Miscellany on the Rural World in the Roman Period

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Ager Mutabilis II. *La explotación del territorio de Emporiae y Gerunda durante el bajo Imperio romano y la tardoantigüedad* PID2019-105759GB-I00, del Ministerio de Ciencia e Innovación.

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Landscape and territory in the northeast of the Iberian Peninsula in the Roman period. The property of the Roman villa of Pla de l'Horta (Sarrià de Ter, Girona, Spain): characteristics, farming and forest resources

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The establishments that are known as villas in Roman contexts provide an opportunity to understand the most common system of land use throughout the Roman Empire. These establishments, which were positioned strategically in the territory, were more than just living spaces. The complexity in the choice of location and the way villas developed and evolved help us to understand the high value of this type of farms for the economy of the Roman Empire. The landscape and the changes it underwent due to the location of these establishments are the basis of a field of study that is constantly being updated due to complementary studies.

Key Words

Roman villa, Landscape, Agriculture, Geomorphology, Carpology, Antracology,

Introduction and Methodology

One factor that often surprises visitors, and even archaeologists, is the location of certain sites. Generally, when a site appears in a highly anthropised and modified urban environment it is difficult to picture the composition of the landscape in ancient or medieval times. However, this exercise of recreating the paleolandscape is vital to understand the reasons leading to the occupation of this space and its evolution.

The case analysed in this study, a Roman villa, is a good example of this problem. Currently, the site is situated in a residential neighbourhood, surrounded by blocks of flats and single-family dwellings and with a motorway on the slight elevation to the west. All these elements have deeply changed the existing landscape and make it difficult to understand what it must have looked like in the first century BCE, which is when the settlement was established.

Reconstruction of the historical landscape is essential to understand the history of any site. The landscape contains physical elements, such as topography or vegetation, as well as other symbolic, social and cultural elements that can be specific to each historical period. There is also a relationship between settlement and other anthropic elements such as roads or, in the case that we will analyse, the location of the Roman city of *Gerunda* (now Girona). Undertaking multidisciplinary analyses is vital to reconstruct a landscape that could differ considerably from that found today, with distinct vegetation and crops to those that shape the contemporary territory.

The following study focuses on the analysis of the landscape in which the Roman villa of *Pla de l'Horta* is located, from different areas of knowledge. This study aims to know in depth the geographical and geomorphological features of the territory in which the village and that settles surrounds and analysis of vegetation, both native and crops with which economically exploited this property which it had a mid-life between the first century BCE and the V century AD. For this purpose, geographical and geomorphological studies have been carried out that have allowed us to know the characteristics and value of the soil as a cultivation space in the immediate surroundings of the villa, observing the areas of optimal agricultural value and discarding with less strategic value. In turn, it has assessed the potential flooding of the land associated with the main building of the site and the influence of the floods of the *Ter river* passing by.

As regards **anthracology** and carpology studies, these have been carried out based on samples located in different spaces inside the archaeological site. For this study, we have taken a total of 24.5 liters of sediment which have been obtained 48 carpological samples allowed a total of 5 taxa detect potentially crop plants in the reservoir. For what concerns the **anthracology**, of the 205 coal fragments recovered for the study, have been identified 11 different taxa that correspond to the plant species that would form part of the landscape around the Roman villa.

Landscape as a subject of study

Landscape archaeology provides the opportunity to study the territory from a *humanised* perspective, shaped by societies over time. When a landscape is analysed in a specific historical context, it can rarely be considered virgin. Instead, it is a *lived-in* space. Its configuration is the result of the needs of the society that shaped it. The forms of the landscape have a considerable historical load, as they conserve the traces of human impact over time (Palet, 2005) an impact linked to social, economic and cultural changes. At any given moment, these changes fostered an appropriate structure to enhance the resources the landscape could offer. The extent to which these modifications have survived over time will depend largely on their adaptation, functionality and effectiveness (Olesti *et al.*, 1991).

If we consider the agricultural use of the territory, then the adaptation of the topography, of geographic, geological and hydrographic determining factors, and the use of certain areas for complementary economic activities such as livestock farming and forestry activity, is designed to rationally organise the rural space (Olesti *et al.*, 1991). Such adaptation was always associated with the socioeconomic structure of the time.

Shaping the landscape is a phenomenon that must be analysed as a long process (Riera *et al.* 2010). We should include concepts such as agrarian morphology, the land division system and communication networks, and study the combined dynamics that they generate to characterise the various phases in the occupation of the landscape (Chouquer, 2003). The perspective provided by these diachronic studies will help us to contextualise a certain period in a territory (Palet, 2005). The landscape is always dynamic and changing due to human activity. At each point in time, it will be transformed and altered from previous and subsequent phases, creating a series of distinguishable phases. As indicated above, changes in the landscape cannot be separated from historical events and the social and symbolic configuration of society in each period. In the case addressed here, the organisation of space in the Roman period cannot be isolated from the context of the historical process of Romanisation.

The patterns of occupation of space also vary over time. A good example of this is the location of Roman villas, particularly those that had a strong residential aspect. In other periods, buildings in relatively isolated agricultural environments were designed to go unnoticed, for greater protection or safety. In the Roman period, villas were situated in highly visible areas where they dominated the surroundings. Their location was related to a conception of self-representation in which the building plays a role as a symbol of the owner's power and wealth. These factors would have a direct influence on the choice of building locations and their relationship with the environment, as we will see below.

Romanisation and the landscape

From a global perspective, Menéndez and Soria, two engineers who studied land planning, proposed some years ago general rules that could be applied to these processes. According to these authors, the organisation and planning of a territory occupied by a new power or society generally involves three main operations undertaken by the new power: delimitation that helps to define the occupied area under one jurisdiction; hierarchical organisation to create centres or headquarters from which to exert power over the territory; and the incorporation of subsidiary centres and areas by means of roads that parcel up and connect different points in the territory (Menéndez, Soria, 1994).

The process of territorial construction of the Iberian Peninsula in the Roman period did not differ, in essence, from the processes developed in other areas of Imperial construction. This is because the model that was applied had already been tested and validated in other territories (Burch *et al.* 2013). In this process, we can find some of the aspects described by Menéndez and Soria. For example, the Roman power established a territorial delimitation, the *provinciae*. Within these provinces, it created smaller systems of organisation such as the *conventus* and the *civitates* that had a clear hierarchy and in which the *civitates* were the main element of territorial cohesion. Based on this organisation, transport links, which were essential for territorial organisation, were strengthened and the territory was divided into plots for use. This last aspect was usually carried out through the creation of cadastre and centuriation.

The division of the territory

All territorial divisions were based on two previous factors. The first was the political decision that sought to share out the land in plots. The second was the engineering project established for the land by means of milestones (Fiches, 1993).

The land division lines were based on natural morphology, influenced by topography and hydrology, which could alter the form of the cadastres (Burch *et al.* 2013).

The new territorial organisation was consolidated by combining two distinct planes: that of constructions and that of meanings. Thus, the territory was marked out by focusing on the limits, the centres of power and the roads. These were the three essential elements that were used to establish the territorial planning. Then, the land was divided into plots or properties were delimited by means of centuriation. Once this process had been completed and the plots had been distributed, the exploitation of natural resources began. Marking out of the boundaries between the types of properties and occupied centres culminated with their consecration. This reinforcement system helped to constantly maintain the established boundaries, with the added factor of the divinities to guarantee respect for them (Burch *et al.* 2013).

The suburbium

The Roman *civitas* was generally divided into two spaces: *urbs*, which were usually comprised (with notable exceptions) of an urban centre that was the administrative, economic and religious hub, and the *territorium* formed by the area that was administratively dependent on the *urbs*. *Urbs* were clearly defined by the *pomerium*: a ritual boundary of a sacred nature that was not necessarily marked by physical elements like walls: it could be defined by topographic elements such as rivers or paths or by delimiting milestones (Bedon, 1997). The territory was essentially defined by the *ager* and corresponded to the area that depended on the *urbs* administratively. This was also a clearly defined area over which the *iurisdictio* of the magistrates extended (Pomponius, *Dig.* 16, 239, 8). Between these two areas was a third area, the *suburbium*, which was less clearly defined spatially and even legally (Fernandez, 1994; Goodman, 2007). This was a space that in some aspects could be associated with the *ager*, but was closely linked socially to the *urbs*. Legally, this area was not subject to some of the precepts that affected the space inside the *pomerium* of the *urbs*. For example, the *suburbium* could be used as a funerary area, while this was completely prohibited in the sacred area delimited by the *pomerium*.

The *suburbium* was an area of undefined limits and varying size, depending on the environment and the importance of the *urbs* with which it was associated or even the specific element that is analysed. If we focus on the subject of this study, the context in which the adjective *suburbanus* was used most in the sources was to refer to a privileged residence for resting and *otium*. In fact, the term, which was originally used to define a set of properties situated around the city of Rome, ended up referring to a type of villa in which the residential structures and comforts were notable. Suburban villas were originally those in the vicinity of the city and generally used as a main residence. Their main characteristic was their close relationship with the city itself, where the owner would have carried out his daily activities. For this reason, suburban villas needed to be close to a road that would facilitate the daily journey from villa to the *urbs*. The association with the city was not just linked to proximity: it was also reflected in external aspects. A suburban villa was the *domus* of its owner and had to have the same social functions as it would have had if it was inside the *urbs*. It had to reflect the owner's status. This was achieved through architectural and decorative elements and internal layout, with spaces to receive *clients* or undertake social obligations, and through integration into the landscape in a privileged setting. A view over the surrounding area was sought as well as integration into the environment. In addition, the location was chosen to boost aspects of self-representation that highlighted the owner's power and wealth. Industrial areas could be a demonstration of economic power and villas were often situated in elevated areas not just for the good views (Fernández, 1994), but also so that they could be seen by travellers on the roads. All these aspects strengthened the owner's self-representation.

In summary, locations for these villas were sought close to roads, with abundant water (used for the industrial areas and to supply elements associated with the owner's comfort such as baths, decorative fountains, etc.) in a privileged environment that was often at a slight elevation to open up views to and from house.

The suburbium of Gerunda

To understand the configuration of the Pla de l'Horta property (fig. 1), we should also be familiar with the physical environment of the space that comprised the suburban area of the Roman city of *Gerunda*, an environment that influenced the location of the urban centre itself. What is known as the Pla de Girona (Girona Plain) is a valley between the mountains of the Gavarres to the east and the Guilleries to the west, irrigated profusely by various rivers and streams from these higher areas. This is an important area strategically, as it is at the point of transition between two much larger plains: that of Empordà to the north and the pre-coastal depression to the south. The Roman city of *Gerunda* was founded in the first third of the first century BCE (Keay, 2016), to control an old road that crossed the territory from north to south: the Via Heraclea, which in the Imperial period became the Via Augusta. Despite the existence of a flat area nearby, both the road and the city were constructed on the western slope of a small hill. This location, in an elevated area, is associated with one of the main characteristics of the surrounding territory: the frequent floods. Indeed, the small valley that runs from north to south and extends to the west of the city is a space irrigated by a large number of small streams and rivers, the main one of which is the River Ter. All of these flows of water create a space that is very fertile for cultivation, but with a considerable risk of floods, especially at the point where four of these water courses converge (the rivers Ter, Onyar, Güell and Galligants), just to the west of the urban centre of the original *Gerunda*.

These elements of the landscape influenced not only the location of the urban centre but also the size and occupation of the periurban area or *suburbium*. Several suburban villas have been identified around *Gerunda*. The best-known archeologically is that of Pla de l'Horta. Most of the known villas in this environment (Montfullà, Vilablareix, Palau, Aiguaviva and Bell Lloc) (fig. 2) have common characteristics. Some of these characteristics are related with the general conception of suburban villas during the Empire. They include proximity to a water course or proximity to paths and roads for fast journeys between the villas and the city. Other aspects are more specific to the *suburbium* of Girona. For example, most of the known villas in this specific area were not at the centre of the plain. Instead, they were constructed in the first elevated areas of the surrounding hills. The reasons for choosing these locations were various. One reason could be the search for a scenographic setting that would reinforce the owner's image. Higher areas would make the buildings more visible and, at the same time, would provide a better view over the landscape. However, other aspects would also

have had an influence, such as the aforementioned risk of flooding. In fact, to date, no villas have been identified in the area of the plain closest to the city, even though *a priori* this could be considered an ideal space (Palahí and Costa, 2016). Another reason why villas were located at the edges of the plain could be that the flat area was kept for cultivation. The floods made the soil very fertile and the plain provided a rich area for farming.

Figure 1. Geographical situation of the villa of Pla de l'Horta (Girona, Spain).

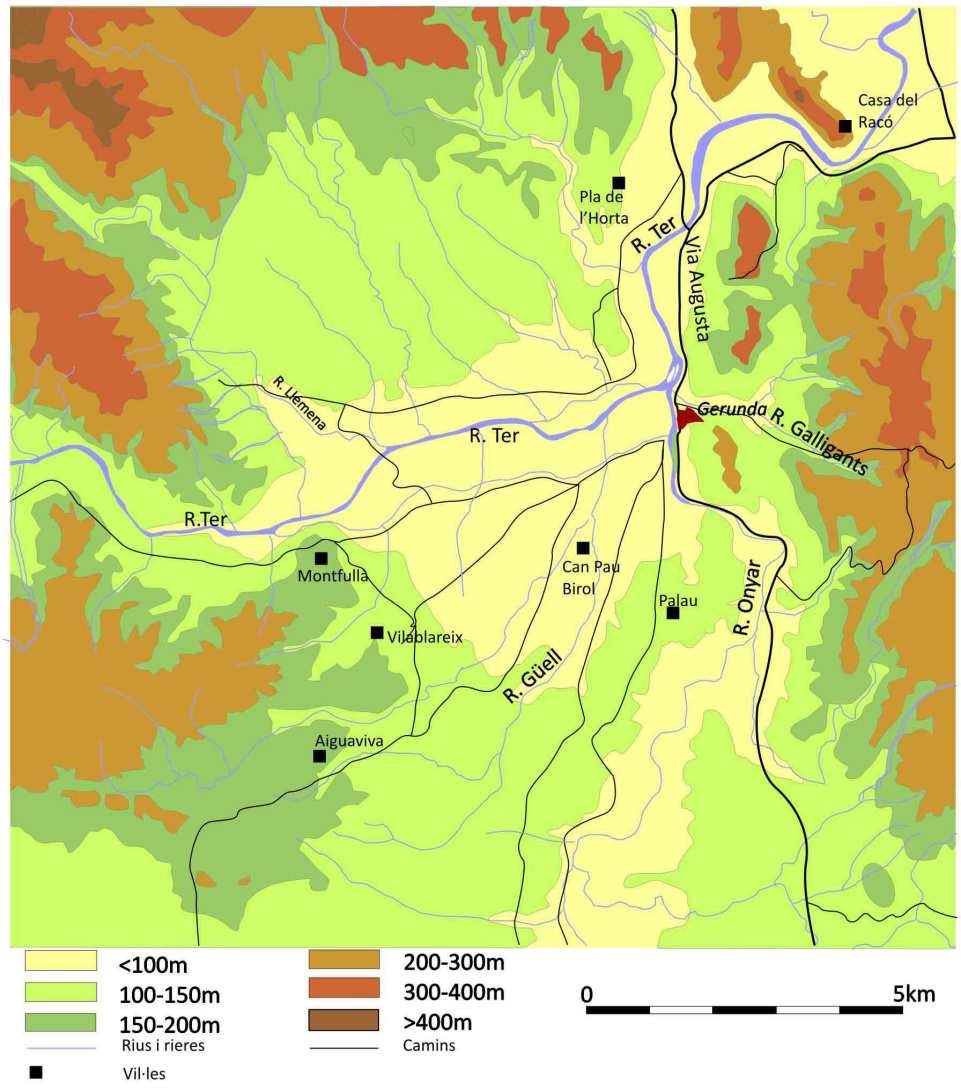


Figure 2. Map of the plain of Girona with the layout of the Roman villas located.

Location and description

The Roman villa of Pla de l'Horta is located in Sarrià de Ter, 4.5 km north of the current city of Gerona (Spain). The villa was sheltered against the eastern slope of the small hill of Montagut and faced the small plain that opens up to the east, on land that sloped gently down to the ford where one of the branches of the Via Augusta crossed the River Ter (Palahí, 2019). Its construction dates to the middle of the first century BCE, a few decades after the foundation of the city of *Gerunda* (80–70 BCE) and undoubtedly as part of the distribution of lands that accompanied the creation of the city.

Even when it was first built, the villa's residential structures were clearly distinguished from its production structures. The first residential building was constructed using materials of local tradition, with stone walls bound together with mud, an exterior coating of mortar, floors of beaten earth and roofs of *tegulae*. Nevertheless, the conception of the building was fully Roman, as a *domus* organised around an atrium with a long porticoed

façade on the eastern side, open to the agricultural plane. The production areas were on the western side between the residential building and the slope of Montagut hill, and probably already at that time towards the north as well. At the start of the first century CE, the villa underwent its first transformation. The building was reconstructed completely, with a structure very similar to the existing one but using new materials: concrete (*opus caementicium*) was used widely in the walls and floors were decorated to a high quality, with a combination of *opus signinum* with mosaics and *opus sectile*. At this time, the building already had many comforts with various dining rooms (*triclinia*) and some baths.

From this time and throughout the Early Roman Empire (first to third centuries CE) new alterations were carried out that extended and enriched the villa, undoubtedly in parallel with an increase in the wealth and prestige of its owners. Thus, in the mid first century CE, the residential building was expanded considerably with the construction of a large peristyle on the eastern side that almost quadrupled the built area of the villa. Subsequently, at the end of the second century CE, the entire western wing of the villa was rebuilt. From this time, it was arranged around a large room, an *oecus*, which was in a central position. However, it was not only the residential areas that underwent alterations and extensions. Considerable expansion can also be seen in the industrial areas, particularly towards the north, with the creation of areas for processing products and storage. The excavated part of the villa has revealed that some of the residential structures were abandoned in the Late Roman Empire from the fourth century CE, including the large *oecus* and the rooms situated to the north of this room. This section of the villa was converted into industrial areas. The large rooms were replaced with stores of *dolia de fossa*. However, we cannot associate this automatically with abandonment of the residential part of the villa, as only a quarter of the residential building has been examined archaeologically, corresponding to the back of the building at this time. Therefore, we cannot rule out the continuing existence of residential areas in the front of the house, to the east of the excavated part. If we focus on the production areas of the villa, which still need to be excavated to a large extent, the most relevant structures correspond to a large *torcularium* for wine production.

Choice of place. The physical environment

The Pla de l'Horta villa was founded at the end of the Roman Republic (first century BCE). However, the greatest expansion of this model of production and territorial occupation occurred during the Early Roman Empire, in this villa and in suburban and rural establishments generally. The distribution of these establishments seems to indicate a clear preference for alluvial plains with gentle topography, such as the plain of Empordà or, in the specific case of the villa of Pla de l'Horta, the broad fluvial terraces of the River Ter. The natural factors that determined the choice of location were mainly soil quality, water resources and other socioeconomic factors: proximity to

urban centres, ports, markets and roads. These were fundamental factors in the establishment of a villa (Burch *et al.* 2013).

In ancient literature, the choice of location for a villa is mentioned as an aspect to consider. As Latin agronomists indicated, the production of a *fundus* would be largely, but not exclusively, determined by how much water was available. A villa needed to have a water tank or be located close to a river course (Casión, *De Agr.* 1, 11, 2). Varrón suggested that a villa should be close to a spring or a water flow whose source was the mountains (*R.r.* 1, 2,2). The strategic factor of water supply had to be combined with a privileged position in relation to roads. Varrón noted that the setting and good road connections facilitated the transport of products from the *fundus* and enabled access to supplies (*R* 1, 2). However, being close to a road was not the same as being on top of it: a certain distance and an easy connection were required (Columela, *De r.* 1, 5, 7).

The location of Pla de l'Horta is practically perfect strategically (fig. 3). Sheltered against the eastern slope of Montagut hill and facing the small plain that opens to the west, the villa occupied land that sloped gently down to the ford where one of the branches of the Via Augusta crossed the River Ter. In fact, the old Roman bridge over the river was destroyed during the Civil War and was replaced by the current bridge, situated in the same place (Palahí, 2013, Palahí, 2019). One of the three milestones recovered

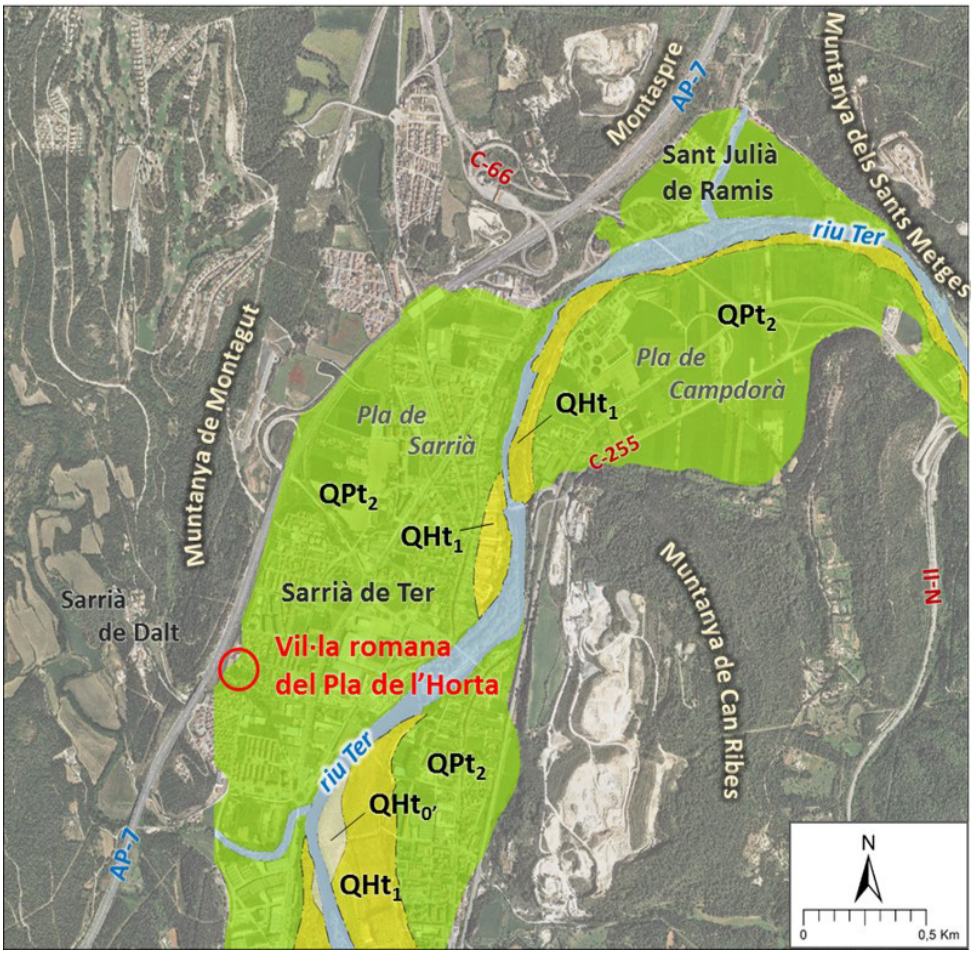


Figure 3. Map of geographic features that directly affect the archaeological site. The red dot indicates the location of the villa.

around the Roman city of Gerunda comes from this area (Fabre, *et al.*, 1991). An excellent drinking water supply was guaranteed by the torrent of *Sarrià*, situated to the southeast of the villa, on the other side of the hill where the main part of the farm was situated. This water course was the main source of water for the *fundus*, supplied through the construction of an underground aqueduct (Palahí, 2013, Nolla and Palahí, 2019).

There are many examples of rural aqueducts that supplied villas with this precious liquid. Sant Jaume de Domenys in Penedés, Sant Pere de Riu in the Maresme (Catalonia, Spain) (Prevosti, 2005), and the Collet villa in Sant Antoni de Calonge, Baix Empordà (Catalonia, Spain) are some of the many examples of channels and aqueducts that ensured the water supply to these villas for consumption associated with residential areas and for irrigation.

Geomorphology

A geomorphological study (Montaner *et al.* 2018) has established the potential for river flooding of the plain in the period and sector where the site is located. The study was based on cartographic identification of the main morphological elements, such as fluvial terraces and erosive scarps. On the side of the settlement's western slope, the geomorphological study was focused on identifying the existence of units of alluvial terraces or deposits on the slope that could indicate a specific agricultural use associated with the Roman settlement.

The geology-based analysis and the digital elevation model (DEM) show that the villa is situated at the western end of a terrace at quite high levels, between 8 and 12 m from the actual height of the river. Hence the occurrence of flooding was very low (return period greater than 500 years) and the risk of the plain flooding would not undermine its agricultural use. In contrast, on the other side (the western sector) of the villa, the slopes that exist today correspond to deposited material. They are agriculturally poor, and the area is small compared to the dimensions of the plain in this sector.

As a result of the geomorphological and geological study carried out in the sector of the fluvial terrace where the site is located, we can conclude that the plain was affected by floods that recurred extremely infrequently, which made it ideal for agricultural activity. The potential agricultural interest of the area further to the west, at the start of the western elevation and next to the current route of the motorway, could be ruled out for two reasons: a lack of sufficient surface formations covering the substrate for the development of agricultural land, and the suitability for farming of the plain and the terrace that extends towards the River Ter (fig. 4).

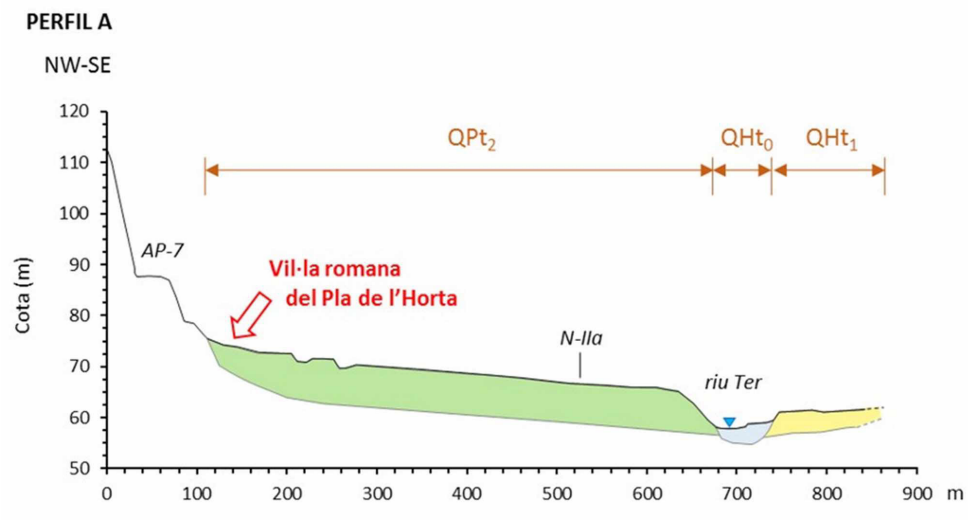


Figure 4. Geological map of the river terrace units of the river Ter as it passes through Sarrià de Ter, with the location of the Roman villa. (Montaner *et al.*, 2018).

Crops and forest activities. Carpology and anthracology

In the carpological study, various taxa were identified (fig. 5).

Figure 5. Location on the plan and section of carpological samples.

The cultivated cereals that were documented include bare grain wheat (*Triticum aestivum / durum/ turgidum*). This crop needs deep, rich soils that are preferably calcareous. The plant has an annual cycle and an erect, hollow or full stalk reaching up to 1.2 m high. It was traditionally cultivated to make flour, as the higher quantity of gluten in wheat makes it the most suitable grain for bread making. Remains associated with this crop have been found to the south of the villa's *pars fructuaria*, where remains of storage *dolia* and silos were found, and in the sector to the north of the *pars fructuaria.* The second cultivated cereal for which remains were found is barley. Barley and wheat often occur together in Mediterranean culture (Zohary and Hopf, 2000). It tended to be grown in winter, although it can also be planted in the spring. Remains associated with this grain have been

located in the northern sector, in the silted levels of the pit for the wine press, dated to the third century CE.

In direct relation to the cultivation of these two cereals, remains of *Lolium rigidum* or ryegrass have been found. This plant is associated with winter cereal crops and is used as fodder for stabled animals (fig. 6).

	Triticum aest/ durum/turg	Hordeum Vulgare	Cerealia*	Lolium	Vitis Vinifera	Pisum	Indeterminate
Ref.1477	1		1		1		4
Ref.1480					3		2
Ref.1497					1		
Ref.1182	1		3		2		2
Ref.1267							1
Ref.1225							2
Ref.1462			2				13
Ref.1567	1	1					1
Ref.1833		2		1	2		
Ref.2073						1	
Total	**3**	**3**	**6**	**1**	**9**	**1**	**25**

Figure 6. Table of carpological samples.

A potentially cultivated fruit tree that was identified is the grapevine (*Vitis vinifera*). This is a woody, climbing plant that can reach 30 m. The fruit is a globular berry of varying colour, between green and black. The fruit matures from July onwards in the hottest zones. They can be consumed fresh or dry (raisins) and as an alcoholic drink after fermentation. The vine shoots and tender buds are rich in tannins and anthocyanins, which have been used as an astringent against diarrhoea and haemorrhages. Remains of grape vine were located to the east of the area of the *torcularium* and in the sector immediately north of the pressing area. Within this section on crops, it should be noted that legumes were also present. Specifically, *pisum* seeds, commonly known as the pea, were found. Peas would have formed part of the usual diet in the period (López, 2019). (fig. 7) (fig. 8).

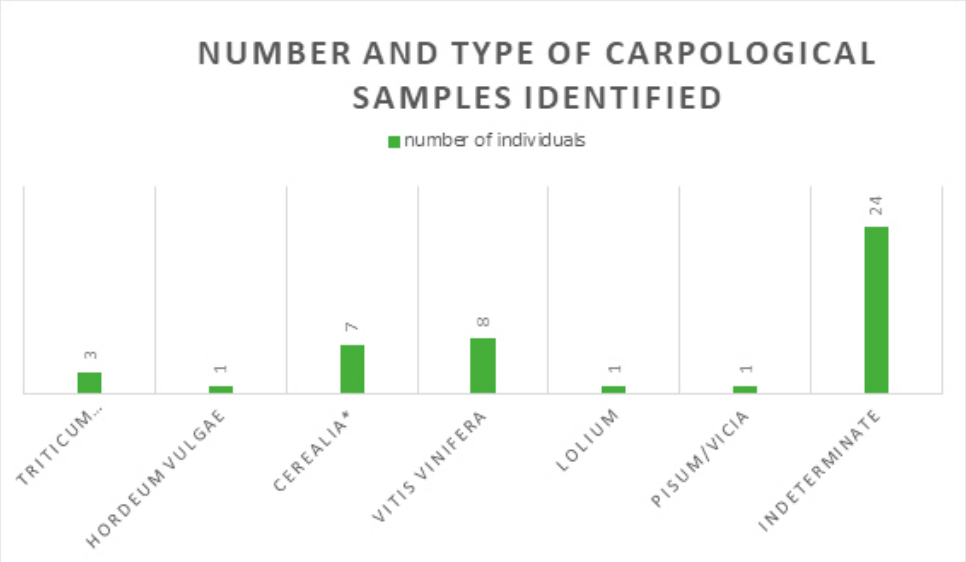


Figure 7. Chart of carpological samples.

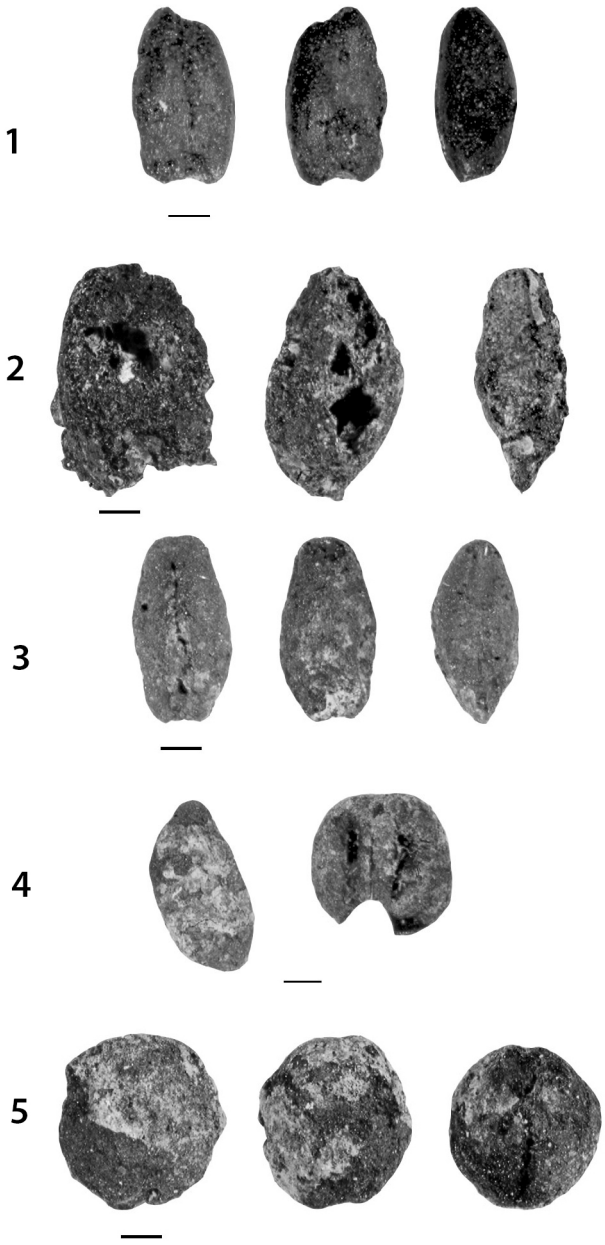


Figure 8. Some of the identified taxa in the carpological study: 1-2 Barley, 3- Ryegrass, 4- Grapevine 5- Pea (López, 2019).

Some examples of anthracological studies in Roman villas of the Iberian Peninsula provide very interesting data. A study by Euba and Allué of the Roman villa of Moro (Torredembarra, Catalonia, Spain) (Euba and Allué, 2003) provided data on the vegetation surrounding this villa and the use of wood as fuel to heat the villa's thermal complex (Euba and Allué, 2003). The anthrocological study revealed a considerable presence of olive (*olea europaea*) as the main plant species, followed by pine and shrub species that are typical in Mediterranean regions (Euba and Allué, 2003). Another study in a similar context of inhabitation and chronology to Pla de l'Horta, is an anthracological analysis of the area around the Roman villa of Los Cipreses (Jumilla, Murcia, Spain). This villa was a place of residence, like Pla de l'Horta. It also had a production area where grapevine (*vitis vinífera*) and olive (*olea europaea*) were predominant as the main crops, along with barley, fig and other plants cultivated on the farm (Noguera and Antolinos,

2009). These data help us to better understand the farmed areas around villas and the characteristics of agriculture in the Roman period.

An anthracological (fig. 9) study was carried out to determine the species that were used as fuel. A total of 205 charcoal fragments were studied from seven stratigraphic units. Eleven taxa were identified: maple (Acer sp), alder (*Alnus* sp), strawberry tree (*Arbutus unedo*), heather (*Erica* sp), juniper (*Juniperus* sp), prunus (*Prunus* sp), holm oak/kermes oak (*Quercus* sp sclerophyllous), oak (*Quercus* sp deciduous), a rhamnaceae or false buckthorn (*Rhamnus/Phillyrea*), a rosaceae (*Rosaceae/Maloideae*) and remains of grape vine (*Vitis vinifera*). The remains that were analysed indicated that the following varieties were used as fuel: representatives of deciduous vegetation of sub-Mediterranean forests: maple (*Acer* sp) and oak (*Quercus* sp deciduous), along with other species from Mediterranean forests: tree strawberry (*Arbutus unedo*), heather (*Erica* sp) holm oak/kermes oak (*Quercus* sp sclerophyllous). These species tend to form mixed forests in low Mediterranean land, especially in hollows and shady spots. The rhamnaceae, rosaceae, prunus and junipers could also have been found in these forests as part of the shrub layer. Finally, the alder is a representative of riverbank vegetation that thrives along the edges of water courses (fig. 10).

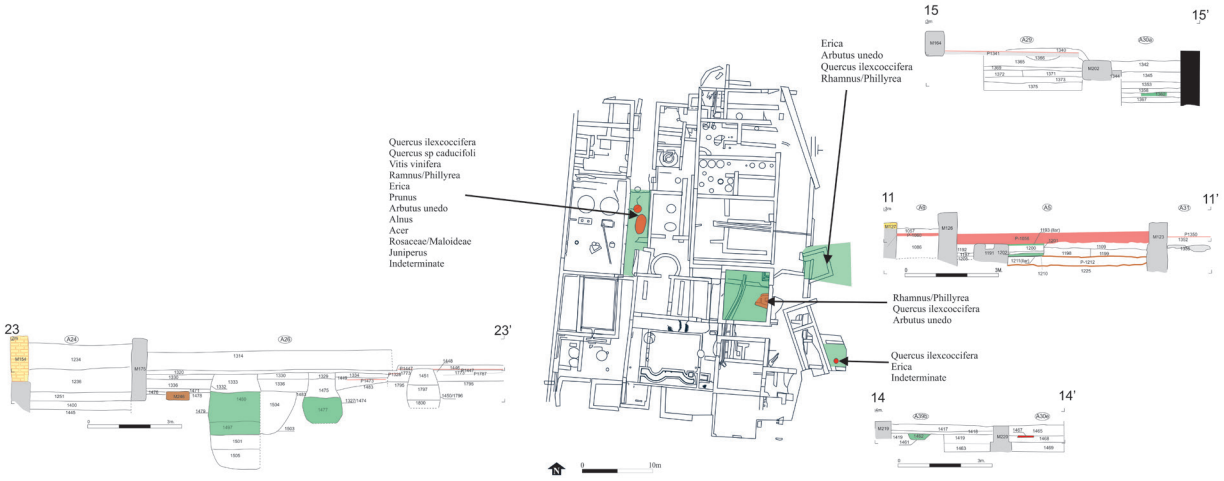


Figure 9. Location on the plan and section of antracological samples.

Therefore, in general, we can consider that plant-based fuel was collected in mixed forests of holm oaks and oaks that would have flourished in the surroundings of the settlement. Remains of pruning the villa's main crop, the grape vine, were also used. The remains that were studied were extracted from strata overlying a silo situated in the zone that separated the living quarters of the villa's inhabitants from its production area. The strata are associated with a room with hypocaust heating and a large oven, dated to the first century CE (Costa and Palahí, 2019).

The notable presence of shrub taxa in the ensemble (tree strawberry, heather, rhamnaceae) indicate that the forest environment may have been fairly open, as these are heliophytes that colonise degraded land. The

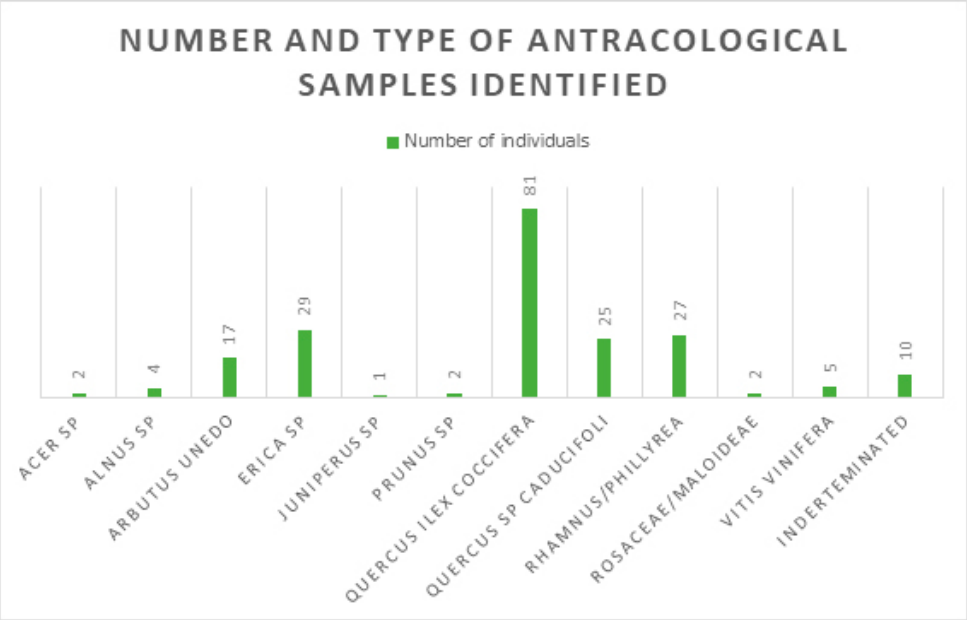
remains of grape vine complete the ensemble and indicate that vines were grown in the settlement. Although not extremely abundant, the grape vine remains may be due to use of prunings in the villa's fires and ovens.

Figure 10. Table of antracological samples.

Ref	*Acer sp*	*Alnus sp*	*Arbutus Unedo*	*Erica sp*	*Juniperus*	*Prunus*	*Quercus ilex-coccifera*	*Quercus sp caducifoli*	*Rhamnus/ Phillyrea*	*Rosaceae/ Maloideae*	*Vitis Vinifera*	*Indeterminate*
1477	1	4	6	1			20	14	3		2	4
1361			10	25			1		1			
1480				1		1	22	3	2		3	
1497	1			1	1	1	18	8	6	2		5
1462				1			12					1
1193									15			
1211				1			8					
Total	**2**	**4**	**17**	**29**	**1**	**2**	**81**	**25**	**27**	**2**	**5**	**9**

Other taxa present at the site may have been cultivated, such as rosaceae and prunus. The rosaceae include apple and pear trees and the prunus consisted of peaches, cherries and almonds. From the wood anatomy, we cannot determine whether these species were cultivated in Pla de l'Horta, and no remains of their fruit have been found. Hence, we cannot confirm that prunings were also used in this case as fuel. Notably, representatives of these subfamilies grow in a wild state in the Mediterranean geography. In contrast, the presence of seed and wood remains from the grape vine do indicate that the species was cultivated locally and managed by periodic pruning. The taxa that were best represented in terms of remains are holm oak/kermes oak, heather, rhamnaceae and oak. These four taxa comprise 83% of the identified remains. Therefore, we can conclude that the inhabitants of Pla de l'Horta took advantage of wood from local forests of holm oak and oak (fig. 11).

Figure 11. Chart of antracological samples.



Discussion

A study of the Picardie region (France) has collected data from fifty-two archaeological sites, of which more than fifty carpological remains of each have been analyzed. This study has allowed outlining the general evolution of the choice of crops between the beginning of the La Tène period and the end of the Roman period (Zech-Matterne 2014, 313). Thirty-four of the studied sites are located on plateaus or on the edge of a plateau, which has served as a point of comparison for this study, to highlight the possible repercussions of the topographic situation concerning the options of crops made. It seems that in those sites next to roads (500 m) have a preference in cultures (mainly buckwheat and wheat) bread grains. These two kinds of cereal have been detected in our study case, without discarding the presence associated species these crops, useful as fodder for animals, not mentioned in this french study. A similar trend is found in whether the establishments are to the south or north of the region, being more frequent in the former to find bread cereal crops. From south to north, a systematic abandonment of the most typical cereals of the La Tene period is observed in favor of bread-making cereals fruit of the Roman influence in them (Zech-Matterne 2014, 317). The same applies to the species of legumes, which diversify and increase in number from the consolidation by the Roman system (Zech-Matterne 2014, 320). After the arrival and consolidation of Roman agricultural practices in the north of Gaul there occurred already a substantial change in the choice of cultivated species, in the south something similar occurred, but with a greater diversity of taxa.

A carpological study of Corsica offers data with taxa identical to those of the Languedoc region at the same time (1st century AD). Taxa of *Hordeum, Triticum aestivum, vitis vinífera, olea europea, juglans regia,* and *prunus pérsica* (Ruas and Vigne 1995: 115), three of which are present in our study site with the same chronology.

Another carpological study of interest is the one carried out by R. Buxó in the wells of Lattes. Of 21 samples taken from five wells studied, a total of 65,954 remains were identified. The vast majority of these are seeds, but also grains and shell fragments. The vast majority of remains (57790) are grape seeds, come from a well-dated well (year 50-40 BC). By dating, the samples are distributed as follows: 58,069 seeds extracted from 3 samples were in strata of the first century before our era (in 440 liters of sediment); 661 remains of 11 samples for the full first century AD; and the remaining 1210 samples extracted 7 stratigraphic samples are chronologically placed at the end of the first century AD (Buxó 2005, 200). We observe as the vine has a large presence on this site. Overall, grape seeds dominate the other remains of fruits, which seems logical since these specimens are produced in very high numbers per fruit (Buxó 2005, 210). As regards the cultivation of cereals, samples of the study indicate a great representation in this archaeological site of *Hordeum vulgare* and *Triticum aestivum/durum*, and a token presence of leguminous: *Lens / Vicia, Pisum sativum* and *Vicia*

faba. The remains of cereals correspond to well's abandonment strata dated between the first century BC and the first century AD (Buxó 2005, 203). The variety of plant residues well illustrates the consumption of introduced species during the Roman period. From the second half of the 1st century BC, an increase in the development markers of new agricultural products is observed. It will be from the 1st and 2nd century AD that the pooling cereal crops to tree crops become so very common practice (Buxó 2005, 217), not only in Gaul but in all the provinces of the empire. Carpological studies of the Languedoc region with Lattes show a certain extension of viticulture, at least in the coastal strip. Between the third century and the century before our era, the cultivation of the vine occupied a prominent place to the point of significantly reducing imports of wine, a remarkable fact at a time when Italian wine flooded the French market. Studies on grapes in Lattes, provide strong arguments in favor of substantial local production of wine in the first century BC (Buxó 2005:,217).

If we compare this data with samples of our case study we see that in general, the priority crops focus on bread grain and grape growing that relates to wine production. If in the Languedoc local production of this product grows around the first century BC, in our study case this would be delayed until the beginning of the AD, being the areas closest to the coast the first to generate their wine production, and later this proceeding of own production is observed inside the territory. In the case of Pla de l'Horta, structures related to wine production have been found in Augustus era, but it will be in the Flavian phase where we find reforms that indicate greater relevance and productive capacity that confirm the importance of the cultivation of the vine in this rural interior setting (Costa, Palahí, Vivo 2019, 209-226).

Final considerations

We can confirm that the location of the Roman villa of Pla de l'Horta, including land, buildings and dwelling, was selected according to the criteria of suitability for farming, transport, and inhabitants' mobility. The location close to roads and a water course provided a landscape that was entirely appropriate for farming the land, in this case, for vine growing and subsequent wine production. This seems to have been the sustenance and economic driver of the property for centuries. The surface area of the property must have been large, although it cannot be defined specifically given that we do not have sufficient information to give an approximate figure in hectares.

The crops were of a marked Mediterranean nature. Notable were wheat and barley as winter grains. Ryegrass was associated with these crops and traditionally used as fodder for animals. Horticultural crops can also be observed. These, along with wheat and barley, would have formed part of the diet of the villa's inhabitants, including the owners and the slaves who lived in the villa and carried out the work. In addition, remains of

trees were discovered that grow naturally in Mediterranean environments but may have been farmed at the villa. Species like almond and fruit trees such as apple and pear were present at the villa and burnt remains of them were found. Although we cannot verify that these tree species were cultivated, we cannot rule out that the fruits were eaten. Such fruits were very common as food in this period and geographical context and were collected in forestry activities around villas. Finally, we know which species of trees were used as fuel because of the various spaces in which they were burnt in the residence. Oak and holm oak were favourite species for fuelling ovens, as well as heather, which was found in fireplaces in rooms associated with cooking.

Conclusions

The choice of where to build the villa was based on several factors. The most important factor was related to the conception of the property as a suburban villa, closely associated with the city of *Gerunda* and in which residential areas and social uses of the building could be of even greater importance than production areas. Therefore, an area was sought close to the city and the Vía Augusta, which enabled fast, easy travel between the two places. It was constructed in a privileged position, at an elevation, which strengthened the self-representation values of the complex. In addition to these social factors, we can find other practical criteria such as the availability of water for production needs and to provide certain comforts such as bathrooms or decorative elements like fountains or ponds. Finally, some determining factors were associated with the territory itself and its topography. The villa was constructed on slopes that were of little use for cultivation, according to the analyses. However, this location enhanced the values of the building and freed space on the plain, which was more suitable for farming.

We have indicated that one of the main crops that was cultivated was grape vine, for the subsequent production of wine in the villa. The grape vines were not planted on the slopes of the surrounding mountains, formed of marls that were not suitable for cultivation, but on the plain that extended to the east of the villa. The mountains would have been mainly occupied by forests of holm oaks and oaks as well as shrub species that provided wood for the villa and a habitat for animals that could be hunted. Along with the animals reared at the villa, these would have met the food and work needs in an establishment of this type.

When the Roman Empire fell, and the villa no longer existed as an economic system and social space, the territory continued to be farmed but under different premises, as a result of the new political order, the new social customs and the new economic conditions. All of these factors influenced the landscape, transformed it and adapted it again, in an ever-changing process.

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