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Supplying the Roman army? Animal production and consumption in the countryside of north-eastern Iberia (Can Rubió, la Garrotxa)

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ABSTRACT

In this paper we investigate the presence of the Roman army in the countryside of northeastern Iberia through the case study of Can Rubió, an archaeological site dated to the 1st c. BC-1st c. AD¹.

The contextualisation of the archaeozoological information obtained from the study of 1,495 faunal remains, together with the structures and other finds from the site (pottery, metal and bone objects), allows us to hypothesise that Can Rubió was a military-logistics centre. Its main function would have been horse and cattle breeding to supply animals for riding, cargo and/or transport for the Roman army stationed in the hinterland of the Graeco-Roman city of Emporion. It would also have produced some goods for its own consumption, including wool, leather, milk and meat. The possible acquisition of portions of caprine and pork meat has also been documented. Thus, this paper provides information of great interest on a subject to which very little attention has been paid to date: the presence of the Roman army in a period in which the occupation and pacification of the area had already been completed.

1. Introduction

Until recently, the presence of the Roman army in northeastern Iberia –*Hispania Citerior* province – has been poorly documented in archaeological terms. It was one of the first areas to be occupied by the Romans (218–195 BCE). However, beyond the political and military establishments referred to in the literary sources (such as *Tarraco* and *Emporion*), only in the last 15 to 20 years have we begun to identify archaeological sites that can be linked to a Roman military presence. Thus, especially with regard to the 2nd-1st centuries BC, it has become possible to identify a network of garrisons, camps and logistics facilities that can be directly related to the Roman army (and its auxiliary troops). They show that it was not limited to a passive occupation of these territories, but contributed to its exploitation and transformation as the spearhead of Roman interests in the province (Naco and Principal 2020, Olesti 2021).

Some of these establishments are also linked to the conflict episodes that took place in the northeast, both directly (as in the Sertorian or civil

wars) and indirectly, as a supply source and rearguard for the Roman conquest of the western Iberian Peninsula (Noguera et al. 2014).

We have, therefore, increasingly accurate knowledge of this network of military- logistics establishments deployed throughout the territory, both along the coast –around ports and key anchorages– and along the main overland communication routes. Recent publications have presented many of these sites, showing the presence of both *ex novo* settlements linked to the army (Monteró, Camp de les Lloses, Can Tacó, Puigpelat, Puig Castellar de Biosca, etc.) and indigenous settlements with Roman troops and garrisons (Olèrdola, Ca l'Arnau, Castellot de Bolvir, St. Miquel de Sorba, etc.) (Padrós and Ruiz de Arbulo 2015, Pera, 2016).

Undoubtedly, this military presence, in both periods of actual war and “peaceful” occupation, would have affected the indigenous populations. A considerable cost was involved in maintaining a Roman legion consisting of some 6,000 legionaries, together with large numbers of servants, cavalry, pack animals, auxiliary troops, etc. that multiplied its needs (Roth 1999). Neither should we forget the taxes, impositions

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and confiscations the local peoples were subjected to. These were not limited to maintaining the army in Hispania (the so-called *stipendium*), but also sought key resources for the Roman Republic, such as metal, timber or agricultural resources that could be shipped to Italy or other provinces (a brief presentation of the main literary sources and archaeological data about this process in NE Spain can be found in Olesti 2017, 436-438, and Salido 2014).

In this respect, it has been pointed out that the Roman conquest in general, and the Roman army in particular, may have acted as an accelerator for indigenous food production, which would have had to meet both its own requirements and the Roman exactions (Erdkamp, 1998; 2007). The increase in agriculture, livestock and the occupation of new land would have been largely a consequence of this Roman coercion, which could have been manifested directly in the collection of taxes or levies and indirectly in the increase in demand resulting from the new imperial economy. The Roman army, therefore, could have influenced the local economy as a coordinated collection mechanism through the *publicani* (public contractors that supplied the needs of the troops). At the same time, these needs could also be supplied by the local communities, increasing their production.

This is where it makes sense to study the supply needs of the Roman troops, who had their own means (grain, wine, armaments, etc. shipped in by sea from Italy or other provinces), the recourse to local taxes, and purchases from indigenous producers.

In the last 20 years the archaeology of the Roman conquest of Hispania and the Roman army has been outstanding, identifying camps and battlefields (Morillo et al., 2002; Nàco and Principal 2020). However, there is still little information about the supplying of the troops, especially during the 2nd – 1st c. BC. The distribution of Italian wine and pottery has been a good indicator of Roman camps and their associated network of military logistics sites. The role of the northeast of the Tarraconensis in the supplying of the Roman army placed as far as the Cantabrian area has been documented through the presence of amphora wine from the Layetania, the arrival of Samian Ware through Narbo, or other products from *Baetica* (Morillo and Salido 2010; Morillo, 2014). The development of *prata*, military areas for the breeding of the army livestock, from the Augustan period in the Northwest of the Peninsula, is also an indicator of this new system of the Roman Army supplying.

With the civil wars having ended, the presence of the Roman army at the end of the Republican period is even more difficult to identify, as

most of the *castella*, fortifications and logistics establishments had been abandoned by the Triumviral period (43–31 BC) or during the reign of Octavius-Augustus (31 BC-14 AD). However, recent studies have shown the still noteworthy presence of these troops, even in the *conventus Tarraconensis*, the Catalan area, throughout the Early Roman period (Moralejo 2019). It is precisely this period that is documented at the Can Rubió site, the subject of this study, which is located in the hinterland of the Graeco-Roman colony of Emporion.

The archaeozoological study presented in this paper, as well as the re-study of the archaeological structures and associated finds (pottery, metals, bone objects), allows us to hypothesise that the function of this settlement would have been linked to stockbreeding. At the same time, the affiliation of the occupants appears to have been more that of a military or logistics context than of a traditional rural property.

2. Can Rubió

The Can Rubió archaeological site is located in la Garrotxa (Fig. 1). It was excavated between 2006 and 2007 as part of the construction of a new road (C-37 vic-Olot). The excavations were carried out by J. Guàrdia and K. Harzbecher from the company Arqueociència SL (Guàrdia and Harzbecher 2007).

2.1. The structures

Although three distinct phases were identified, all were relatively short and dated to between the second half of the 1st century BCE (the presence of some earlier finds notwithstanding) and the mid-1st century CE. The most important period of activity appears to correspond to the Augustan era, with later phases of reform and abandonment.

The area occupied by the structures, some 800 m², is complemented by the remains designated Can Rubió II, some 200 m to the southwest, which suggest a larger establishment of about 1600 m².

Initially, the site consisted of a large central cistern-reservoir, with a *lacus* (an artificial lake or tank for collecting liquids) and a small associated area, as well as a system of wells and water supply channels that were fully operational in the Augustan era (Fig. 2). The reservoir consisted of a large, almost square pit (14.50 m per side) bordered by several sets of stone blocks of varying shapes and sizes laid directly on the geological substrate. The pit walls had a concave section and reached



Fig. 1. Location of Can Rubió and other sites cited in the text.

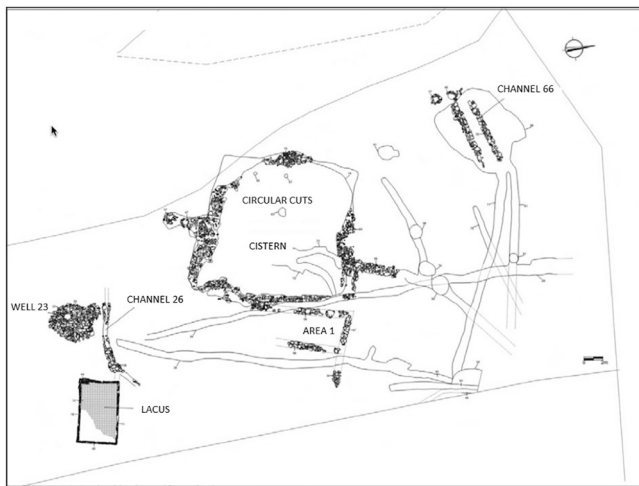


Fig. 2. Layout of Can Rubió.

a depth of 1 m in middle. The reservoir measurements correspond to precisely 50 Roman feet (14.78 m.). A small well associated with the south side provided water and channel 66 to the north acted as an outflow. Of particular note in this structure, however, were the two channels documented in the subsoil and three large circular cuts (in one of the cuts there was a large wood fragment corresponding to a structure that it has not been possible to identify. There is no doubt that there was a water supply for the pond (as evidenced by the well and the channel, although it is possible to hypothesise a system of decantation and/or filtration inside the structure).

A second structure is the *lacus*, which was located in the southeastern part of the site in conjunction with the well 23 and the channel 26 (Fig. 2). It is a rectangular structure, dug into the geological substrate, 5.70 m long and 4.30 m wide, almost exactly 20x15 Roman feet. Both the floor and the walls used lime, which was very uncommon in indigenous contexts.

An isolated room was dug next to the pond. Its poor condition prevents it from being measured, but it has a rectangular floor plan delimited by the remains or foundations of three walls, of which only the last row remains.

The rest of the structures correspond to channels dug in the subsoil, some reinforced with dry stone walls and roofs, and 5 wells of different sizes, all connected to channels (Fig. 2). This was therefore a complex hydraulic system for collecting groundwater, which is not far from the surface, and redistributing it to the *lacus* and reservoir, as well as other structures that have not been preserved outside the excavated area.

We cannot rule out that other possible wells could correspond to deposits dug in the subsoil, particularly as in that case the structure received the water discharged from the large reservoir by channel 66, rather than channelling water to it. As these structures were not excavated beyond a certain height, this is difficult to corroborate, but we cannot rule out that water was taken from the pond for an as yet undetermined purpose.

This first phase was abandoned at the end of the Augustan period, when new developments can be seen in the establishment. The pond walls were reinforced and inside cut 90, in the northeastern sector, a new channel was laid with two parallel dry stone walls.

Finally, in the last phase of the site, Area 1 linked to the reservoir and the small well and its associated channel were built.

2.2. The pottery

Most of the finds are from SU 1 and SU 18, which correspond to the abandonment of the large pond. Other structures also contributed (SU 31 and SU 43), although in much smaller quantities. It is worth noting in

the first place the very high percentage of Roman common oxidised ware (70 % of the total pottery), including a large number of imported Italic pieces and others of local production, well above the amounts of slow-wheel-turned pottery of local tradition (especially kitchen pots), and fine crockery, such as Italian *Terra Sigillata*, South-Gaulish *Terra Sigillata* and thin-walled (Fig. 3). Also noteworthy is the low percentage of fine or luxury crockery (Guàrdia and Harzbecher, 2007, 25) (Fig. 3).

Amphoras are not very numerous, with some Italic (Dr. 6^a), Tarraconense (Pascual 1, Dr. 2–4) and Baetic examples (Fig. 3). These low percentages could indicate that the site was not a consumer centre connected to the army (as happens in military camps or roadside centres, where the percentage of wine or oil amphora is much higher). The site was connected to the network of wine and oil distribution, as part of the military logistics, but its function was not the redistribution of these wine and oil military consumed products.

2.3. The metal objects

What makes Can Rubió more exceptional is the type of the metallic finds recovered, both bronze and iron, that in themselves are unusual in a rural context, as we explain below.

First of all, the presence of a set of 4 *Aucissa* fibulae stands out (four in SU 1 and one in the SU 18). All the examples belong to Type 22b (Feugère, 1985) (Fig. 4). The presence of Type 22b2 in many Roman encampments in the *limes* area, such as Haltern, Oberaden and Dangstetten (Getcher, 1979), allows us to state that this fibula was first manufactured around 20 BC, although its production does not appear to have lasted beyond the reign of Claudius. It should be noted that these fibulae are often associated with military contexts.

An entire specimen of an Alesia-type fibula corresponding to Erice type 19.1b was also found (SU 1) (1995), as well as fibulae older than those of the *Aucissa* type, and contexts linkable to the presence of the Roman army, for example in camps associated with the Cantabrian Wars (Fernandez and Bolado, 2011, 318).

The work of Erice (1995) shows the presence of 53 *aucissa* fibulae in the Catalan area at that moment. Just only 4 were from rural contexts (Rubí, Tolegassos, Montbui-Igualada and Vall d'Uxó). 33 come from *Emporiae*, 7 from *Tarraco*, 5 from *Baetulo*, 3 from *Ilerda* and 1 from *Barcino*, all of them cities with likely presence of veterans from the Augustean period. Therefore, Can Rubió is an exception of the general urban contexts in which this fibula is mainly recovered.

A second significant element is the fragment of a bronze bowl with geometric decoration, which is unusual in domestic contexts, but common in logistics-military contexts (Uroz, 2015).

Also significant are some documented iron elements, such as a largely preserved cowbell, as well as 5 small fragments, and the numerous long nails and hooks discovered. Some of these are difficult to interpret but are quite specialised. They include a punch with a ring and a small associated tag. Also noteworthy are a small, preserved whole tether and a ring belonging to a second, small specimen, which would have been part of a more complex fastening mechanism.

Clearly from a military context are two spear ferrules as well as four very hard stone projectiles from a Roman catapult.

Finally of note is the small preserved collection of coins. It is not exceptional in itself, but it includes a broken coin, a phenomenon that can again be associated with a military context. It is an Emporitana with the legend *L.M.RV.F.P.C.Q* from the end of the 1st century BCE. There is also a second Emporitana coin from the beginning of the 1st century CE with the legend *EMPOR*, and finally an Iberian as from Unitkesken from the first half of the 1st century BCE. These coins also show the establishment's relationship with the Emporitana hinterland.

The chronology of all these finds corresponds perfectly with a radiocarbon dating taken in SU 86 (Guàrdia and Harzbecher, 2007) that offered a result of 40 BC-80 AD.

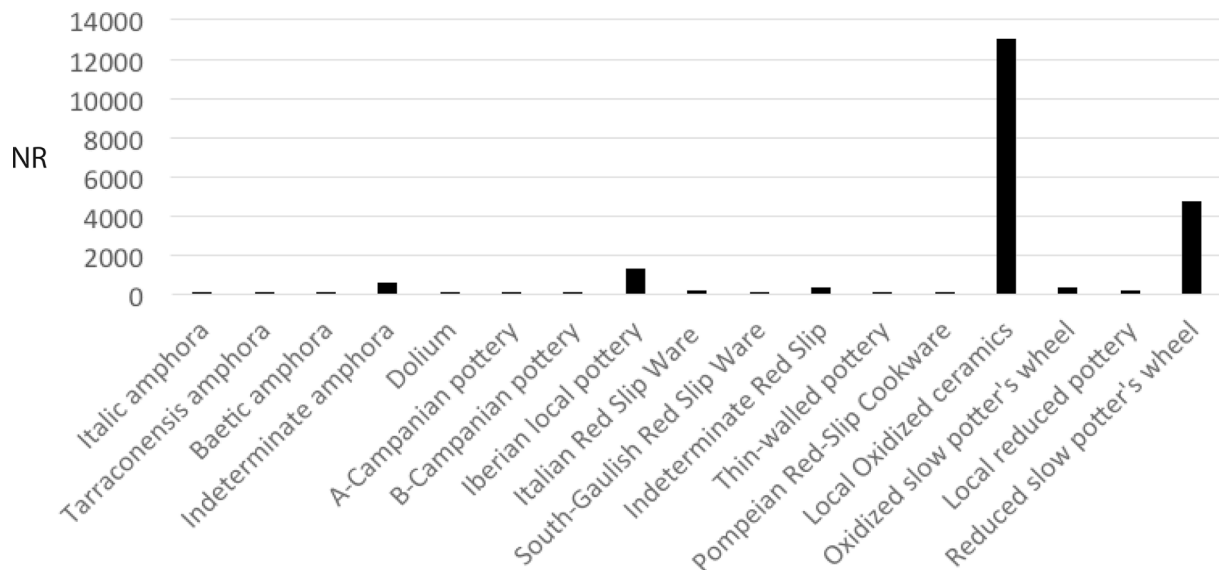


Fig. 3. Number of the different ceramic categories recovered at Can Rubió.



Fig. 4. Set of five AVCISSA 22b2 fibulae located at Can Rubió.

2.4. The bone objects

Finally, we can highlight two elements that are also exceptional in rural areas. On the one hand, three bone styluses, preserved only at the top, as well as a large number of shapeless fragments of punches, which we interpret as small styluses or writing instruments. Among the best preserved is a punch ending in a ball, another with a rhomboid shape decorated with diagonal criss-crossed incisions, and a third worked in the shape of a spiral. In addition, there are 8 reported fragments of bone punches. The presence of bone styluses (and it cannot even be ruled out that a preserved bronze punch was also a stylus) is associated with late-Republican military sites, of which there are many in the Catalan area (Olesti, 2021).

3. Materials and methods

A total of 1,495 faunal remains were recovered from different contexts of the excavated area at Can Rubió (Room 1, deposit, water drainage channels, wells and pond).

In order to characterise animal production and consumption, the archaeozoological analysis focused on the study of taxonomic representation frequencies, age-at-death estimations, anatomical representation frequencies and anthropogenic modifications of the faunal

remains recovered at the site of Can Rubió. Osteometric analyses were not performed due to the high fragmentation of the bones.

The taxonomic variability was based on the relative frequency of taxa (NISP). The osteological reference collection from the Archaeozoology Laboratory of the Catalan Institute of Classical Archaeology (ICAC) was used for identification. Sheep and goat differentiation was made according to Boessneck (1980), Payne (1985), Prummel and Frisch (1986), and Zeder and Pilaar (2010). Equid remains were identified to species based on the publications of Peters (1998), Armitage and Chapman (1979) and Johnston (2004). When identification of some skeletal elements such as long-bone shaft, rib, vertebrae and skull fragments were not possible, these were recorded under the following categories: large-mammals (fragments of large artiodactyl and perissodactyl size, e.g. horse, red deer and cattle), medium-mammals (fragments of medium artiodactyles, such as sheep, goat, roe deer, and pigs), and small-mammals (bones of the smallest mammals, eg., cat, rabbit and hare).

Age-at-death was recorded on the basis of the eruption and wear of mandibular teeth. Tooth wear stages followed Grant (1982) for cattle and pigs, and these were grouped into the age stages suggested by O'Connor (1988). For sheep and goats, tooth wear stage and age stage followed Payne (1973), Levine (1982) for equids and Silver (1980) for dogs. Age-at-death for equids and dogs was also recorded on the basis of epiphyseal fusion of long bones, following Barone (1976).

Anatomical representation was based on the frequency of skeletal elements using the Minimum Number of Elements (MNE). The calculation of the MNE makes it possible to determine the taphonomic effects or anthropogenic selection of an assemblage, as it assumes that all the skeletal elements of an animal were present at the time of its death (Lyman, 2008). Any deviation from this expected skeletal representation would have been caused by postmortem factors. In our case, a differential representation between skeletal elements could be also the result of an import/export of certain meat products (Landon, 1997; Hambleton, 1999).

Butchery marks were described as 'chop', 'cut', and 'saw' marks when recording their location and orientation, as they may have been linked to different stages in the carcass processing (Lyman, 1987; Gifford-Gonzalez, 1989; Greenfield, 2000). Fracture types were identified following the criteria in Outram et al. (2005). Individual fractures were categorised as new (breaks that occurred during or after excavation), dry (fractured after loss of moisture and organic content) and helical (fracture of bone in a fresh state).

4. Results

The faunal remains analysed in this study totalled 1,495; 896 of which were defined in taxonomical and anatomical terms (NISP).

4.1. Taxonomic representation

The main species at Can Rubió were domestic animals (Table 1). Wild animals only represent 2 % of the total NISP, with a sparse presence of red deer, roe deer, lagomorph and bear (Table 1). Among the domesticates, cattle is the main species represented (41 %), followed by equids (24 %), sheep/goats (19 %), pigs (14 %) and dogs (1.2 %).

The majority of the sheep/goat remains belong to sheep. 24.4 % of the caprine remains were identified as sheep (42 remains) and only 15.7 % as goat (27 remains). In relation to equid specimens, 40 % were classified as horse (85 remains), 6.6 % as donkey (14 remains) and only 2 % as mules (4 remains).

4.2. Age patterns

Age-at-death estimations show differences between taxa. Sheep kill-off patterns reveal a clear predominance of slaughtering at adult and elder ages (after 24 months), with an age-at-death peak at 36–48 months. A small proportion of sheep slaughtered before maturity (prior to 24 months) is also documented (Fig. 5). A predominance of slaughters at adult ages is also observed for goats. In that case, however, an absence of slaughtering before 24 months and a peak in age-at-death of 24–36 months, which progressively decreases to 72–96 months, has been documented (Fig. 5). No senile animals were recorded in either species.

Cattle kill-off patterns show that they were predominantly slaughtered at relatively older ages. Although some individuals were slaughtered just before the optimum age for meat consumption (18–30 months), a clear age-at-death peak between 60 and 96 months (elder category) is observed (Fig. 5).

In contrast, the analysis of pig kill-off-patterns shows that they were slaughtered at a younger age than cattle, sheep and goats, predominantly between 14 and 27 months (sub-adult category). Despite this predominance, some individuals were also slaughtered after 48 months old (Fig. 5).

Almost all the equid remains were from adult individuals (94 %), as the epiphyses were fused and the permanent teeth were in wear. All this indicates a predominance of equids aged between 4.5 and 12 years, although sub-adult (3.2 %) and elder individuals (2.6 %) were also documented. The Minimum Number of Individuals calculation for Can Rubió shows the presence of 1 sub-adult donkey, 1 adult donkey, 1 sub-adult horse, 5 adult horses, 1 adult mule and 2 elder equids.

The 11 dog remains were from adult individuals, except for one mandible fragment. The tooth eruption sequence shows that it came

Table 1

Presence of animal taxa at Can Rubió. NR = number of faunal remains recovered. NISP = number of identified specimens. MNI = Minimum Number of Individuals.

TAXA	NR	NR%	MNI
Sheep/Goat (<i>Ovis aries/Capra hircus</i>)	170	18,97	17
Pig (<i>Sus domesticus</i>)	125	13,95	10
Cattle (<i>Bos taurus</i>)	363	40,51	11
Equid	211	23,55	11
Dog (<i>Canis familiaris</i>)	11	1,23	2
Lagomorph (<i>Oryctolagus cuniculus/ Lepus capensis</i>)	1	0,11	1
Red deer (<i>Cervus elaphus</i>)	12	1,34	1
Roe deer (<i>Capreolus capreolus</i>)	2	0,22	1
Bear (<i>Ursus actos</i>)	1	0,11	1
Total NISP	896	100	55
Large-mammals	506		
Medium-mammals	93		
Total NR	1495		

from a 7-month-old dog. The Minimum Number of Individuals calculation shows the presence of 1 adult individual and 1 immature individual. The deer, roe deer, bear and lagomorph remains were all from adult individuals.

4.3. Body part representation

The anatomical representation by MNE shows some differences between taxa. In relation to sheep and goat remains, all parts of the head, the proximal hind limbs and forelimbs and the distal limbs are present, with a clear predominance of the tibia and femur (elements from the proximal part of the forelimbs) (Fig. 6). In contrast, there is an absence of vertebrae, with the trunk only represented by some ribs. This absence is not due to the difficulty in identifying vertebrae remains on a taxonomic level or to the high degree of fragmentation of these elements, as only four rib fragments and one vertebra fragment from medium-sized mammals (sheep/goat, pig, dog) were documented in the assemblage.

The anatomical representation of pig remains shows the presence of elements of the head, the proximal hind limbs and forelimbs and the distal limbs, with a clear predominance of mandibles and scapula (Fig. 6). The trunk, with some ribs and some atlas, axis and cervical vertebrae, is the most underrepresented part. No thoracic and lumbar vertebrae were recovered. As with caprines, this sparse presence of trunk elements could not have been caused by a high degree of fragmentation and/or by the difficulty in identifying vertebrae remains on a taxonomic level, since, as mentioned above, only four rib fragments and one vertebra from medium-sized mammals were documented in the assemblage.

The anatomical representation of cattle is more balanced than that of caprines and pigs (Fig. 6). All the body parts were documented, with the presence of elements of the head, the proximal hind limbs and forelimbs, the trunk and the distal limbs. The best represented elements are the metacarpals and metatarsals and those least represented are vertebrae and ribs. Despite the underrepresentation of trunk parts, we documented 43 rib fragments and 47 vertebrae fragments from large mammals. These remains unidentified in taxonomic terms, but were probably from cattle or equid specimens. Therefore, unlike sheep/goats and pigs, they were present in the sample. However, due to their high degree of fragmentation, their species could not be determined.

Equid anatomical representation reveals a similar pattern to cattle remains. All body parts were documented, with elements of the head, the proximal hind limbs and forelimbs, the trunk and the distal limbs (Fig. 6). The best represented elements were the radius, metacarpal and metatarsal and those least represented were the ulna, vertebrae and ribs. As in the case of cattle, this sparse representation of trunk elements may have been due to their high degree of fragmentation. Most could not be determined at the species level and were classified in the generic large mammal category that includes cattle, equids and large deer.

The red deer elements consisted of eight antler fragments, a mandible fragment, a metatarsus fragment, a calcaneus and a first phalange. Roe deer parts consisted of two metatarsus diaphyses. The bear is represented by a canine tooth and the lagomorph by a femur diaphysis.

4.4. Anthropogenic modifications

Of a total of 896 bones, 307 (34 %) present helical fractures. Most of these fractures are found in the bones of sheep/goats (36 %), pigs (48 %) and cattle (42 %), although they are also documented in dogs (27 %) and equids (13 %) remains (Fig. 7). At the same time, 44 fragments present anthropogenic marks (cut, chops and saw marks) from animal's processing. They are mainly found on cattle, sheep/goat and pig bones, although they are also documented on three equid remains (Fig. 7). No butchery marks have been documented on dog remains.

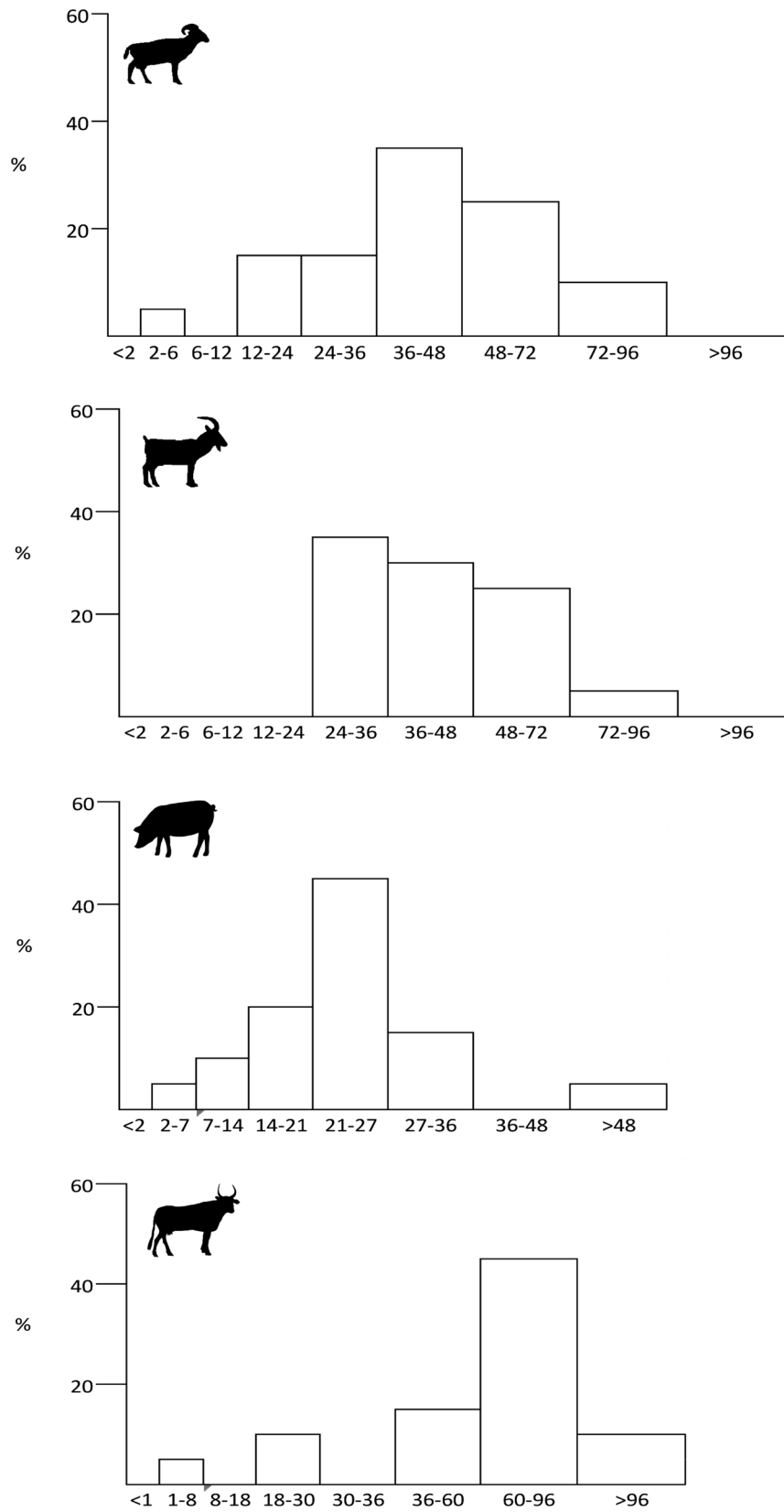


Fig. 5. Relative percentages of mandibles by ages (in months) for sheep (n: 29), goats (n: 16), pigs (n: 16) and cattle (n: 30) at Can Rubió.

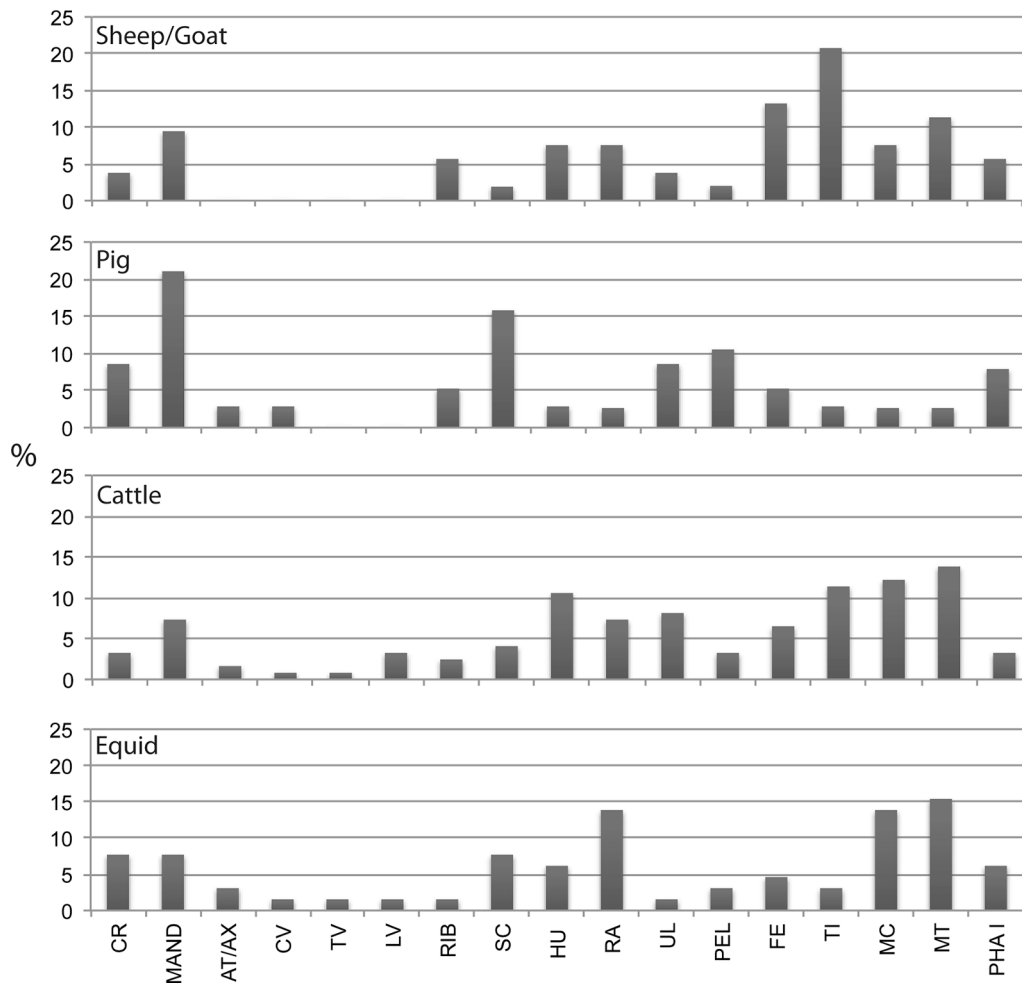


Fig. 6. Anatomical representation by MNE for sheep/goats, pigs, cattle and equids at Can Rubió.

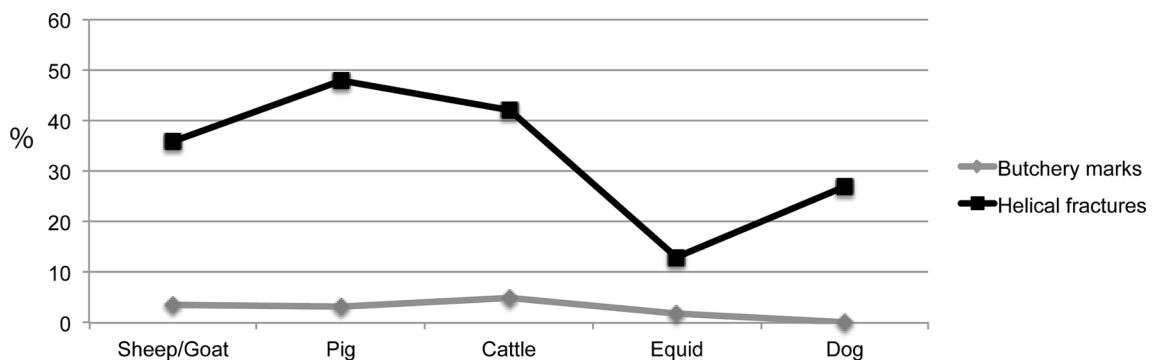


Fig. 7. Percentage of butchery marks and helical fractures documented on sheep/goat, pig, cattle, equid and dog remains at Can Rubió.

5. Discussion

The study of the faunal remains recovered from the Can Rubió archaeological site has allowed us to put forward a series of hypotheses on the production and consumption of animal products at the settlement, as the faunal remains correspond to waste from their processing and consumption.

The first thing to note is the absence of imports that in this case would have been remains of marine resources, such as oysters or fish. At the same time, the documented wild species are those present in the catchment area around the site (red deer, bear, roe deer) and in a very small percentages compared to the domestic mammals. Therefore,

although the meat from game, such as red deer, roe deer and hare, could be eaten, domestic animals were the basis of the diet at Can Rubió.

In terms of domestic species, a highly significant predominance of cattle remains compared to other taxa has been documented (40.51 % of the total NISP). Cattle presence in Roman sites of the northeast of the Iberian Peninsula is very variable and related to the function of each site (Colominas, 2013). Cattle remains represent the 38 % of the total NISP in the villa of Vilauba, the 20 % in the city of Llívia, the 19 % in the small villa of Tolegassos and only the 4,7% in the city of Emporion, just to mention four sites located in areas near to Can Rubió (see Fig. 1 for the location of these sites). The study of kill-off-patterns shows that cattle at Can Rubió were most likely to have been bred and raised in the

settlement, as the presence of individuals of between 1 and 8 months and over 96 months has been documented. This hypothesis does not exclude that some cattle were not bred at the site, but rather collected from the surrounding region. The study of the anatomical representation supports the hypothesis, as all parts of the skeleton have been documented fairly homogeneously. Slaughter patterns also show that these cattle were mostly exploited for traction and/or load-bearing before their meat was consumed, as most of the individuals remained alive until they were 60–96 months old. When raising cattle solely for meat, the optimum slaughter age is around two years old, when the animal had reached its full size. Beyond that, the size gain of the animal relative to its food intake begins to decline (Oueslati, 2006). If cattle were being used primarily for their meat, a much larger proportion would have been slaughtered at earlier ages.

The economic importance of equids, principally horse, must also be highlighted at this site, as it is the second most important taxon in quantitative terms (23.55 of the total NISP). This is very unusual in Roman settlements in the northeast of the Iberian Peninsula, where normally very few *equidae* remains are found (Colominas, 2013). Horse remains represent the 10 % of the total NISP in the city of Llívia, the 1,8% in the villa of Vilauba, the 1,6% in the city of Emporion, and just the 0,1% in the small villa of Tolegassos. Diverse studies have shown that the large numbers of *equidae* at some settlements can be directly related to the presence of military camps and their provisioning (Hamilton-Dyer, 2001; Johnston, 2009; Vosen and Groot, 2009; Albizuri and Nadal, 2014). No remains of young individuals have been documented at Can Rubió, with those of adult individuals predominating at 94 % and only 2.5 % of elder individuals. This leads us to suggest that these animals were probably not being bred in the settlement, but were acquired at an immature age to be trained and exploited in the establishment for riding, transportation and/or cargo-bearing tasks. Once horses reach that age, they are usually considered to be adults and can start to be ridden (Arbogast et al., 2002). It has been proposed that the ideal age for cavalry horse recruits would have been between four and seven years old, once they had reached maturity and were at the peak of their physical prowess but were still young enough to be trained (Johnston, 2009). The study of the anatomical representational frequencies supports this hypothesis, as all parts of the skeleton have been documented fairly homogeneously. The fact that we have documented some anthropogenic marks and fractures on some of the *equidae* remains, together with the fact that they were recovered mixed with the remains of the other taxa and had not been treated differently, inclines us to propose that the carcasses of this taxon may have been processed, either for the sporadic consumption of their meat or for obtaining, for example, skins or glue, among other products (Grant, 1989; Vanderhoeven and Ervynck, 2007).

In economic terms, we found sheep, goats and pigs in a secondary position. Sheep kill-off patterns show that this species was primarily used to obtain wool. The presence of individuals of between 2 and 6 months could be evidence of the reproduction of this taxon at the site and therefore their breeding. On the other hand, caprine body part representation shows the almost complete absence of some elements (vertebrae and ribs) and the predominance of others (femur and tibia). This uneven representation may be evidence of the importation of certain body parts and not the live animal and/or the entire skeleton. The fact that some sheep between the ages of 12 and 36 months were also documented could indicate that, apart from raising sheep for wool, portions of meat may also have been acquired at the optimal point for consumption. The goat kill-off pattern shows a predominance of the exploitation of this taxon for meat production, as most individuals were slaughtered between the ages of 24 and 36 months. Slaughtering is also observed once this optimal meat point had been passed, which could be evidence that goats were also used for their milk and were therefore bred in the settlement. On the other hand, the fact that no unborn, infant or senile individuals have been documented means we cannot propose reproduction of this taxon at Can Rubió. If we add to this the data

obtained from the study of the anatomical distribution, we could propose the acquisition of certain portions of goat meat in the settlement.

Pigs at Can Rubió were generally slaughtered at a younger age than cattle, sheep and goats, predominantly between 21 and 27 months old. Pigs were mainly exploited for products such as meat and fat. It is therefore hardly surprising that the majority of the pigs were slaughtered at the most economically opportune moment. Some individuals of between 2 and 7 months and over 48 months documented may be evidence of the reproduction of this taxon in the settlement. The study of the frequency of the anatomical parts also shows, as for goats, a possible acquisition of certain portions of meat, such as shoulders or hams. The low presence of ribs and vertebrae could also be showing an export of these meaty elements.

Therefore, archaeozoological data show that Can Rubió may have specialised in keeping horses (and perhaps also donkeys and mules) to be used as mounts, pack animals and/or for traction, as well as cattle for similar purposes (traction and/or carrying loads). The people who lived at Can Rubió also kept some sheep and goats for wool and milk and some pigs for meat. At the same time, a possible acquisition of salted, dried or smoked meaty limb cuts and a possible export of smoked ribs are documented, both from sheep/goats and pigs.

If we link all this information to that gleaned from the study of the other finds from Can Rubió (metal and bone objects), we appear to be looking at a military or logistics-administrative settlement, as the bone styli and specially the *fibulae Aucissa* and *Alesia*, could be considered military-associated finds. It is also the case of the two spear ferrules or the *catapulta* stones, being strange to document them in a private context, even in a veteran property. There are also some pottery finds and the bronze cup that are not very common in rural properties. Therefore, Can Rubió was not a typical rural farm or *villa* if we take into account the archaeological and archaeozoological remains. At the same time, the documented structures are totally unusual with no parallels in the northeastern countryside. The complex hydraulic system and the absence of other common rural structures (silos, stores or *cella vinaria*) allow for not considering the site as a rural farm or *villae*. The structures reflect the considerable effort put into the water supply, which was obtained from wells and stored in two types of reservoirs: a *lacus* to supply of clean water to the inhabitants and animals of Can Rubió and a pond with an indeterminate function. All the structures reflect Roman metric measurements that can be linked to regular planning, which would also be logical in a logistical-military context. The Latin authors describe ponds associated with livestock production. Thus, Columella (6, 14; 6, 30), a 1st-century-AD author, refers several times to the existence of *piscinae*, i.e. ponds of a considerable size (different to *laci* that were smaller) in stockbreeding operations, precisely of oxen and horses. The horses were required to swim in ponds (known as *piscinae*) for certain treatments (Columella, 6, 40). In fact, in Roman cavalry training both soldiers and horses were had to swim (Vegetius, *Epitome rei militaris*, 10).

The military presence in this area may be surprising, with the civil wars over and a long way from the frontlines of the Cantabrian Wars. However, we have several indications of this presence. On the one hand, the establishment of *Caesarean* settlers around 42–40 BC in *Emporion* itself, with veterans from Caesar's armies, is well known (Livy 34, 9, 4). Apart from this demobilised contingent, small units (*vexillationes*) were deployed in the region for surveillance, road control and provincial infrastructure support. Moralejo (2019) has recently proposed the presence of a *vexillatio* in *Emporion*, due to several inscriptions from the 1st-2nd centuries AD (IRC III, 3; IRC III 162) found in the site, especially one dedicated to Jupiter by the *vexillatio* of the Legio VII Gemina, which was stationed in the region (IRC III 14). Also documented in the vicinity of the town (near the *mansio* of Iuncaria, La Jonquera) is a *beneficiarius consularis* (IRC III 184), a senior officer linked to the supply of the army and the protection of communication nodes. This is further confirmation of a military presence in the Empordà area. It would also explain the location in the Emporitan hinterland of an establishment specialising in

the maintenance of horses and cattle, animals linked to military logistics tasks.

At the same time, palaeo-environmental studies carried out in the Can Rubió area (Vall d'en Bas) show that it would have been very suitable for grazing, thanks to a higher rainfall than in the neighbouring regions (Revelles et al., 2017, 53). They also show that from the 2nd century BCE the oak, beech and fir forest receded and was replaced by pine, shrubs and ruderal species (Revelles et al., 2017, 53). This phenomenon was accentuated shortly before the change of era, coinciding with the founding of Can Rubió, although it was not accompanied by an expansion in agriculture, as no increase is seen in such species as *cerealia* or *poaceae*. This leads us to consider that the regression of the forest was due to a need for more pastureland in the area.

In this respect, based on all the data presented in this article, we propose that Can Rubió could have been a military-logistics facility whose main function would have been the breeding and exploitation of horses and cattle for the Roman army.

There must have been multiple centers like Can Rubió spread throughout the conquered Hispanic territory, each one with its specificities depending on its functionality. In this sense, the presence of piscinae, of fibulae Aucissa and Alesia, of bone styli, of spear ferrules and catapult stones, together with the high presence of cattle and equid remains, has allowed to suggest in this specific case this functionality of a military-logistics centre.

6. Conclusions

Horses and their close relatives were crucial to the expansion and success of the Roman Empire. This was partly a result of the military using equids, not only for the cavalry but also as mounts for officers, to maintain communications and for the transport of people and goods within the Empire and across its borders (Hyland, 1990; Johnston, 2009). In this article, we have shown that Can Rubió could have been one of those military-logistics facilities that would have supplied the Roman army with animals for riding and as beasts of burden. The animals destined for the army would have grazed on the surrounding pastures.

The archaeozoological study also documented the supply of animal products to the facility. Although it has been proposed that the Roman provincial administration supplied food and products to the army (Thomas and Stallibrass, 2008; Vosen and Groot, 2009), it seems that it was up to Can Rubió to procure its own goods, such as wool, leather, milk and, of course, meat. In this respect, we propose that the inhabitants of Can Rubió, apart from obtaining products from the local/regional population (requisitions or compulsory purchases), another important source could have been the resources they produced themselves.

The re-study of the archaeological structures and the metal and bone finds from Can Rubió, as well as the study of the faunal remains, has allowed us to answer some questions about this settlement, including its functionality. At the same time, however, it has raised many new ones, such as who supplied it with the horses. Several possibilities have been put forward. They include demanding equids in payment of taxes; auxiliaries bringing their own mounts; requisitions from landowners; tributes from client kingdoms; direct purchases; the capture of enemy animals; and the setting up specific stud farms (Thomas and Stallibrass, 2008). We look forward to answering some or all of these questions in future studies of the site.

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CRedit authorship contribution statement

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acquisition, Visualization, Writing – original draft, Writing – review & editing. **Jordi Guardia:** Formal analysis, Funding acquisition, Writing – review & editing. **Karin Harzbecher:** Formal analysis, Funding acquisition, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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