Rodet-Belarbi, 2002; Albarella *et al.*, 2008; Colominas, 2013a; Colominas *et al.*, 2014).

The second stage corresponds to those changes which are mainly recorded from the Early Roman period. They are structural changes that are part of the changes linked with the new organisation of the territory and entailed much more specialised and in-

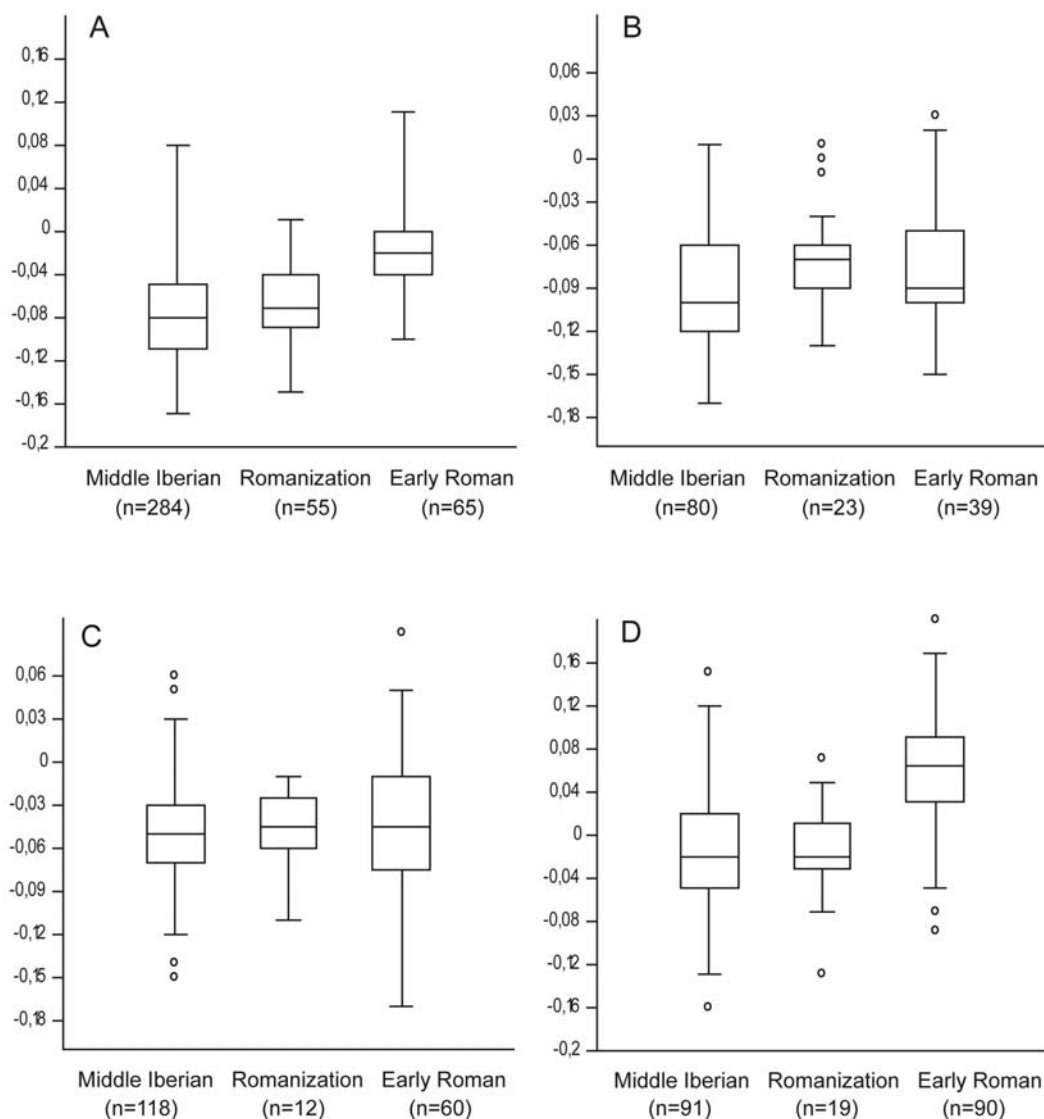


FIGURE 6.

Box plots of log-ratio sheep (A), goat (B), pig (C) and cattle (D) measurements from the comparative assemblages by period. The box displays 25-75 percent quartiles. The horizontal line inside the box represents the median and the minimal and maximal values are represented by the upper and lower horizontal lines. The circles represent outliers.

tensive livestock exploitation from the Early Roman period onwards. Pigs are the primary taxon used to obtain meat products, thus increasing their economic importance, whereas the other taxa are mainly used to obtain other products, such as wool, milk and traction. Therefore, it is during this time period when the most important changes with regard to livestock management practices materialised.

## CONCLUSIONS

The study of the taxonomic frequencies, age estimates and the osteometric analysis of the fauna from 11 sites located in the northeast of the Iberian Peninsula and their comparison with archaeozoological data available for the area under study have allowed us to document the important changes that



livestock management practices underwent as a result of the Roman conquest. The use of restricted time periods has allowed us to note that these changes did not emerge simultaneously and did not affect all taxa equally. The first change to take place already did so during the Romanization period, documented by an increase in the body size of cattle and sheep. Later, and during the Early Roman period, a general change in the animals' slaughter patterns and taxonomic frequencies was noted.

Therefore, just as with the study of settlement patterns and other categories of archaeological material, the study of the faunal remains has enabled us to show that the changes that took place as a result of this area's conquest were neither homogeneous nor linear, where the degree of involvement of the different characters (conquered and conquerors) could have varied throughout time. Given that during the Romanization period only a change in the size of cattle and sheep as a result of imports and/or an improvement of the livestock was documented, and this is only observed in newly-created settlements, which additionally present Romano-Italic architectural or material characteristics (Duran & Mestres, 2008; Burch *et al.*, 2010), the evidence thus far available appears to show that the local communities were likely little inclined to accept these changes and, when these changes took place, it was likely not as a result of their own initiative. Therefore, these first changes are likely more linked to opportunisms on the part of individuals or as a result of interventionist politics on the part of the conquerors. This increase in cattle and sheep size has also been documented in most of the new territories conquered by Rome, such as France (Lepetz, 1995; Forest & Rodet-Belarbi, 2002), Great Britain (Dobney *et al.*, 1996; Albarella *et al.*, 2008), Germany (Teichert, 1984), Holland (Lauwerier, 1988), Romania (Gudea, 2007), Switzerland (Schlumbaum *et al.*, 2003) or Slovenia (Boschin & Toskan, 2012). Therefore, we must also consider the possibility that these changes do not only reflect an economic need of the territory in question, but they may also represent domination and acculturation strategies promoted by the Empire.

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