ECONOMIC DRIVEN CULTURAL CHANGE THROUGH FAUNAL ANALYSIS: VILLA DE VILAUBA

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ABSTRACT

Katie Tardio: Economic Driven Cultural Change through Faunal Analysis: Villa de Vilauba
(Under the direction of Jennifer Gates-Foster)

This thesis examines the participation of the Villa de Vilauba, located in the Roman province of Hispania Citerior, in the Roman economic system as assessed through the analysis of faunal assemblages from the first to the fifth centuries CE. The faunal assemblages of the villa are contextualized within their regional economic context and compared to the faunal record from the region of Roman Tarraconensis, and more widely, the rest of the province of Hispania. This allows the author to gauge the effect of the Roman conquest on livestock production within the villa, and on the region more broadly. Focusing on the three main domestic livestock types of the ancient Mediterranean (ovicaprine, pigs, and cattle), it is concluded that villa owners actively determined what fauna they would incorporate into their estates and, in doing so, they choose to incorporate Roman foodways and husbandry with their own.

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Introduction

Iberia, located along the rugged northwest *limes* of the Roman Empire, was Rome's earliest province in the west. The inhabitants of the southern and eastern coasts of this peninsula were no strangers to foreign influence, having contact with the Phoenicians, Greeks, and, later, the Carthaginians, before Rome subdued the region and incorporated it into its empire.[1] The influence that Rome had on provincial peoples, such as those conquered in Iberia, has been part of a heated debate concerning the nature of Roman imperialism in the west. Though the dispute over the type of social, cultural, military, and economic power Rome wielded over its territories is entrenched in modern scholarship,[2] the use of faunal data to review cultural change in Spain is a relatively new development. In order to address this, I examine faunal evidence for both the pre-Roman and Roman phases at Villa de Vilauba.

The participation of the Villa de Vilauba (Figure 1) in the Roman economic system is assessed through the analysis of faunal assemblages from the first to the fifth centuries CE. The Villa de Vilauba, located in the Roman province of Hispania Citerior, is a Roman agricultural production center located near the eastern coast of Spain. Its function, location, and especially its numerous detailed archaeological reports, make it ideal for addressing Roman impact on animal economy in a provincial agricultural center. The faunal assemblages of the villa, once contextualized within their regional economic context, are compared to the faunal record from the region of Roman Tarraconensis, both before and after the Roman conquest, and, more

[1]Richardson 1996: 9-41.

[2]Haverfield 1923; Millet 1990; Woolf 1998; Mattingly 2011; Webster 2001.

widely, the rest of the province of Hispania (Figure 2). This is done in order to gauge if the Roman conquest had an effect on livestock production within the villa and the area overall. The faunal evidence from this production center can also be used to assess the villa's involvement in both local and long-distance Roman trade networks[3]. Since long distance trade networks are well attested in the Roman Period, and given this villa's location just outside of ancient Tarraco and near the Mediterranean coast, villa owners would have had an easily accessible international market.

My goal is to contextualize this villa within its cultural-economic boundaries, based on animal remains within the empire. To do this, Anthony King's vocabulary on the 'Romanization' of provincial diets, discussed below, is essential to help explain the phenomena of dietary change.[4] King bases his analysis on a core and periphery model, where Rome is at the center, creating a model for the provinces to follow. Published faunal data, focusing on measures of abundance of taxa and biometric data, will be used to test the predictions of King's models at Vilauba. Using these data, I will assess how the individuals at Villa de Vilauba responded to Roman influence and explore the degree to which local agency is evident in animal husbandry decisions.

'Romanization' with Regard to Faunal Remains

Romanization is a complex and highly debated issue that has been addressed in various academic circles, beginning with Theodore Mommsen in 1885.[5] This descriptive term used to describe the process of transformation brought about by interaction with Rome has taken many

[3]This study will focus specifically on bovine, pig, and sheep/goat.

[4]King 1988; 1999; 2001.

[5]Mommsen 1995.

forms ranging from a "civilizing mission" of the Romans,[6] to a top-down elite driven phenomenon.[7] Other scholars, such as Mattingly and Webster[8], attempt to find middle ground that assumes a reciprocal view of the Romanization process.[9] Central to the definition of 'Romanization' is the question of what actually was 'Roman'. Barrett has pointed out that Roman culture was neither homogeneous nor static.[10]

In the context of the Iberian Peninsula, there has been a tendency to see 'Romanization' as a process that affected the region in its entirety, in one form or another.[11] These conclusions were based largely on what the ancient sources pointed out as hallmarks of *Romanitas*.[12] As part of this approach, foodways have been seen as a productive way to address 'Romanization,' or more broadly cultural change during increased interaction with the Roman Republic and Empire, because dinning preferences and habits are often an important part of identity, including social class.[13]

For example, diet, both of the colonizer and colonized, is often altered as a result of cultural contact.[14] At the most basic level, pork consumption is associated by many scholars,

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[6]Haverfield 1923.

[7]Millet 1990; Woolf 1998.

[8]Mattingly 2011; Webster 2001.

[9]This statement refers to the idea that both the Romans and colonized/conquered exerted influence on one another.

[10]Barrett 1997: 51.

[11]Lowe 2009: 1; Keay 2001: 117-119; Discussed by Livy, Pliny, and Strabo.

[12]*Romanitas*: refers to the collection of political and cultural concepts and practices by which the Romans defined themselves. The geographer Strabo (1.4.9) distinguishes between a civilized society and a barbarian one on the basis of law, political life, education, and rhetoric. Tacitus, on the other hand, (*Agricola* 21) sees the appearance of Roman architecture, the use of Latin, Roman dress, and luxury amenities (baths, theaters, etc.) as an indication of 'Romanness'.

[13]Counihan & Esterik 2013; Goody 1982; Higman 2012.

[14]Driesch 1992; Albarella, Johnstone, Vickers 2008; King 1999; 2001; MacKinnon 2010; Lauwerier M. 1988.

especially King, with the concept of 'Romanization'.[15] It was generally the meat of choice in Italy and most commonly used in the recipes recorded by Roman author Apicius.[16] Modern zooarchaeological focus on the Roman occupation of the west has been influenced largely by the evidence produced by Anthony King, who states that Romans played an active role in shaping the diets of their provinces.[17] He describes two broad trends that occur across the empire: he calls these two trends the "Rome" pattern and the "military" pattern, respectively.

The "Rome" pattern is defined by a high percentage of pigs (*Sus scrofa domesticus*), which he claims most likely corresponds to a high-status diet, especially with the presence of pork from young animals.[18] On the other hand, the "military" pattern, originating in the army stationed in the north of the Alps throughout the first century CE, consists of higher consumption of beef.[19] There are two possible reasons that the "military" pattern differs from that of the "Roman." The first, which King posits, is that legionary troops who often hailed from Gaul and northern Europe preferred beef.[20] The second, and more probable option is that the army needed cattle not only for food, but to transport their equipment and for their valuable leather hides.[21] It would follow that Roman cultural inclinations would be the catalyst for pork consumption and

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[15]King 1999; 2001; MacKinnon 2001; 2010. MacKinnon demonstrates the presence of this pattern in Roman Carthage.

[16]MacKinnon 2001; 2010: 169; Flower and Rosenbaum 1958.

[17]King 1988; 1999; 2001.

[18]King 1999: 188-9. High percentage of *Sus scofra domesticus* is defined as greater than 50% of the NISP.

[19]King 2001: 220.

[20]King 1999: 188-9; 2001: 210.

[21]Morley 2007: 576.

the army for beef consumption. King also sees pork as a luxury good, associated with provincial elites and cities.[22]

King argues that though trends in dietary preference roughly correspond to the different climatic and topographic zones of the provinces, the patterns of faunal use were not solely environmentally determined, since there is evidence for Roman influence on livestock growth and consumption.[23] His working hypotheses are that "there was a dominant diet originating in Rome itself that was imposed on or taken up by provincial societies" and that "agents of the Roman state, principally the army, also had dietary patterns that were imposed on or copied by the peoples of the provinces."[24] This dichotomy that King sets up, although over-simplified, provides a useful analytical framework within which most zooarchaeological research has been conducted in the Roman west.

However, several regional studies call these trends into question.[25] An increase in the frequency of pigs (or cattle), relative to other livestock, often coincides with 'Romanization' in many areas of the empire; however, the situation is much more complex, and marked by numerous natural and social factors, such as the degree of integration into the Roman economy, or local environmental and land use practices. King's model highlights animals as a source of primary products, particularly meat, not as providers of labor and secondary products; such has milk, leather, and wool. Thus, the dominant model for interpreting the impact of Roman conquerors on diet does not take into account the secondary uses of livestock or histories of local land use practices.

[22]King 1999: 188-9; for a full discussion of the importance of pork to Roman diet see MacKinnon 2001.

[23]King 1999: 188.

[24]King 2001: 210.

[25]Teichert 1984; Lauwerier 1988; Driesch 1992; Audoin-Rouzeau 1995; Peters 1998; Albarella et al. 2008; MacKinnon 2004.

Another major theme in the literature of the 'Romanization' of livestock, stemming from King's military pattern, is the appearance that "improved breeds," of larger cattle, appear after the Romans conquer a region. These studies typically examine military camp sites, and the small towns that sprouted up next to them, to determine the effect of Roman presence on cattle size. The *limes* settlements along the Dutch Eastern River, in *Germania Romana* and *Germania Libera*, and in Britain, as well as villages throughout Gaul, have demonstrated an increase in cattle size and robustness after the arrival of the Romans.[26] Lidia Colominas investigates this phenomenon in North-Eastern Spain, and her findings are incorporated into the analysis of Vilauba below.[27]

In addition to studying the biometrics of the ancient livestock, countless regional studies have been done to assess the validity of the model discussed above. Michael Mackinnon has worked at sites in Portugal, Tunisia, Sicily, Italy, Turkey, to investigate the impact of Roman contact and colonization on foodways and animal husbandry.[28] Each of his studies, including that of the Italian Peninsula itself, reveal local and regional variation in livestock practices, highlighting the importance of analyzing the local and regional, as well as the general, and complicating King's trends.[29]

While King's general overarching patterns have been widely accepted as relevant to the trends in the empire overall, they fail to acknowledge regional and local variation in foodways or the complexities of animal husbandry. Instead, it is more productive to look at the regional patterns not only for food consumption, but also for animals as sources of labor and secondary

[26]Teichert 1984; Lauwerier 1988; Driesch 1992; Audoin-Rouzeau 1995; Peters 1998; Albarella et al. 2008.

[27]Colominas, Schlumbaum, and Sana, 2009; Colominas and Sana 2009; Colominas 2009; Colominas 2013.

[28]MacKinnon 2001; 2004; 2007; 2010.

[29]MacKinnon 2001; 2004.

products such as milk, leather, and wool. The work of Colominas, and others interested in the effects of the Romans on livestock size, provide another angle from which the faunal data can be studied.[30] A more holistic view of the function of domesticated animals, specifically in the context of specific villa sites, allows for the reinterpretation of these agrarian economic centers and an opportunity to assess the role of individual agency in economic decision-making. Since King's "Roman" and "military" pattern vocabulary is well known and widely used, it will be employed to discuss the respective trends (increase in pork or beef consumption), but will not carry the connotations of 'Romanization'. Using zooarchaeological evidence, this paper examines not the 'Romanization' of the Villa de Vilauba, but focuses on the complex systems of cultural change occurring when contact is made with a foreign power. Economic benefits for the selection of particular livestock, which played an integral role in the success of the villa economy, are a driving force for villa farmers.

'Villa' vs. Farm

There is no doubt that villas and farms were a key aspect of the rural landscape of the Roman Empire; however, what differentiates them can be difficult to determine. There is little archaeological evidence for small farms, and the ancient sources only call upon them to invoke bucolic ideals; ideals which larger villa complexes were meant to recall. [31] There are four main types of villa complexes in the Roman world, though there are countless variations of these types. These types include the *villa urbana* (villa located within the city), *villa suburbana* (villa located outside, but close to a city), *villa maritima* (luxury villa located on the coast), and the

[30]Colominas, Schlumbaum, and Sana, 2009; Colominas and Sana 2009; Colominas 2009; Colominas 2013.

[31]Vigil *Eclogues;* Horace *Odes*.

villa rustica (villa located in the open countryside).[32] Villa de Vilauba is a large *villa rustica* that was explicitly used for production; therefore the discussion of villas below will pertain to this villa type.[33]

Rivet defines a villa as, "a farm, which is integrated into the social and economic organization of the Roman world."[34] Whereas Marzano classifies a villa as a "building(s) equipped with residential quarters and agricultural processing and storage facilities at the center of an estate devoted to either agriculture, animal, husbandry, or both."[35] The first definition deals with a villa's position within the Roman world, while the second specifies the facilities within a villa. Both are necessary to gain a sense of the working environment these large farmsteads encompassed and the networks to which they belonged.

For the purposes of this analysis, a villa will refer to a large farm with residential quarters that produces a surplus, allowing the villa to participate in an external economic system, whether it is regional or empire-wide. Percival notes that a villa could not exist in isolation, and that they possess certain connections to markets, craftsmen and patterns of exchange.[36] He notes that during certain periods villas have the potential to be self-sufficient, producing only for themselves, but he also claims that in this stage, they are no longer villas but rather simply large farms.[37] Therefore, a defining aspect of a villa economy is its ties to the outside world. This fact is vital when looking at Villa de Vilauba. Because of its surplus, the desire for economic stability

[32]Johnston 2004: 7-15.

[33]Castanyer and Tremoleda 1999; Colominas 2013.The term used by the ancient Romans to denote a villa set in the countryside, often as the hub of a large agricultural estate.

[34]Rivet 1969: 177.

[35]Marzano 2015: 197.

[36]Percival 1989: 5.

[37]Percival 1989: 5.

and growth should be seen in the owner's decisions regarding livestock and agricultural production.

History, Economics, and Food Culture of the Region Surrounding Villa de Vilauba

Romans in Spain

The provinces of the Iberian Peninsula were among Rome's earliest in the west, with the pacification lasting roughly 200 years, from the late third century BCE to the age of Augustus.[38] Until recently, Classical scholars have largely overlooked the range of cultural variation within the peninsula prior to the arrival of the Romans. During the Bronze Age, western Andalucía, eastern Andalucía, south-eastern Spain, eastern Spain between the Segura and the Ebro, the lower Elbro valley, the northeast coastal Spain, and the northeastern interior can all be distinguished from one another in terms of their settlement patterns, social organization, religious practices and artistic traditions.[39] (Figure 3). The Iberians dwelling along the Mediterranean coast who had sustained contact with the Phoenicians, Greeks, and, later, the Carthaginians were the most well known in the ancient world and by the fifth century BCE had come to share a number of broad cultural characteristics. [40] Rome would have its first conflicts with these coastal peoples.

During the Republican Period, warfare was Rome's most powerful instrument for domination, though Spain in particular was difficult to pacify and was won only with staggering cost to Rome. The result of these early expeditions was the creation of the two territories of *Hispania Citerior* and *Hispania Ulterior* in 197 BCE. Economically speaking, Rome was able to

[38]Keay 2001: 117.

[39]See Ruiz and Molinos (1998) for a summary of all the evidence; concerning food culture, only regional data is available in the publication.

[40]Keay 2001: 124.

retain control of the Iberians and ensure the exploitation of their rich metal and agricultural resources.[41] The period between the mid first century BCE and the late first century CE was crucial in both cultural and economic development. Most colonies in the territories that would make up the provinces of Tarraconensis and Baetica were founded right after the end of the Sertorian war in 72 BC.[42] Roman involvement in the region increased dramatically during the civil wars of 49-45 BCE.[43] According to Suetonius, Caesar settled 80,000 citizens in colonies in Italy and the West, including the Iberian Peninsula.[44] Augustus' final pacification of the coastal regions of the peninsula and the establishment of the *annona*, or tax of grain and other foodstuffs to be sent to Rome, would integrate the provinces into the Roman economy and increase agricultural production and rural settlement.[45] This extremely brief and simplified outline is meant to frame the next the following two sections that focus more closely on the advent of villas in northeastern Spain and their agricultural production.

Appearance of Villas in Tarraconensis

The establishment of the *colonia* and *municipia* system by Caesar and Augustus restructured the rural landscape and thus facilitated the development of more rural settlements in Iberia, as well as in other provinces.[46] Particular concentrations of villas were located in the regions of Baetica and on the coastal plains of Catalonia, where the Villa de Vilauba is located. It

[41]Keay 2001: 129. *Iberians* here refers to the coastal populations discussed above.

[42]Marzano 2015: 199.

[43]Lowe 2009: 87.

[44]*Caesar* 42.1.

[45]Lowe 2009: 87; Garnsey 1988: 231: The *annona* tax was part of the food supply system for the Roman Empire. It required certain areas of the Empire to provide foodstuffs, especially grain, to either the city of Rome (*annona civica*) or to feed the Roman army (*annona militaris*).

[46]Lowe 2009: 87.

is argued that villas arose during the Roman Period, though we should not take this to mean that large farms did not exist before the Roman conquest.[47] Vilauba, and other villa sites, took over earlier farms and expanded them.[48] Many of these settlements sprang up in the valley of Baetis (southern Spain), where important mines drove Rome's interest in the territory. However, the region was also very fertile, and soon acquired the reputation for abundant agricultural production in wheat, wine, and oil.[49] Baetica and Tarraconensis became important producers of olive oil and wine. [50] Tarraconensis, with its capital at Tarraco, was considered one of the most 'Romanized' of the whole empire by contemporary sources.[51] Every larger town in this area had a rural territory to help supply the city with food.[52] It is not an accident that the most urbanized areas, such as Tarraconensis, were also located in the principle agricultural zones.[53] The grandeur and size of these large country homes and farms increased during this time. Ancient Tarraconensis displays a mixture of large villas and small farms.[54] Although economic conditions did favor the growth of production, as will be discussed later, rural settlement involved a hierarchy of sites rather than a homogeneous villa-culture.[55]

[47]Lowe 2009; Keay 2001.

[48]Castanyer and Tremoleda 1999.

[49]Marzano 2015: 200.

[50]Peña Cervantes 2010:158-9.

[51]Discussed by Livy, Pliny, and Strabo, scholars still approach this area with the idea that is was particularly Romanized.

[52]Curchin 1991: 126.

[53]Curchin 1991: 126.

[54]Curchin 1991: 127.

[55]Curchin 1991: 127.

Agricultural Production in Tarraconensis

From the reign of Augustus to the Antonine period, the population of the Roman Empire, including the city of Rome itself, increased by one-third, which in turn increased the demand for food.[56] Agriculture and animal husbandry provided the principle source of wealth for elites, while employing a vast majority of the Empire's citizens and slaves in production activities.[57] During this period, villas began emerging throughout the western provinces and as mentioned above, Tarraconensis saw the increase of rural settlement with wine and olive oil production and exportation from the first century BCE onwards.[58] This is attested by the number and type of Spanish amphorae found throughout the Mediterranean,[59] and the installation of presses within villa compounds.[60] The cost of press installations is unknown and would have varied, but these machines took up one or two rooms and are indicative of production beyond self-sufficiency. In terms of olive oil production, a press meant substantial production because it is not necessary to have a press for the amounts of oil consumed by a household.[61]

Animal husbandry was essential to agricultural production at this time. Bovines were needed to plough wheat and vegetable fields and to transport agricultural goods. They provided dung for fertilizer and dairy products, while raising sheep for wool, goats for milk, and pigs for consumption permitted villa owners to make use of land holdings not suitable for farming. This extra income allowed them to increase crop production and make substantial profits on

[56]Kehoe 2007: 545; Through the *annona* tax, the provinces were required to help feed Rome.

[57]Kehoe 2007: 548; Leveau 2007: 652.

[58]Marzano 2013: 118; Pliny *NH* 14.71.

[59]Marzano 2013: 188; Brun 2003.

[60]Marzano 2013:108; Kehoe 2007: 552.

[61]Kehoe 2007: 552.

secondary goods that would carry them through leaner years.[62] This villa system became so successful that by the first century CE, Domitian passed an edict prohibiting the creation of new vineyards in the provinces.[63]

Diet and Animal Husbandry of Pre-Roman Spain[64]

In the pre-Roman, Iberian, era of the peninsula (2nd millennium BCE - 3rd century BCE), the faunal record is dominated by the remains of domestic sheep (*Ovis aries*) and goat (*Capra hircus*), although most faunal reports do not differentiate between the two species.[65] (Table 2). It is clear that these animals were used not only for their meat, but also for milk and wool production as is evident in mortality profiles, which include an abundance of older female sheep and young males.[66] Cattle (*Bos taurus*) were next in overall abundance in the assemblages.[67] These valuable animals, however, were used mainly for labor and were slaughtered only when their utility had diminished. Pigs (*Sus domesticus*) were the least common domestic animal during this period, if they were present at Iberian sites at all.[68] Most of the Iberian peninsula is located in the Mediterranean climate zone, characterized by hot, dry summers which, in the Iberian case, are reinforced by the continental effects of the large land

[62]Kehoe 2007: 552; Marzano 2013: 124; Leveau 2007: 652; Frier & Kehoe 2007: 138.

[63]Suetonius *Dom.* 7.2.15. It should be noted that this episode could be made up by Suetonius, but nevertheless, there is archaeological evidence to back up the influx of Spanish products into the Italian Peninsula.

[64]This study will focus specifically on bovine, pig, and sheep/goat usage, though there were other species present. See Table 2.

[65]Albizuri and Nadal 1999; Miro 1989; King 1999; Marti 1994; Colominas 2009; Valenzuela 2008. Though Greek and Phonecian traders had been in contact with this region, the listed sources did not find discrepancies in the faunal record from before and after contact.

[66]Albizuri and Nadal 1999; Miro 1989; King 1999; Marti 1994; Colominas 2009; Valenzuela 2008.

[67]Albizuri and Nadal 1999; Miro 1989; King 1999; Marti 1994; Colominas 2009; Valenzuela 2008; It should be noted that cows provide significantly more meat than ovicaprines.

[68]Albizuri and Nadal 1999; Miro 1989; King 1999; Marti 1994; Colominas 2009; Valenzuela 2008.

mass.[69] Because of this climatic zone, ovicaprine herding was the most prevalent form of livestock raising on the peninsula prior to the Roman period, up through the modern period.[70]

Villa de Vilauba

The Roman villa site of Vilauba is located in the northeast of Spain, in the municipality of Camós, in the district of Pla de l'Estany (Girona), the ancient province of Tarraconesis, on the south side of a small valley (Figures 1 & 2). The villa was occupied from the last quarter of the second century BCE to the first decades of the seventh century CE, and its occupation history has been divided into four phases by the archaeological field team (See Table 1):[71]

Phase	Time Period
Pre-Roman Period	Last quarter of the 2nd century BCE to the second half of the 1st century CE.
Early Roman Period	Second half of the 1st century to the end of the 3rd century CE.
Late Roman Period	End of the 3rd century to the end of the 5th century CE.
Visigoth Period	End of the 5th century CE to the beginning of the 7th century CE.

Table 1: Phasing of Villa de Vilauba

[69]Gomez-Pantoja 2001: 177-8. The "continental effect" could also be called "the big land mass effect" because it focuses on the differences between water and land. Basically, water holds temperature better than dirt. This means that the temperature over large stretches of land is going to change more dramatically than the temperature over water.

[70]Gomez-Pantoja 2001; Fernandez & Echevarria 2015.

[71]Castanyer and Tremoleda 1999: 18-19; The excavation named the "pre-Roman" period after the phases of the building, not the entrance of Romans into the region.

This study will look at the faunal remains from the first century CE through the fifth century CE.[72] This villa was chosen as a case study because it has been thoroughly documented, with detailed faunal reports published from each excavation season.

Vilauba functioned as an agricultural center in the middle of the Catalonian region and, although it does have its collection problems, it will serve as the basis for this case study. Faunal documentation for pre-Roman sites has been well-attested in this area for both villa and town sites, and it must be taken into consideration that the faunal remains coming from this site begin in the early Roman period, after the Romans already had a significant presence in the area.

Villa Structure

All that remains of the pre-Roman villa are foundation stones.[73] During the early Roman period, the villa consisted of residential quarters and agricultural processing facilities (Figure 4). The domestic wing was made up of a central courtyard surrounded on the north, east, and west by a gallery giving access to the different rooms.[74] The industrial areas were separated from the domestic areas and consisted of various large rectangular structures, which appear to be either where the animals were stabled or where the different activities related to agricultural work, including crop processing, took place.[75] A small bathing complex connected to the residential wing was also part of this estate.

A fire at end of the third century marked the beginning of a series of structural changes characteristic of Late Roman Period villas. These changes included two new wings on the east

[72]There were no viable faunal samples recovered from before the first century CE and the Visigoth period is beyond the scope of this paper.

[73]Castanyer and Tremoleda 1999: 45.

[74]Castanyer and Tremoleda 1999: 55.

[75]Castanyer and Tremoleda 1999: 56.

and the south sides of the courtyard.[76] On the south side of the site, a series of new utilitarian structures that appear to have been cisterns and different facilities related to agricultural work were positioned around a press (Figure 5).[77] These additions increased the number of buildings used for agricultural production and made the residential and working areas less clearly separated. The study of these two sectors during the Roman phases has shown that Vilauba, although it was a modest villa, would be significant in its territory, with a theoretical agricultural area that ranges from a minimum of 50 hectares and a maximum of 85 hectares.[78]

Faunal Analysis and Discussion[79]

Materials and Methods

This analysis focuses on the three major domesticated animal groups at the villa: sheep/goats (*Ovis aries/Capra hircus*), pigs (*Sus domesticus*), and cattle (*Bos taurus*).[80] Other taxa were found on site, but are not considered because they were either found in small numbers or because they do not contribute to assessment of Roman involvement at the villa. The faunal remains for this study come from the strata associated with the early Roman and late Roman periods of the different excavation campaigns that have been conducted in Vilauba from 1982 until 1989. The sample set consists of 2,232 faunal remains (Table 3). Of this total, 1,250 species could be identified, representing 56% of the sample, while 982, the remaining 44%, are grouped

[76]Castanyer and Tremoleda 1999: 120.

[77]Castanyer and Tremoleda 1999: 120-1.

[78]Colominas 2013: 77. This is one of the largest villas in *Tarraconensis* but not in *Hispania* overall.

[79]The information this section (Faunal Analysis) is a synthesis of the faunal reports of Castanyer and Tremoleda 1999: 353-363; Colominas 2013; Colominas and Sana 2009, and therefore, will only be cited here. If information is coming from just one of those sources, or a different one, it is noted.

[80]These three groupings of animals are the main focus because they were not only the only significant species found at the site, they are also the only domesticated species, whose populations can be modified by directly by human behavior.

according to body size (i.e. large mammal; Table 4). All the samples are remains from meat production and consumption, collected by hand, dry-sieved through a 1/4-inch screen, and suffering from only slight carnivore gnawing.[81]

The remains were identified in the field and measurements were taken according to von den Driesch.[82] From these species classifications the number of individual specimens (NISP) and the minimum number of individuals (MNI) is rendered.[83] The age at death of individuals in each species is determined according to the degree of epiphyseal fusion of bones and tooth-wear.[84]

Biometric data was compiled and calculated using the log ratio method to examine changes in cattle body size over time at Vilauba.[85] This technique is employed to investigate variability in animal size through time and across space when analytical units of interest contain only small numbers of measurable skeletal parts.[86] This analysis is based on the assumption that different parts of the skeleton of an individual are harmoniously proportioned. Although the

[81]Castanyer and Tremoleda 1999: 353-363; Colominas 2013; Colominas and Sana 2009. Taphonomic processes are the conditions which animal and plant remains undergo as they decompose. By this statement I mean that all faunal assemblages underwent the same taphonomic processes, so there is no bias among the degradation.

[82]Driesch 1976. This is the standard handbook of measurement for zooarchaeological reports.

[83]Both quantifications are taken because MNI is at least as sensitive as NISP to effects of fragmentation. While MNI decreases with increasing fragmentation, NISP moves in two directions with fragmentation, increasing at low levels of fragmentation and decreasing at high levels of fragmentation. In addition, MNI appears more sensitive than NISP to the relative identifiability of different body parts. MNI may be a less representative descriptor of relative element frequency than NISP in highly fragmented assemblages. Therefore they act as counter balances for one another.

[84]Grant 1982; Silver 1980; Bullock & Rackham 1982; Levitan 1982. Epiphyseal fusion refers to the fusion of the epiphysis, or head, of a long bone to the long bone shaft. The listed scholars explain in detail the age ranges for this fusion.

[85]Castanyer and Tremoleda 1999: 353-363; Colominas 2013; Colominas and Sana 2009. This technique was first published by Simpson (1960) and was proposed for use on archaeological material by Meadow (1981) (although he termed it the log size index). The technique was developed in order to compare graphically the relative rather than absolute dimensions of a number of animals or groups of animals. The technique involves dividing the value of the specimen by the standard value and then converting the answer into its logarithm: log (archaeological measurement / standard measurement). A negative result indicates the archaeological specimen is from a smaller animal than the standard, and vice versa.

[86]Meadow 1999.

method is widely used and accepted, the results obtained must be interpreted with caution since you compare archaeological measurements with a standard animal and your specimens may differ in body proportions to your standard. There for the LSI method can introduce some variation to the data. However, this technique is useful to identify general changes over time. It allows us to combine the measurements of different skeletal parts on the same graph using the size index scaling method.[87] In this way the size range of the animal population can be determined from fragmented individual measurements, as is frequently the case with archaeological fauna remains.[88]

Results and Discussion[89]

The grouping of data according to stratigraphic sequence and species permits the investigation of changes in overall site husbandry and diet over time, which in turn corresponds to agricultural and economic production over time. Overall, looking at the total quantities of each species, we see that the percentage of *Sus domesticus* and ovicaprine[90] are similar in all phases: each approximately 30% of the total number of species MNI, except in the pre-Roman phase where sample sizes are small. In contrast, *Bos taurus* shows a progressive increase in MNI through the late Roman period. The Pre-Roman period is discussed first to lay the foundation for comparison. Brief counts for the Early and Late Roman periods come after, followed by the discussion of each species.

[87]Meadow 1999.

[88]Simpson et al. 1960.

[89]The percentages in this section correspond to the relative frequencies between the three categories of animal, not the overall assemblage, unless otherwise stated.

[90]Ovicaprine: refers to both sheep and goat.

The Pre-Roman Period

The first stage of this site corresponds to an occupation level between the late second century and beginning of the first century BCE. Only nine fragments were found, and though eight have been identified, the sample is too small to advance any conclusions. Faunal assemblages from the region during this period will be used as a means of comparison. The contemporary sites of Ca n'Olive, La Pedrera, L'Esquerda, Mas Castellar, and Turo del Vent serve as samples of Pre-Roman faunal samples because they are large farm complexes or small rural villages in the same region as Villa de Vilauba, and thus open to the same amount of Roman influence (Table 4).[91] Ovicaprine remains dominate the sites; they range from just under 70% at La Pedrera to about 45% at Mas Castellar. *Sus domesticus* is present in reduced amounts (on average 16% of each assemblage); the highest concentration is at Turo del Vent, at 30% of this assemblage. *Bos taurus* has the lowest frequency of the three main livestock types, with its highest rate of 20% at Mas Castellar. This pattern of high ovicaprine frequencies in the Pre-Roman period is well documented and corresponds with the geographic and climate constraints of the area, as discussed above. This pattern should be kept in mind as a comparative framework for the later periods of villa occupation.

The Early Roman Period

The samples studied come from the stratigraphic levels associated with the construction and/or operation of the first documented Roman villa, built towards the second half of the first century and lasting until the end of the third century CE. At this stage there are a total of 759 specimens, 388 of which are fragments of unidentified shafts (Table 5). In terms of the relative frequency of MNI, ovicaprine (45.7%) has the greatest abundance followed by *Sus domesticus* (38.6%) and *Bos taurus* (15.7%).

[91]Albizuri & Nadal 1999; Miro 1989; Marti 1994; Colominas 2009; Valenzuela 2008.

The Late Roman Period

The bones studied are part of a set of levels associated with the reform and reconstruction of the villa after the fire that destroyed at the end of the third century CE. This period yields 1,052 specimens in total, of which 593 or 56.4% were identified (Table 6). In terms of the relative frequency of MNI, *Sus domesticus* (42.6%) has the most individuals over ovicaprine (37.2%), and *Bos taurus* (20.2%).

Ovicaprine (*Ovis aries*, *Capra hircus*)

The osteological distinction between sheep and goats is difficult to identify and can only be determined by comparing specific parts of the skeleton, either by anatomical classification or by osteometry.[92] Because of the nature of this synthesis, the two species have been grouped together by the faunal analyst. The total number of identified remains of ovicaprine is 393, accounting for 29% of the fauna found at the site. In terms of NISP, this group is second to *Sus domesticus* (Figure 6) in the Early Roman period, but is more abundant in the Late Roman period (34.3%; Tables 5 & 6). When considering the MNI, ovicaprine are the most abundant species in Vilauba making up 33% of all individuals (Figure 7). In the Early Roman period, they have the most prevalent MNI with 32, or 45.7%; however, this shifts in the Late Roman period when they come in second behind *Sus domesticus*, with a MNI of 35, or 37.2% (Tables 5&6). This emphasizes a balance kept between the two groups throughout both Roman periods, however, ovicaprines are less abundant than in the pre-Roman sites in the region.

[92]Boessneck 1980.

Four major age groups have been established in which ovicaprine were slaughtered for human consumption.[93] The first are individuals less than three months old, representing about 10% of the total. The juveniles, who are approximately 50% of the total, were slaughtered between 3.6 months and 3 years of age. The third group consists of adult (over 3 years) individuals, with a percentage of 40%. Numerically, the most intensely harvested group were the juveniles, most likely for consumption, while the adults were used primarily for milk, cheese, or wool. The absence of horn, astragali and pelvises, has made it nearly impossible to determine the sex of most of the bones. The osteometrical analysis did not provide significant data.

Sheep and goats would have provided milk, cheese, wool, and manure to fertilize the fields belonging to this villa complex. The fact that juveniles are those chosen most often for consumption reveals that ovicaprines were a vital primary food source.[94] Though they were needed for secondary products, their place in food culture did not diminish through time, but rather continued along with the addition of pork in the Early Roman period (as compared to the Pre-Roman period). Throughout the various stages that make up the general development of the site, the percentage of sheep are stable and without major changes. King's Romanization patterns do not account for this regional variation, though he does mention them, but it fits with the pattern of pre-Roman animal management in the region when compared to pre-Roman data and the predisposition of the region to sheep and goat herding. The secondary products derived from sheep and goats were too valuable to give-up for a pork-centered "Roman" pattern diet. Instead pigs were incorporated into the diet breadth to increase villa profits. Sheep and goats were well

[93]Grant 1982; Silver 1980; Bullock & Rackham 1982; Levitan 1982; Payne 1973. The age at death of individuals is determined according to the degree of epiphyseal fusion of bones and tooth wear. The age data was, unfortunately, not separated by period.

[94]Payne 1973: 282.

adapted to this Mediterranean landscape and represent a conservative diet practice inherited from the Pre-Roman period of the villa. Because of this entrenched foodway-system, it is easier to incorporate pigs into the system than to simply replace ovicaprines.

The presence of cutmarks and evidence of anthropogenic alterations made *post-mortem* are abundant on ovicaprine remains (33.6% of the bones), especially on the limbs.[95] Burned fragments are rare and it appears boiling was the cooking method of choice for ovicaprines. The cuts are due to the skinning and butchering processes that mirror the system still in place today.[96] These data and the variety of bones with alteration on them reveal that the majority of ovicaprines butchered at the villa were eaten there as well.[97]

Sus domesticus

Pigs are the most abundant taxon at Vilauba in terms of NISP with 397 remains or 31.68% of the Roman remains (Figures 6 & 7). In the Early Roman period, *Sus domestics* dominates with 185 elements (55.7%). However, in the MNI, the ovicaprine are represented as the species with the highest number (32/45.7%; Table 5). Moving to the Late Roman period, *Sus domesticus* (42.6%) has the most individuals over ovicaprine (37.2%), and *Bos taurus* (20.2%; Table 6). However, there is a significant shift in NISP in the Late Roman period with cattle bones being most abundant: *Bos Taurus* (37%), ovicaprine (34.3%), and *Sus domesticus* (28.7%).[98] Such a large number of pigs initially corresponds to King's "Roman" pattern, when compared to the Pre-Roman period where they represent of average 16%, however the presence

[95]Anthropogenic alterations refer to alterations made by humans to the bone.

[96]Dosi & Schnell 1986; See Figure 8 for butchery patterns on the ovicaprine elements.

[97]Stein 1987 discusses the idea that young males were produced to be sold elsewhere, this is another form of possible economic gain for this villa.

[98]This could mean that cattle bones are more fragmented, as a result, the NISP if higher than the MNI.

of relatively equal numbers of ovicaprines reveal that both were vital food sources. While pork was being consumed more widely, it did not dominate consumption patterns at the villa.

Tooth eruption and wear, and the state of fusion of the epiphysis of long bones were used to determine the age at death of the specimens.[99] Pigs of all ages were slaughtered at Vilauba, with the highest percentages correspond to individuals between 3 and 4 years (young adults), when their epiphyses were almost completely fused, followed by animals between 6 months and 2 years of age. The abundance of adult pigs is very surprising. Usually young piglets are the most common for food consumption. This is true of the Pre-Roman data for Spain, as well as Mackinnon's analysis of pork consumption in Italy.[100] This could be an indication of the production of large pork products (such as hams) for export. The sex of only four individuals could be identified: an adult male over three years, two adult males and an adult female. Since only 4 of 78 individuals could be identified this is, therefore, an unrepresentative sample.

In contrast to the multipurpose function of the ovicaprines, pigs were probably bred solely as a food source (for both meat and fat), since they produce no secondary products. The fact that they were most commonly slaughtered in young-adulthood, when they had reached their peak weight, reinforces the idea that they were raised primarily as meat for export. This abundance of pork coincides with King's "Roman" pattern, however like the Pre-Roman and Italian data, King's analysis shows an abundance of piglets in 'Romanized' contexts.[101] Like the ovicaprine population, the pig population remains constant through time. When compared to the pre-Roman faunal assemblages from the area,[102] this increasing abundance of pigs is remarkable.

[99]Silver 1980; Bull & Payne 1982.

[100]Albizuri & Nadal 1999; Miro 1989; Marti 1994; Colominas 2009; Valenzuela 2008; Mackinnon 2004.

[101]King 1999.

[102]Ibizuri and Nadal 1999; Miro 1989; King 1999; Marti 1994; Colominas 2009; Valenzuela 2008.

King associates pork consumption with both 'Romanization' and elite communities in the provinces and this could be plausible here, but not as definitive as he describes.[103] In fact, King discusses this anomaly of equal dependence on ovicaprine and *Sus domesticus* to be indicative of a "failed" attempt at Romanization, since local food preference still had a strong hold throughout the first centuries CE.[104] However, this is not a "failed attempt at Romanization," but rather the continuity of Pre-Roman foodways coexisting with new cultural and economic opportunities.

Ancient authors Varro, Strabo, and Martial discuss the importation of ham from Spain, which could provide a lucrative reason for cultivating *Sus domesticus* in such abundance at the villa. [105] The elements recovered from the villa, along with the cut marks on them, could indicate that the pigs were butchered with the intent of procuring hams. The majority of the bones found at Vilauba derive from the head and lower limbs of *Sus domesticus*. Those parts most suitable for consumption, specifically the neck, back, and hind quarters/limbs, are limited at the site, perhaps indicating that they were exported while the less desirable cuts of meat were consumed on the property (Figure 9). Also, the few femura found at the villa are free of boiling, or burning marks, indicating that they were not cooked, but probably salted whole for ham. This meat product, probably sold locally, could have been transported along any number of trade networks as the demand for pork products increased throughout the empire, preserved via salting or smoking.

Bos taurus

Cattle are the least abundant taxon in both the NISP with 325 specimens in total, and in the MNI with 54 (Figures 6 & 7). In the Early Empire, cattle are represented by a NISP of 35, or

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[103]King 1999: 219-220.

[104]King 2001: 213.

[105]Varro, *RR* ii. 4, 10; Strabo, iii. 4, 11; Martial, xiii. 54; Edict.

10.6% and a MNI of 11, or 15.7%, making them a lesser component of the diet (Table 5). However, it should be noted that, overall, they yield more meat per animal than ovicaprines or pigs and are a more precious commodity alive –used for secondary products and as agricultural labor. Cattle have a long reproductive cycle and are also more expensive to maintain, especially oxen, so just those necessary to plough the fields would have been kept. There is a significant shift, however, in the Late Empire period in NISP with cattle increasing to the most abundant taxon based on NISP: *Bos Taurus* (37%), ovicaprine (34.3%), and *Sus domesticus* (28.7%; Figure 6). The NISP of *Bos taurus* could be higher, since their bones are larger, creating more splinters. This increase coincides with the construction of a press on the villa grounds, likely demonstrating that more bovine power was needed to keep up with the demands of production. As stated above, cattle are expensive to keep so an increase in population size is both caused by and perpetuates economic growth (i.e. the wealthier you are, the more cattle you have; the more cattle you have, the greater potential for economic production and wealth).

It is difficult to establish the age of death through dental wearing because the teeth are the sub-hypsodont type,[106] which have a continuous growth pattern that can lead to errors, as those of ovicaprines. Depending on the degree of epiphyseal fusion, long bones can determine the age until four or four and a half years. Most bovines were killed in adulthood during all phases of the villa, which demonstrates the use of their secondary products. Cows were used for traction, breeding, and for the production of milk, leather, and the meat. Since cattle are dimorphic, sex was determined by the osteometry of anteroposterior diameter of the metacarpal.[107] The results

[106]Sub-hypsodont type: a pattern of dentition with high-crowned teeth and enamel extending past the gum line, providing extra material for wear and tear, usually found in animals that feed on gritty, fibrous material, aka herbivores.

[107]Grigson 1982; Harrison & Moreno 1985.

yielded 6 cows, (two adults, one between 3 and 4 years old, one over 2 years old) and 3 bulls (2 are adults). Among the remains of cattle elements studied, 68 show signs of *post-mortem* anthropogenic alteration. Nearly 50% of the bones were boiled, with the rest of the elements exhibiting butchery marks (Figure 10).[108]

The profile of cattle husbandry and consumption at Vilauba is intriguing. Cows were surely butchered for their meat, and leather was processed and used, but it cannot be forgotten that bovines are the most common animal for farm work in these periods. Looking at the numbers, cattle display a rising trend from the early stages of the villa.[109] This increase in the abundance of the cattle population did not result in an active decrease in the use of the other three species of livestock. This demonstrates, along with factors such as age at death, that this increase in population size was not due solely to changes in diet, i.e. people were not necessarily eating more beef. This influx could be caused by several different factors, including a new preference for secondary products obtained from cattle, better adaptation of this species to the climate and landscape surrounding the villa, or selection by the owner for economic gains by way of agricultural wealth. King's general analysis would link the presence of bovines in any significant number at all to the Roman "military" diet and the fact that legionaries, both from Italy and the other provinces of the west such as Germania, had a strong presence in Spain for at least 400 years. However, this does not take into account the central role of cattle in the agricultural economy.

Contrary to King, I posit that the presence of these cattle were based solely on economic gains and that villa owners were actively seeking out larger bovines to increase their agricultural yields. Even if the army were present, it is more likely that their cattle were used to enhance local

[108]Castanyer and Tremoleda 1999 infer this based on the bone fragmentation and the pottery found with the bones.

[109]Colominas 2013; Castanyer and Tremoleda 1999: 353-363.

breeds, which will be discussed at length in the next section. Cattle serve a much larger role than primary consumption, and the different osteological investigations of Colominas have demonstrated that cattle were an integral part of pre-Roman agricultural assemblages.[110]

Biometric Analysis of Cattle[111]

The results of the biometric analysis for cattle demonstrate a dramatic increase in the size of these animals from the first century CE onward (Figure 11). During the pre-Roman period cattle had been relatively small in terms of body size, but throughout the Roman occupation the cattle population exhibits a significant increase in body size. These changes have been mainly interpreted as the result of the import of non-local animals,[112] possibly from Italy.[113] However, it has also been suggested that the increase in size resulted from new animal husbandry techniques applied to local cattle in the first 100 or 150 years after the Roman conquest; this led to more robust and larger animals than those of earlier periods.[114] In the case of Vilauba, the positive correlation between this size increase and the adult age range of bovine slaughter can be related to a specialized exploitation of cattle for traction.[115] The increase in size of cattle was the result of either the improvement of local herds through selective breeding or the importation of animals with larger dimensions, improved in the country of origin. Larger animals could be used to increase agricultural production through plowing, fertilizing, hauling goods, and powering

[110]Colominas, Schlumbaum, and Sana, 2009; Colominas and Sana 2009; Colominas 2009; Colominas 2013.

[111]Colominas, Schlumbaum, and Sana, 2009; Colominas and Sana 2009; Colominas 2009; Colominas 2013; Colominas has extensively studied the growth of overall cattle size in the periods dating before the Roman conquest up through the Visingoth Period. See any of her publications for a full account of her findings.

[112]Teichert 1984; Lauwerier 1988; Audoin-Rouzeau 1995; Albarella et al. 2008.

[113]Driesch 1992; Peters 1998.

[114]Forest & Rodet-Belarbi 2002; Oueslati 2006.

[115]Colominas, Schlumbaum, & Sana 2009.

presses and mills. Large adult animals are indicative of incorporation into intensive agricultural production economic systems, in this case, with the Roman economic trade networks.[116]

Colominas demonstrates through the use the LSI method that bovine populations were increasing in size due to either better husbandry methods or through the importation of larger, sturdier animals. This influx of cattle, and overall increase in the amount of faunal material in the late Roman period, could be the result of added economic pressures and opportunities. Given the limits of the sample size, deciphering whether the agricultural goods produced on this villa were destined for subsistence use or as trade cannot be seen in the faunal record alone, but investigation of the other material culture, such as pantries and storage amphorae found on the property, one can infer that this villa produced a surplus.[117] In addition, the increase in cattle size and number coincides with the remodeling of the villa after a great fire. Along with restoration of existing structures, the villa owners expanded their workspace and added a large press to the property. These seem to be clear indications that agricultural production was successful at this site and increased in in intensity. The larger number and size of cattle would be needed to accommodate the growing demands of this expanding villa, and also reveal a new mindset concerning production practices.

Conclusions

Animal husbandry, foodways, and agricultural production are a productive way to address 'Romanization,' or more broadly, as in this paper, cultural change. This stems from the idea that dining preferences and agricultural habits are an important part of identity, often linked

[116]Colominas, Schlumbaum, & Sana 2009.

[117]Castanyer and Tremoleda 1999.

to social class.[118] Moreover, diet is often altered as a result of colonization or cultural contact. At the most basic level, pork consumption appears to be associated with the concept of 'Romanization,' as King points out, however, this case study indicates that the case of food culture and production is anything but simple. According to King's model, the presence of significant numbers of *Sus domesticus* would indicate that Roman food culture was actively being promoted among local populations, including the family of Villa de Vilauba. It is clear that the family residing in these buildings is elite,[119] but the presence of pigs alone cannot be equated with the complete takeover of Roman preferences in food culture. It is more likely that this pattern of livestock production, similar to King's "Roman" pattern, was promulgated by the villa owners themselves to gain access to Roman trade networks around them. This is further exemplified by the evidence of ham production, rather than intra-villa consumption of the pigs.

Similar observations concerning the presence, use, and increase in cattle at this villa can be made. The increased number of cattle, and the changes in their morphology, are the result of the economic pressures and/or opportunities the Roman administration brought. The size of cattle increased as a result of the need to increase the number of suitable animals to assist with agricultural work, and it is possible that more intensive agricultural practices were applied to the region overall. To this end, certain animals may have been imported from elsewhere to improve the quality of local herds, or improved husbandry and breeding practices could have resulted in changes in local cattle populations. Although it is possible that King's military model coincides with this increase in cattle size, as it does in other regions, but there is not enough information available from Vilauba to know definitively.

[118]Counihan & Esterik 2013; Goody 1982; Higman 2012.

[119]Castanyer and Tremoleda 1999: The living quarters of the villa were filled with imported African sigilata, as well as two bronze figurines: a Lars god and the goddess Fortuna. A resent survey has revealed a bath complex near the *villa urbana* as well. These factor all indicate elite Romans, or those sympathetic to Roman goods.

Ovicaprine data stays relatively consistent during both phases of Roman occupation. Though this is a decrease in frequency from the Pre-Roman period, it is a fundamental part of the Pre-Roman animal economy that shows continuity throughout all occupation phases. In fact, the local system of ovicaprine breeding and herding seems to have been incorporated into the Roman economic system, with ancient authors referencing wool from Spain. The maximization of profits through the exploitation of all four major domesticates speaks to the agency and economic drive of the villa owners, rather than a simple core-periphery model of influence. The provincial elites were taking advantage of and responding to opportunities of new markets.

The increased frequency in both pig and cattle production fall into King's model of impact of Romanization on animal economies, but not necessarily for the reasons he offers. The villa owners acted as agents in determining what fauna they would incorporate into their estates and for what purpose. Economic gain was at the primary concern of the villa owners in the selection of cattle and the implementation of better husbandry practices, to produce a larger yield of both cattle and agricultural produce. Pork did successfully make it into Spanish diets; however, it did not overwhelm the abundance of sheep and goat found on this site. Rather, the presence of pigs complimented ovicaprine production, providing another source of income for the estate; pigs, sheep and goats are capable of grazing on land that is less than exploitable for agricultural production, driving down the cost to keep these livestock. In addition, pork, in the form of hams, and the secondary products of sheep and goat are sold within local, regional, and perhaps long-distance trade networks.

This case study does not reveal a "failed" attempt at the Romanization of food-ways in the countryside of Catalonia, but exposes the complicated nature of cultural change linked to the economic sphere. Through the faunal assemblages, the vital role of domestic animals to the

economic well-being of the Villa de Vilauba is highlighted. The individuals at Villa de Vilauba responded positively to Roman influence, and used Rome's, and other provincial cities', need for agricultural products to their own economic advantage.

FIGURES

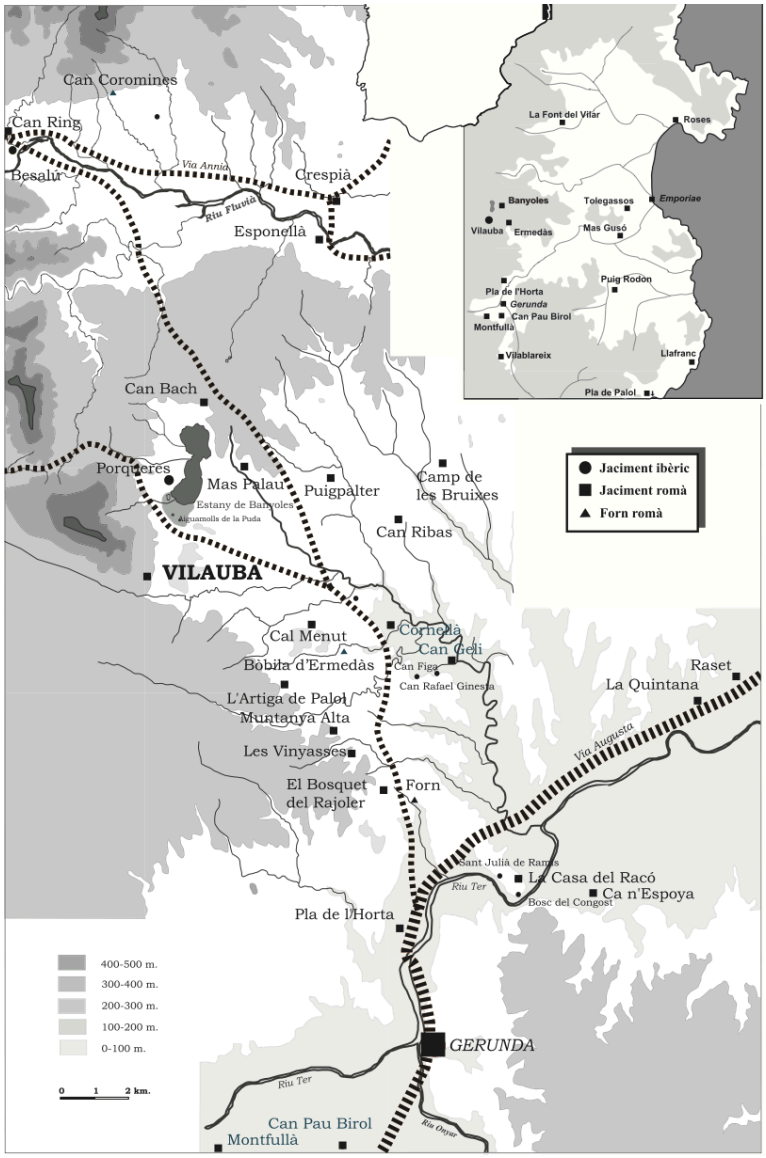

Figure 1: Map showing Vilauba and contemporary sites. Columinas, Castanyer, & Tremoleda 2014: 240.

Figure 2: Map of Spain. Laveau 2007.

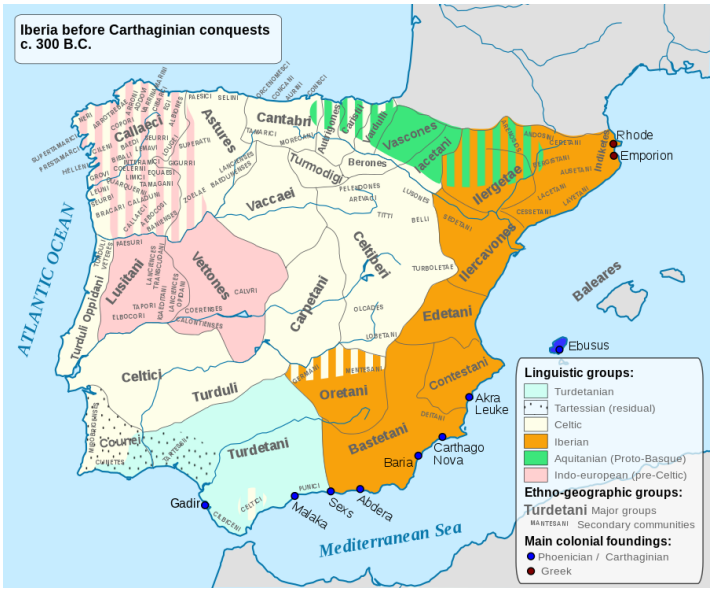

Figure 3: Map of the Iberian Peninsula c. 300 BCE. Fraga da Silva 2015.

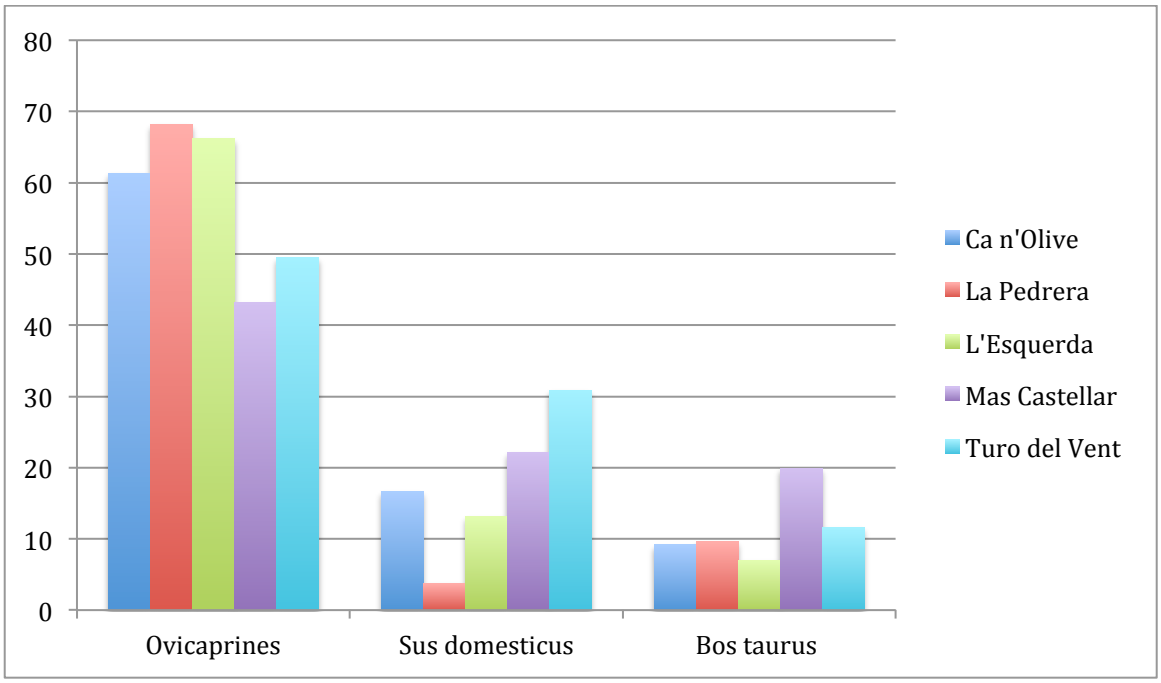

Table 2: Pre-Roman Faunal Data complied from 5 sites in percentages. Albizuri and Nadal 1999; Miro 1989; Marti 1994; Colominas 2009; Valenzuela 2008.[120]

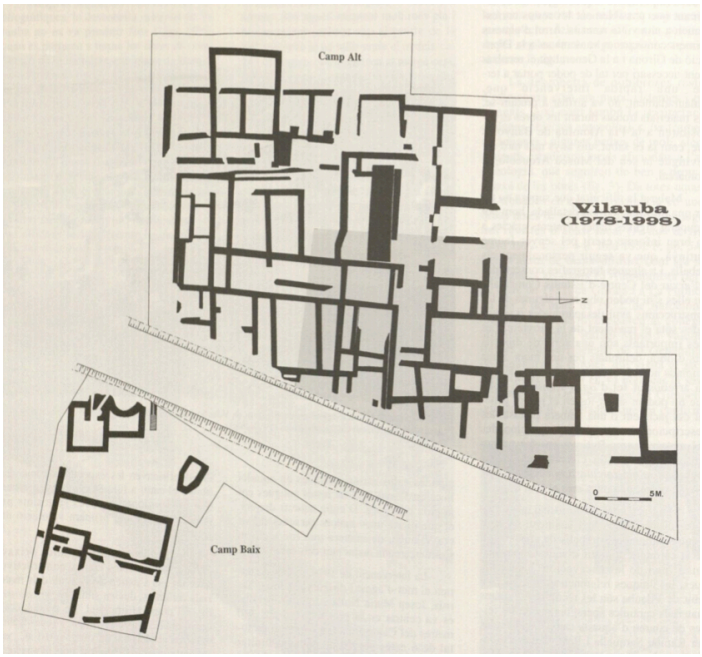

Figure 4: General plan of Vilauba. Castanyer & Tremoleda 1999: 20.

[120]These sites are contemporary with the pre-Roman phase of Vilauba. The authors are in order, respective to the list on the graph.

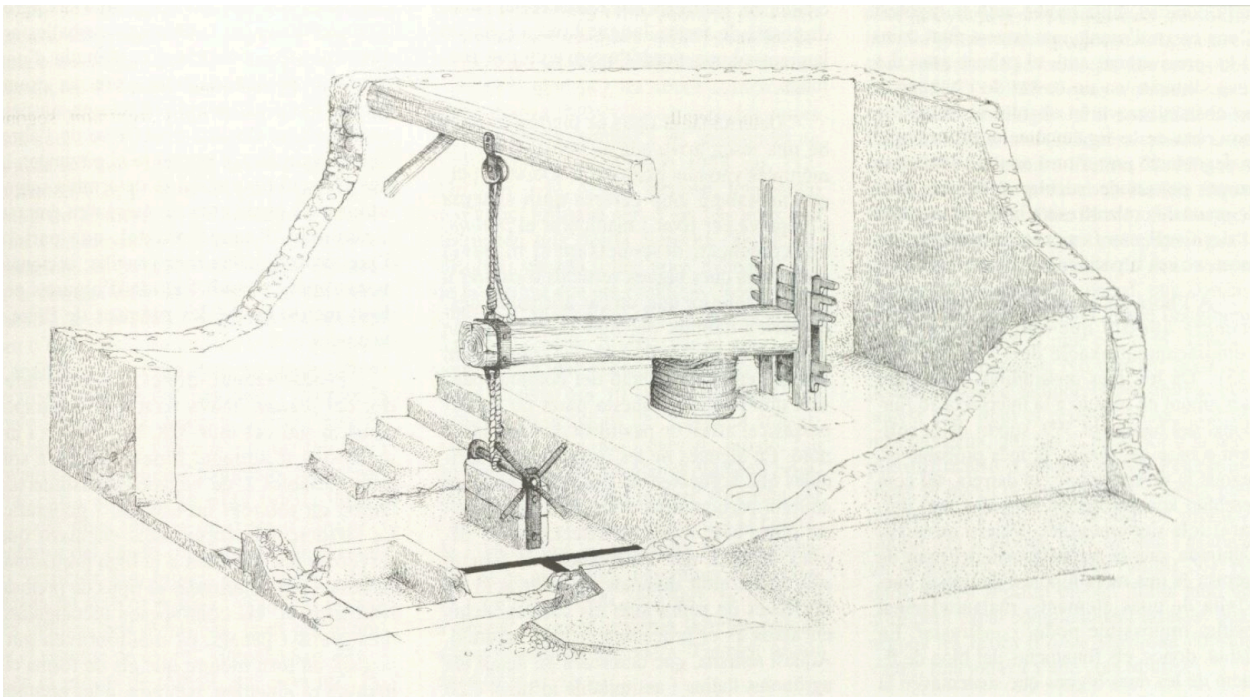

Figure 5: Hypothetical reconstruction 1 of the press. Castanyer & Tremoleda 1999: 139.

Species	NISP	%	MNI	%
Ovicaprine	**393**	**29.0**	**97**	**33.0**
Sus domesticus	**397**	**31.8**	**78**	**26.5**
Bos taurus	**325**	**26.0**	**54**	**18.4**
Equids	78	6.2	9	3.0
Rabbits	20	1.6	9	3.0
Domestic Poultry	20	1.6	13	4.4
Wild Birds	10	0.8	7	2.4
Rodents	7	0.6	4	1.4
Canines	3	0.3	3	1.0
Mustelids	2	0.2	1	0.3
Mollusks	25	2.0	19	6.5
TOTAL	**2,232**		**294**	

Table 3: All Faunal Material from the Villa de Vilauba.

Elements	Count	Percentage
Large Mammals	346	36.0
Large/Medium Mammals	7	0.7
Medium Mammals	120	12.2
Medium/Small Mammals	94	9.6
Small Mammals	316	32.1
Undetermined	82	8.3
Microfauna/Birds	18	1.8

Table 4: Non Classified Fauna from the Villa de Vilauba.

Species	NISP	%	MNI	%
Ovicaprine	112	33.7	32	45.7
Sus domesticus	185	55.7	27	38.6
Bos taurus	35	10.6	11	15.7

Table 5: Fauna from the Early Roman Period.

Species	NISP	%	MNI	%
Ovicaprine	182	34.2	35	37.2
Sus domesticus	152	28.7	40	42.6
Bos taurus	196	37	19	20.2

Table 6: Fauna from the Late Roman Period.

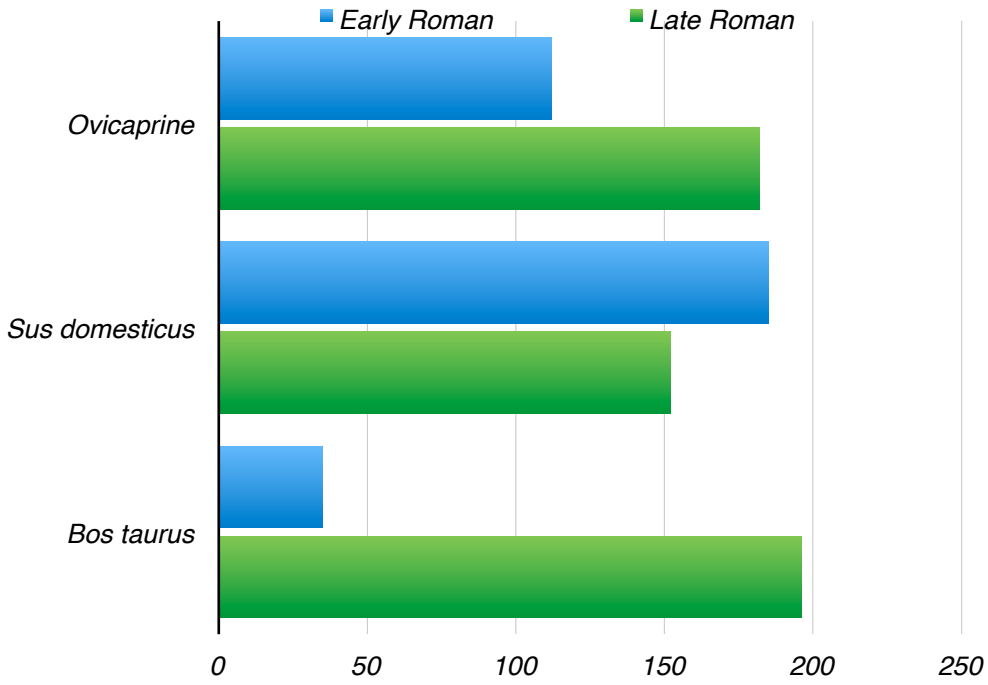

Figure 6: NISP Values.

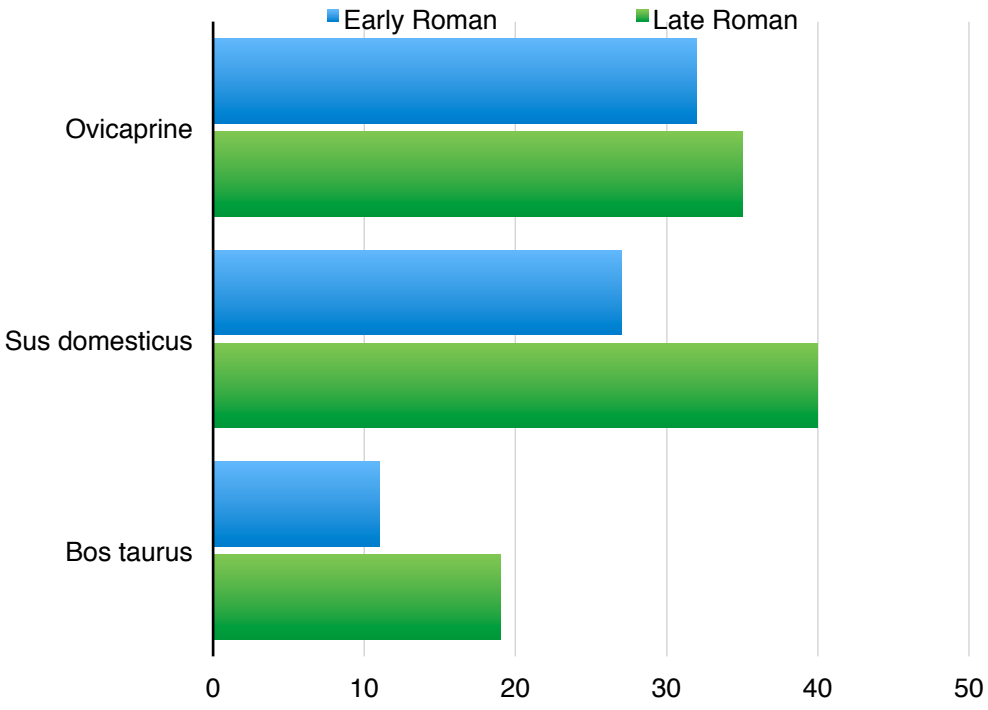

Figure 7: MNI Values.

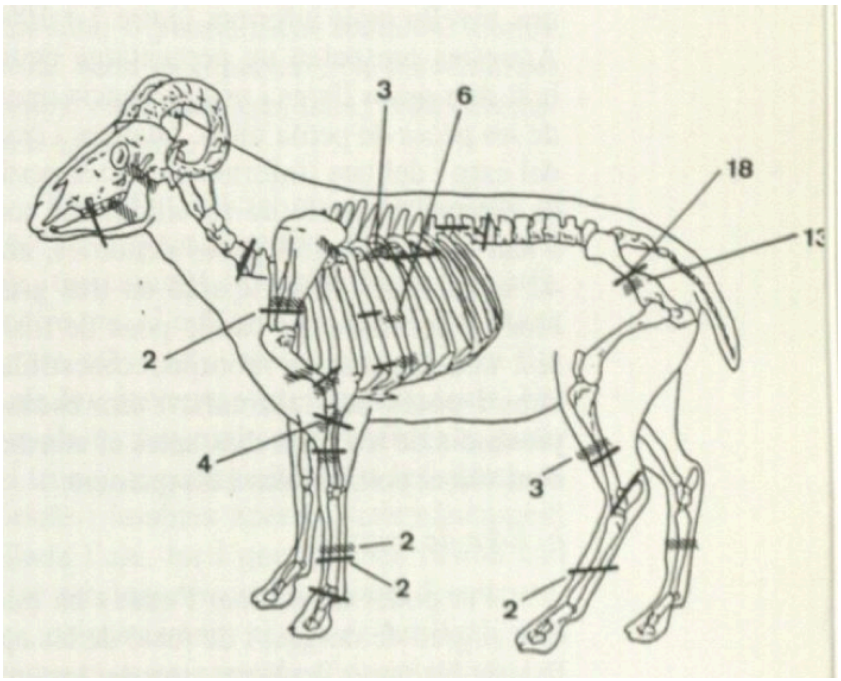

Figure 8: Ovicaprine butchery marks. Castanyer & Tremoleda 1999: 357.

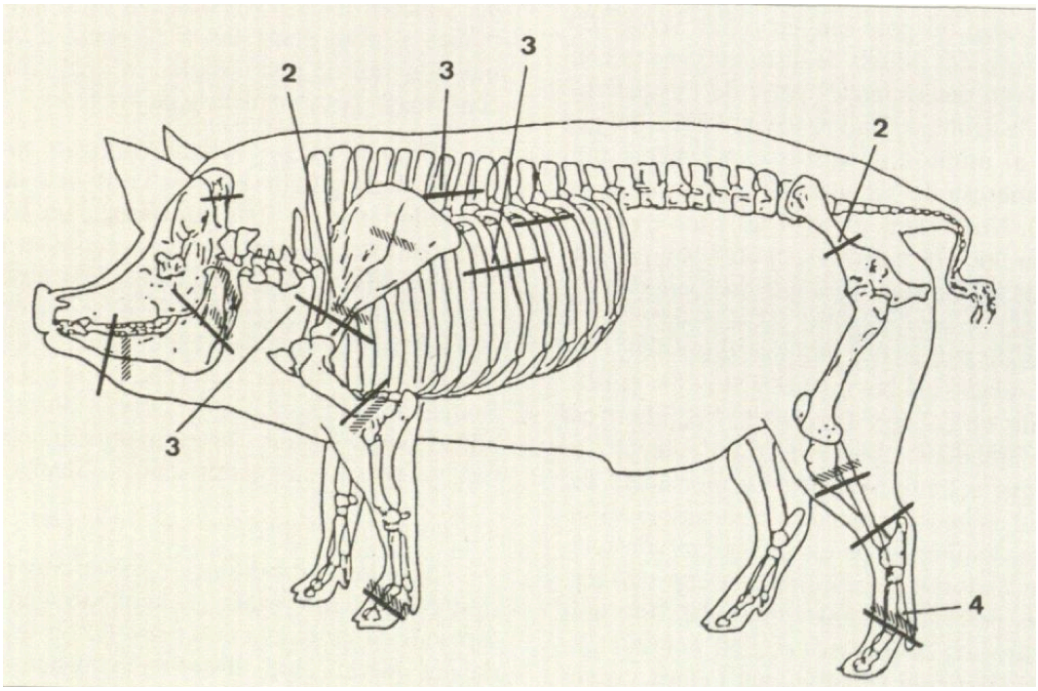

Figure 9: *Sus domesticus* butchery marks. Castanyer & Tremoleda 1999: 358.

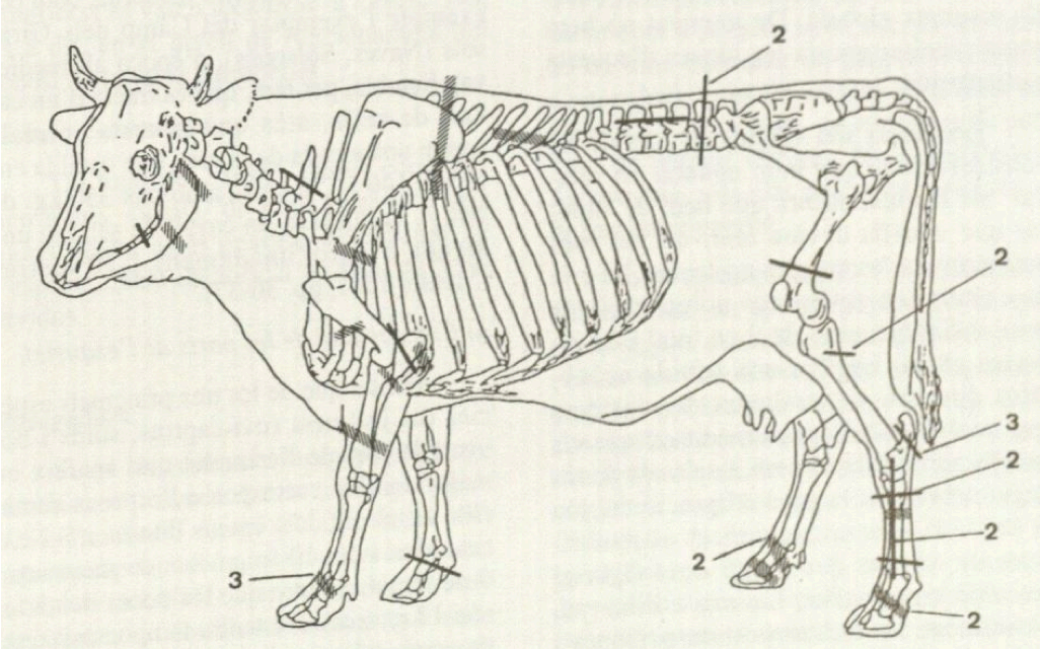

Figure 10: *Bos taurus* butchery marks. Castanyer & Tremoleda 1999: 359.

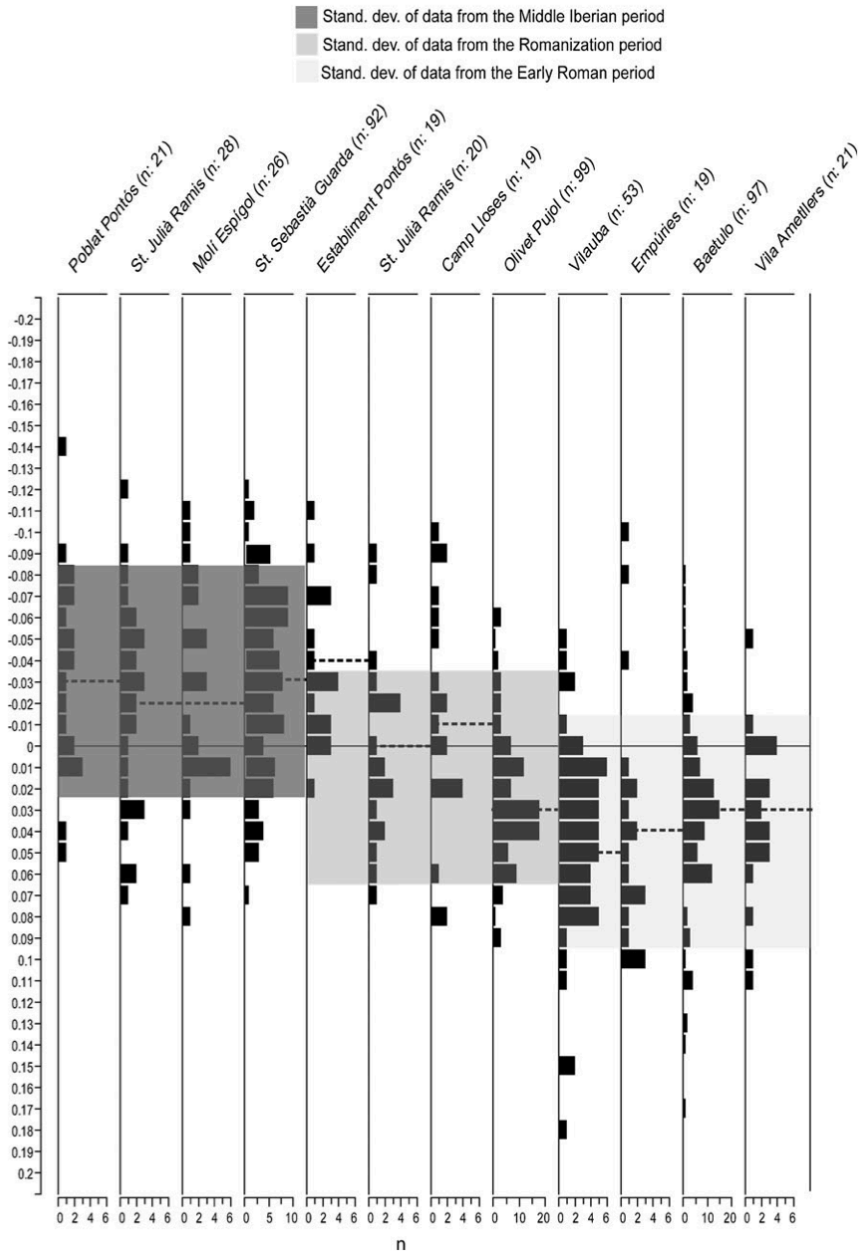

Figure 11: Log-ratio diagram of cattle postcranial measurements per site in chronological order. The dashed line marks the mean of each sample and the shaded area the standard deviation. Columinas, Schlumbaum & Sana 2014: 9.

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