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research

Wild, managed and cultivated plants in Northern Iberia: an archaeobotanical approach to medieval plant exploitation in the Basque Country

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Results from an archaeobotanical study of three Medieval and Post-Medieval sites of the Basque Country are presented. Data reveals the presence of a large range of plant species from different types of productive spaces: agricultural fields, orchards and gardens, and forests which complemented each other to provide different types of resources to the inhabitants of the area. Species such as the medlar (*Mespilus germanica*), the quince (*Cydonia oblonga*) or the bottle gourd (*Lagenaria siceraria*) are documented for the first time in the Iberian Peninsula.
Keywords: Basque Country, Medieval Age, plant remains, economy, subsistence

*I dati archeobotanici di tre siti medievali e postmedievali baschi rivelano la presenza di differenti specie provenienti da diversi tipi di spazi produttivi: campi, frutteti, giardini e foreste, complementari nell'economia di sussitenza degli abitanti dell'area. Alcune specie, come il nespolo (*Mespilus germanica*), il melo cotogno (*Cydonia oblonga*) o la zucca da vino (*Lagenaria siceraria*) sono documentate per la prima volta nella penisola iberica.*
***Parole chiave**: Paesi Baschi, medioevo, resti botanici, economia, sussistenza*

1. Introduction

Since the domestication of plants and animals, agriculture has been the main source of food for large parts of the planet. However, humans have been hunter-gatherers for a much longer period than farmers, depending upon gathering and hunting for their survival. Collecting wild plants (seeds, nuts, fruits, tubers, rhizomes, leaves, stems, etc.) has provided sustainable sources of subsistence to many human groups in many different regions and ecosystems across the planet. Gathering forms part of the traditional ecological knowledge embedded in the expe-

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riences, values and perceptions of humans which is transmitted by one generation to the next and, it is still practiced by millions of people in rural areas. Ethnobotanical studies have shown the importance of gathering wild plants not only for human diet but also for an enormous list of purposes such as medicinal remedies, dyes, fuel, building and bedding material, animal fodder, rituals and religious practices, crafts, cosmetics, lighting, etc.

In farming societies, wild plants continued to have an important role not only as a complement to diet but also as resource in times of scarcity or lean periods. In fact, there is ample evidence of the use of wild resources since the adoption of agriculture (Fairbairn *et al.* 2006) and throughout not only prehistoric but also historical times.

Apart from extensive ethnobotanical literature which focuses in present-day communities (hunter-gatherers and agriculturalists), historical sources and ethnohistorical accounts recall the use of wild plants and the exploitation of non-farmed areas, giving information on the way different ecosystems were used in the past. In addition, archaeobotanical studies provide important datasets which inform on the range of plants used and, therefore, on the productive spaces in use in different periods. Although most of the research has focused in prehistoric times, for later periods (Roman, medieval, modern), however, there are also impressive pieces of work which focus mostly on areas of central and northern Europe where most studies have been undertaken. For the Mediterranean area there is less information although the number of archaeobotanical studies from these periods has greatly increased over the last few years (Castelletti *et al.* 2001; Bandini Mazzanti *et al.* 2005, 2009; Bosi *et al.* 2009; Ruas *et al.* 2006; Cubero Corpas *et al.* 2008; Castiglioni, Rottoli 2013; Rottoli, Castiglioni 2011; Vigil-Escalera Guirado *et al.* 2013) providing useful insights into the way humans interacted with the surrounding environment.

Although food and diet and, particularly agricultural production, have been the main focus of interest of archaeobotanical research of historical periods, research has also followed other pathways. This has allowed the exploration of new issues related to plant use such as, for instance, the study of spices and condiments (Livarda, van der Veen 2008; Livarda 2011), dyes (Hall 1995), fibres (Latalowa 1998). Areas of production such as gardens have been also investigated (Dyer 2000, 2006) as well as food social-related aspects (Paap 1984; de Hingh, Bakels 1996; Yoder 2012).

Focusing in the Iberian Peninsula, the interest of classical and medieval archaeologists in the potential environmental archaeology may

offer for better understanding of human-plant interactions has been rather scarce (Peña-Chocarro, Zapata 1996, 2005; Zapata, Peña-Chocarro 1997; Alonso 2005; Zapata 2008; Antolín, Alonso 2009; Pérez Díaz *et al.* 2009; Alonso *et al.* 2010; Sopelana 2012, Peña-Chocarro 2013; Tereso *et al.* 2013; Vigil-Escalera Guirado *et al.* 2013) leaving most of Iberia as a blank area.

Gipuzkoa (Basque Country) is one of the few exceptions thanks to the intensive work carried out by Arkeolan, one of the most active archaeological companies of the area. During the eighties, Arkeolan started a long battle for the recognition of professional archaeology. The various steps of this long way included the development of legal measures for preserving urban archaeological sites which ended up with the successful protection of all Medieval towns and villages of the three Basque provinces (Gipuzkoa, Bizkaia and Álava). These measures included the obligation of carrying out archaeological work in all enterprises involving earthmoving.

Most of Arkeolan's work has focused on historical sites giving priority to sites where Roman levels were present. Thus, in 1992, the Roman harbour of Oiasso (Irun) was discovered providing the opportunity of working with waterlogged material where organic matter had been exceptionally preserved. These circumstances led to the development of new analytical approaches including, for the first time, plant remain studies (Peña-Chocarro, Zapata 1996, 2005; Zapata, Peña-Chocarro 1997). This successful project set up the methodological bases for future activities in the area (Urteaga, Gereñu 2003).

Despite the vast amount of work carried out on environmental archaeology, it is surprising that there are still archaeological projects in which this approach is just ignored, missing out the enormous potential of this type of studies. The environment was part of the world past societies lived in, it shaped and was also shaped by human communities, and therefore, it brings valuable information for defining and better understanding past human activities.

This paper tries, therefore, to contribute to the knowledge of plant use during the Medieval and Postmedieval periods by looking at their remains from three archaeological sites dated to 13th-17th centuries in the Basque Country. It explores the role different productive spaces (agricultural fields, orchards, home gardens, and woodlands) had within the economy of those communities. Which resources were used? What crops did they grow? Did wild plants played a role? Were fruits an important element of Medieval diet? These are some of the questions we will try to discuss based on the analysis of the plant remains from the sites under study.

2. The sites and the samples

The three sites considered in this paper (Solar Panpinot 12-14, Solar Juan Laborda 16-San Nicolás 21 and Solar San Bartolomé 8) are located in the Basque Country (fig. 1), in the historical territory of Gipuzkoa (fig. 2), and dated to the period between the 13th and the 17th centuries. Two of the plots studied in this paper, Solar Panpinot 12-14 (PAH02) and Solar Juan Laborda 16-San Nicolás 21(FOH04), are located in Hondarribia (fig. 3) while the third one, Solar San Bartolomé 8 (CBE01), is situated in Elgoibar.

Hondarribia extends over a hill which dominates the mouth of the Bidasoa. It was occupied since the Roman period (Urteaga 2004) when, as reported in the written sources (Strabo III, 4.10), the river was the border between the Hispania Citerior and Aquitania. For a long time, the town fluctuated in between two large provinces giving the impression of being an extension of the northern territories. However, during the 11th century AD, Hondarribia entered into the influence area of the kingdom of Pamplona under king Sancho el Mayor's rule. A small settlement with a castle enjoying juridical identity before 1200 must have emerged in this frontier area characterized by the presence of a protected estuary advantageous for fluvial navigation. Then, the town together with the rest of Gipuzkoa, was conquered by Alfonso VIII and in 1203 a town charter establishing its municipality was granted to it. The development of Hondarribia fits well with that described by Beresford (1967) for the so-called "organic town". The town charter allowed the fortification of the town with an inner area which remained almost identical in size until today. Due to its strategic position, the area was the scene of numerous battles and sieges.

Elgoibar, 65 km from Hondarribia, was founded in 1346 following a town charter granted by king Alfonso XI on the lands of the monastery of San Bartolomé de Olaso, on the left bank of the Deba river. It is situated at the crossroad of several routes which communicated the region. Originally, the city was surrounded by a wall and it was naturally defended by the river at one side and by a ditch channeling the water from various streams (Urteaga 2005).

2.1. Solar Panpinot 12-14 (PAH02), Hondarribia

The archaeological excavation took place in 2002 and 2003 in a 230 sq metres plot where new offices for the municipality were planned (fig. 4). Sediments reached up to 2 metres as the existing depression was filled in up to the street level to allow house building. Along the base of

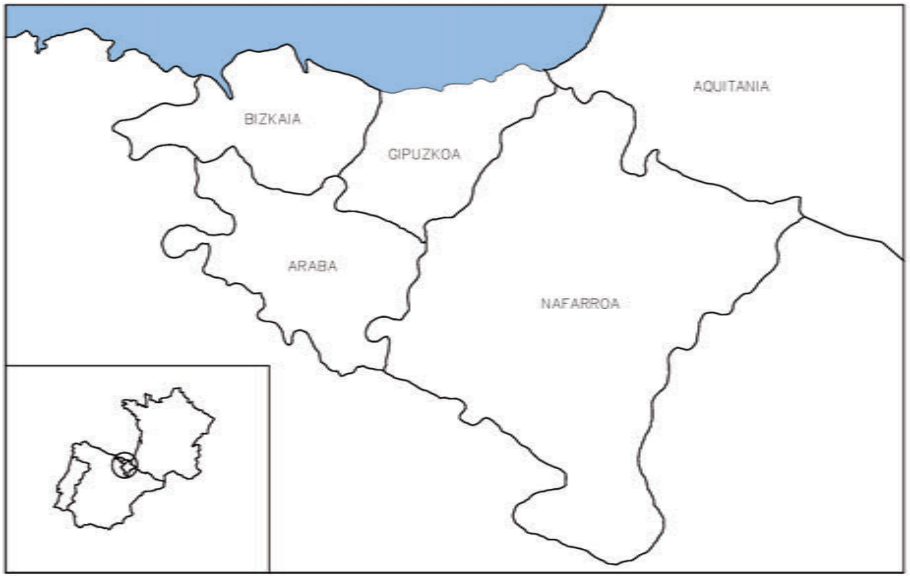


Fig. 1. Location map of the area under study.

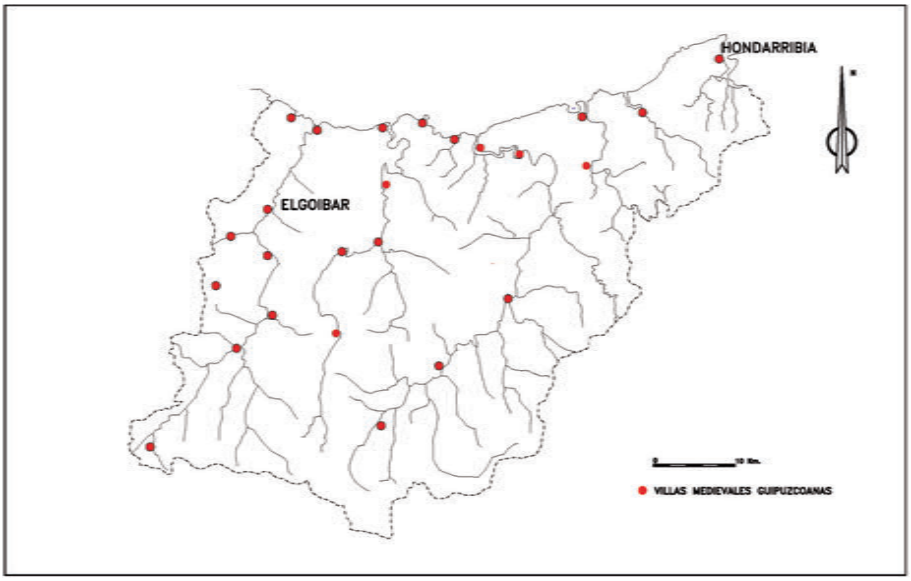


Fig. 2. Location of Hondarribia and Elgoibar.

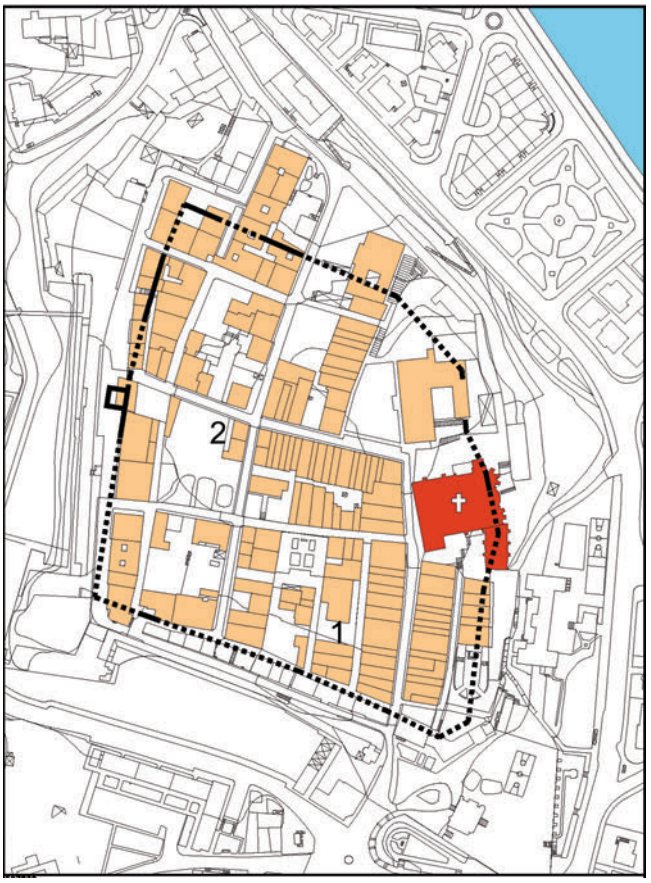


Fig. 3. Plots excavated in Hondarribia.

the stratigraphy, a paleostream channel was found which was filled with dark and soggy sediments. The earliest levels, dated to the 12th century, are then superposed by series of layers of soaked sediments. Samples come from a layer dated to the second half of the 16th century where several structures identified as winery presses were found (fig. 5). A well for water collection was also discovered.

Sixteen samples were taken from different contexts (2, 29, 34, 43, 44, 45, 50, 80, 181, 198, 225, 229, 231, 354, 391, 393). Contexts 391, 43 and 45 are part of the natural ground of the paleostream while contexts. Layers 229, 225 and 181 are part of a thick deposit filling the paleostream channel and have yielded archaeological material from the 14th and 15th centuries. Pottery is rather abundant being dominated by green "Rouen style" fragments. Other finds (coins, buckles, brooches, etc.) do also point to the same chronological period. On top of these lay-

Fig. 4. Panpinot area during excavation.

Fig. 5. Wooden base of the wine press.

PANPINOT (PAH 02)																
Campaign	**2002**	**2002**	**2002**	**2002**	**2002**	**2002**	**2002**	**2002 -03**	**2003**	**2003**	**2003**	**2003**	**2003**	**2003**	**2003**	**2003**
Context	**2**	**29**	**34**	**43**	**44**	**45**	**50**	**80**	**181**	**198**	**225**	**229**	**231**	**354**	**391**	**393**
CEREALS																
Hordeum vulgare				1												
Triticum aestivum/durum (charred)		6	13	204	5	6										
Triticum aestivum/durum (charred) rachis		1														
Avena sp.				1												
DRIED FRUITS																
Castanea sativa							1									
Corylus avellana				2		2	7	8	10	8		1	1	2		
Corylus pericarp fragments				30		16	147	232	116	21		2	16	2	1	
Fagus sylvatica							2									
Juglans regia									2							
Juglans regia fragment				14		7	74	42	27	5	2		9			
Pinus sp.						1	1									
Quercus sp.							1	1								
Quercus sp. ? Fragment							7									
FRUITS																
Malus domestica				1			17									
Mespilus germanica		9	20	39		13	5									
Mespilus germanica (part of the fruit)												1				
Olea europaea										2						
Prunus persica	2		1	12		3	25	115	45	2	2		2	2		
Prunus persica fragments				4			8	42	16							
Prunus avium/cerasus				20			19	42	154	4						6
Prunus domestica ssp. domestica				17		7	1	186	251	5	3		3			
Prunus domestica ssp. domestica fragment				1			3	27	30		1					
Prunus domestica ssp. insititia			1	34		7	139	619	283	14	15		10	3		327
Prunus domestica ssp. insititia fragment							14	37	14					3		1
Prunus domestica/insititia				2				12	11	3						
Prunus domestica/insititia fragment								10	3							
Prunus spinosa		2	1	2			70	267	38	1	3		2	1	1	
Prunus spinosa/insititia						9	7									
Prunus sp.							2	112								
Prunus sp. fragments							1	51			1					
Vitis vinifera		358	886	2620	244	104	3591	3848	1							
Vitis vinifera (pedicels)			5	4		2										
GARDEN PLANTS																
Brassica/Sinapis				1												
Lagenaria siceraria				1			1									
WILD PLANTS																
Euphorbia lathyrus				4												
Rosa tp fruit												1				
Rubus sp.			10													

Tab. 1. Plant remains from Panpinot.

ers there are contexts 354, 231, 198, 80, 2, 29, 34, 44 and 50 which are considered part of the same filling. These represent episodes of rubbish disposal. Finally, context 393 belongs to the filling of an artesian well located at the highest part of the plot and dated to 16th century.

The samples studied from Panpinot have yielded more than 16.000 plant remains (tab. 1) from which fruits represent the largest part although cereals have been also identified. Amongst the fruits, grape pips are the dominant species and different types of plums (*Prunus domestica* ssp. *domestica* and *Prunus domestica* ssp. *insititia*) have been identified together with sloe (*P. spinosa*), peach (*P. armeniaca*), and cherries (*P. cerasus/avium*). Small numbers of olives (*Olea europaea*) have been also retrieved. Dried fruits were also present (hazelnuts, nuts, pine nuts, acorns, chestnuts and beech seeds). Garden plants such as bottle gourd (*Lagenaria siceraria*) and free-threshing wheats and barley were also found.

2.2. Solar Juan Laborda 16-San Nicolas 21 (FOH04), Hondarribia

The excavation was carried out in 2004 on a 931 sq metres plot occupied by a house with a garden. Remains of perimeter walls from 5 structures dated to the 16th-17th centuries were discovered from which

Fig. 6. Buildings discovered at the site of Juan Laborda 16-San Nicolas 21. To the left the cesspit from where samples were taken.

JUAN LABORDA- SAN NICOLÁS (FOH 04)	
Campaign	**2004**
Context	**101**
CEREALS	
Avena sp.	30 (900)
Triticum aestivum/durum (charred)	3
Triticum aestivum/durum (rachis)	2
Triticum sp (charred)	3
DRIED FRUITS	
Juglans regia (fragment)	1
FRUITS	
Cydonia oblonga	6
Ficus carica	1031 (19380)
Malus domestica	2
Prunus cerasus/insititia	25
Prunus domestica sub domestica	6
Prunus domestica sub insititia	25
Prunus spinosa	5
Vitis vinifera	336
Vitis vinifera (pedicels)	34
WILD PLANTS	
Polygonum sp.	1 (30)
Rubus sp	47 (720)
Rumex sp.	2 (60)

Tab. 2. Plant remains from Juan Laborda.

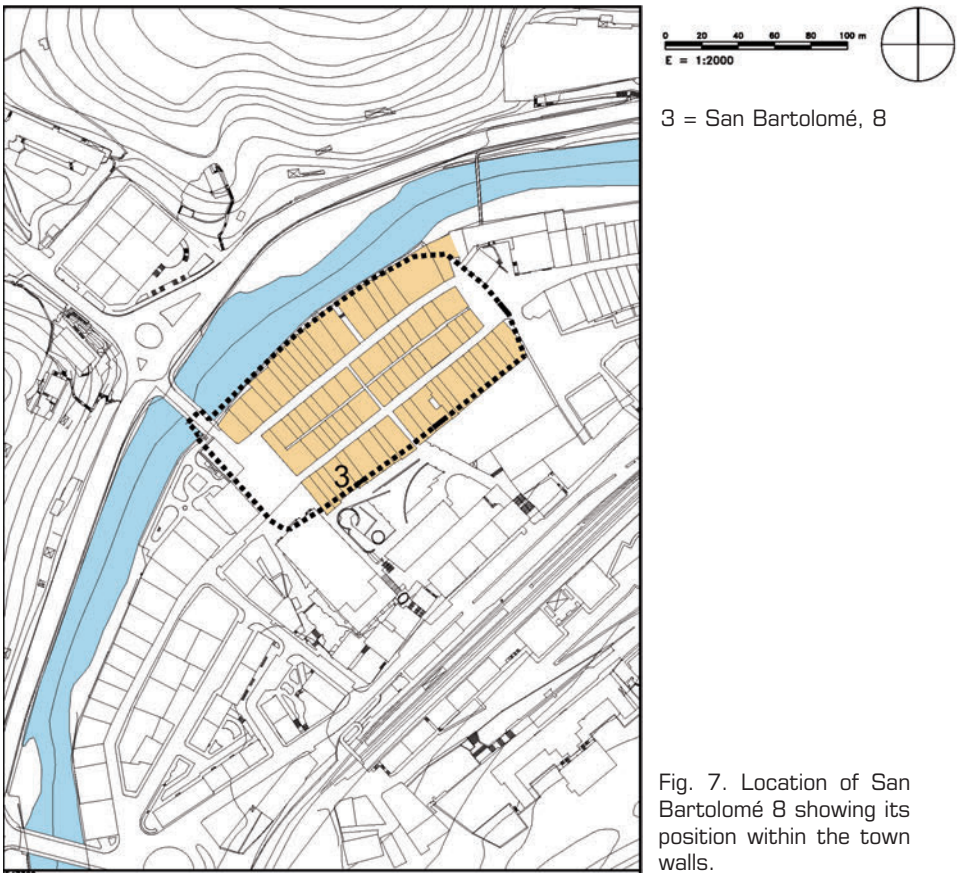
4 showed a N-S orientation being parallel to Juan Laborda street and the fifth, according to ancient cartography (Izaguirre Igiñiz 1994), developed along the E-W axis. In between both groups of buildings a small (maximum width 2 m) blind alley, already visible in the 1700 plan of the village, was detected. Here, a cesspit filled in with dark organic earth was found (context 101) and a sample was taken. The filling was dated between the 15th and 17th centuries (fig. 6). A total of 150 ml were analyzed for the two coarse fractions (4 and 2 mm) whereas for the finest (1 and 0,5 mm fractions) only 5 ml were studied and their total numbers calculated afterwards.

More than 1500 seeds (more than 21.000 if the estimated numbers are considered) have been found. Figs and grapes are the dominant species but other fruits such as apples, sloe, possible cherries and plums have been identified (tab. 2). Quince (*Cydonia oblonga*) has been also identified being the first record for the Iberian Peninsula. Dried fruits are scarcely represented as are the cereals (free-threshing wheats and oats). Amongst the wild species, *Rubus* sp. (blackberry/raspberry) has been also documented in large numbers.

2.3. Solar San Bartolomé 8 (CBE01), Elgoibar

The site was excavated in 2001 by opening a 4,5 m x 4 m transect along the wall and ditch which reached a depth of 3,5 m (fig. 7). The dark soggy sediments of the filling were extremely rich in organic matter and archaeological material resulting from the waste collected by the ditch as part of the village cleaning and of sanitation activities (fig. 8). Amongst the material found there are shoes and other objects in leather, coins, pottery, plant remains, wood pieces, combs, etc. Due to their function as collectors of rubbish, ditches can provide vast amounts of information on urban life and have become spaces of great archaeological interest.

The earliest level of San Bartolomé is dated to the 14th century and the latest goes back to 1616. The five waterlogged samples from this site come from the filling of the ditch and have yielded a total of almost



3 = San Bartolomé, 8

Fig. 7. Location of San Bartolomé 8 showing its position within the town walls.

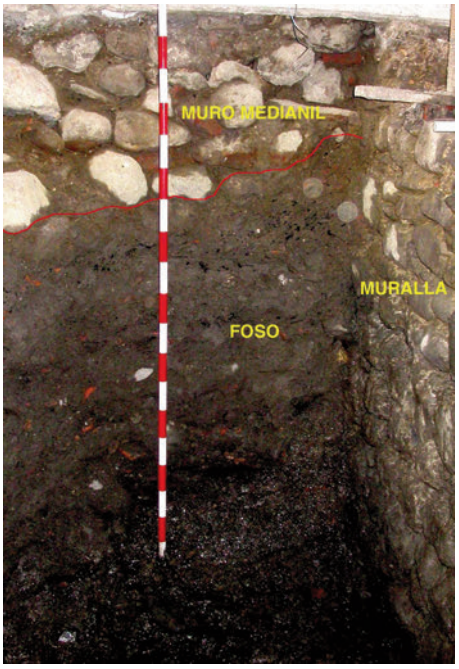


Fig. 8. Stratigraphic section of San Bartolomé showing the waterlogged level of the ditch.

800 remains (tab. 3). By and large the species represented are similar to those from Panpinot (hazelnuts, nuts, chestnuts, beech seeds, and pine nuts) while amongst the fruits plums, peaches and cherries are the most common. The site has also produced a single seed of *Cucumis* sp. (melon or cucumber).

The three sites considered are waterlogged so organic material is beautifully preserved. Samples were taken during the excavation and water sieved on-site. The analysis of the samples was carried out at the Laboratorio de Arqueobiología of the Instituto de Historia (CCHS-CSIC) using a reference collection and different seed atlas. Samples consisted in plastic bags containing semi-sorted material which was further sieved using a sieve column of 4, 2, 1, 0,5 and 0,25 mm meshes. For samples still containing sediment, a volume of approximately 150 ml was analyzed, although there were cases in which bags contained seeds fully sorted, eg. bags with peach or plum stones. While the tables from the sites of Panpinot and San Bartolomé report the real number of seeds, in Juan Laborda-San Nicolás only the coarse fractions 4-2 mm were fully sorted being analyzed only a small portion (5 ml) of the 1 and 0,5 mm fractions. Therefore, the table reports both the real number of seeds identified and the estimated amount in brackets (tab. 2).

SAN BARTOLOMÉ (CBE 01)					
Campaign	**2001**	**2001**	**2001**	**2001**	**2001**
Context	**12**	**28**	**29**	**30**	**31**
DRIED FRUIT					
Castanea sativa	1	1			
Castanea sativa (fragments)	119	23			
Corylus avellana	45	5	2	4	
Corylus avellana pericarp (fragment)	732	116	70	140	26
Fagus sylvatica					4
Juglans regia (fragments)	2390	182	283	165	24
Pinus pinea (scale)			1		
FRUITS					
Olea europaea	2				
Prunus persica	346	50	20	29	6
Prunus persica fragments	192	6	5	2	9
Prunus avium/cerasus	674	64	76		5
Prunus avium/cerasus fragment	22		4		
Prunus domestica ssp. domestica	17				
Prunus domestica ssp. domestica fragments	1				
Prunus domestica ssp. insititia	1242	82		19	5
Prunus domestica ssp insititia fragments	61	5	64	2	1
Prunus dulcis fragment	1				
Prunus spinosa	10		1		
Prunus sp				7	1
Prunus sp. fragment	67				
Prunus sp.	312	66			
Vitis vinifera	1				
Cucumis melo/sativus	1				

Tab. 3. Plant remains from San Bartolomé.

3. The plants

3.1. Field Plants: cereals, legumes and grapes

Agriculture certainly contributed to the feeding of the population of the area under study. Cereal cultivation probably provided most of the calorific intake individuals needed representing the main source of carbohydrates in human diet. However, evidence at these sites is sparse mostly due to the type of preservation. Waterlogging does not usually preserve cereal grains.

In Panpinot the number of cereal remains is significant but all of them have been preserved by charring. The main cereals identified are the free-threshing wheats (hard and bread wheat) while barley and oats are just represented by one single grain. In Juan Laborda-San Nicolas site, free-

threshing wheats are also present but in small numbers whereas oats appear again represented by a single caryopsis. Free-threshing wheats is a generic name for a group of wheats in which threshing allows the grain to be easily separated from the chaff (the various layers that surround the grain) as opposed to the hulled wheats which require a further operation to separate the grain from the chaff. Free threshing wheats include two species, *Triticum durum* (hard wheat) and *Triticum aestivum* (bread wheat), which can be only distinguished when remains of their chaff (rachis) are preserved. Panpinot samples have only provided a single rachis while Juan Laborda-San Nicolas have yielded two rachis segments whose degree of preservation has prevented its identification to species level, so it is impossible to ascertain whether we are dealing with hard or bread wheat. No cereals have been reported from San Bartolomé.

Free-threshing wheats are the commonest wheat species of the period being used for human consumption. Barley and oats were also common crops of the time although little represented in these sites. The reduced number of remains does not allow for considerations regarding their use, whether for human food or for animal feed. Both barley and oats are attested in contemporaneous sites in the Basque Country (Sopelana 2012) and in earlier medieval contexts of the region (Zapata 2008).

Apart for feeding people and animals, cereal sub-products (straw and chaff), had multiple uses in rural society (animal food and bedding, tempering, crafts, thatching, fuel, etc.). Ethnographic studies of present-day communities in rural areas have shown the multiplicity of uses these elements have in traditional societies (Hillman 1985; Mingote 1987-88; Peña-Chocarro, Zapata 2003; Peña-Chocarro *et al.* 2009) and it is likely that they were used similarly in the past. There is no evidence of hulled wheats or millets but this absence might be related to the type of contexts studied.

As for legumes, their cultivation is well established in the area since prehistoric times, and there is archaeobotanical data which shows the presence of lentils (*Lens culinaris*), bitter vetch (*Vicia ervilia*), peas (*Pisum sativum*) and possibly *Lathyrus* spp. at sites like Zaballa (Sopelana 2012) in the southern part of the Basque Country. Due to environmental constraints, it is likely that dry cultivation in extended fields did not take place, but some species such as peas or grass pea may have been grown at small scale in gardens. Their absence from the archaeobotanical record of these sites may be linked more to the preservation mode than to their real absence from the crop assemblage.

Grapes (*Vitis vinifera*) were also cultivated in farmed land. Plenty of documentary sources recall the presence of vineyards in the area. Seeds

were found in large quantities in Panpinot, probably associated with a wooden wine press which was partly preserved due to waterlogged conditions. In the cesspit of Juan Laborda-San Nicolas, grape pips were also present in a considerable number. Their presence in a cesspit context points to their consumption as grapes or dried raisins.

3.2. Plants from orchards and home gardens

Despite the scarcity of written evidence on gardens and orchards in medieval and modern times (Dyer 2000, 2006), their remains (seeds and fruits) are commonly found in a variety of contexts since the Roman period (Moffet 1992; Dickson 1994, 1996; Wiethold 1995; Ruas, Bouby 1996; Ruas *et al.* 2006; Karg 2007; Viklund 2007; Rosch 2008; Bouby *et al.* 2012) demonstrating they played a role within subsistence, contributing to a healthier diet. Gardens were a common feature of medieval and postmedieval landscapes, they varied in purposes, size and consequently in production but all yielded vegetables for the kitchen table. Apart from providing food and other goods, gardens did also supply with additional income in case of surplus. However, despite the significant value of these productive spaces, research has been very limited. According to Dyer (2000, 2006), the largest gardens were of royal and aristocratic property. Conceived as recreation areas for the pleasure of their owners, these spaces were managed by specialized gardeners. They were also producers of fruits and vegetable for the palace consumption and surplus sold. Of more modest size were the gardens of castles, monasteries and manor houses which had the function of supplying fruits and vegetables for household consumption and market. Finally, the most abundant type was that of the peasants or town inhabitants which were smaller in size and dedicated to the production of fruit and vegetables to complement the cereal-based diet.

Bouby and Ruas (2014) have stressed the major implications of adopting fruit-tree cultivation. On the one hand, arboriculture is a huge investment over extended periods of time with delayed returns as trees will only produce fruits several years after plantation. On the other hand, a major issue in fruit cultivation is the way trees reproduce through vegetative propagation as opposed to the sowing of annual plants (cereals, legumes) which implies the development of specific techniques to assure their reproduction (grafting) and their management (pruning). Fruit trees have played an important role in human diet as they provide sugars, vitamins, mineral salts, fibres adding diversity to diet. In addition, dried fruits are also source of lipids and proteins.

Fig. 9. Peach stone (*Prunus persica*) from Panpinot.

Many studies have focused on the main Mediterranean fruits, grape, fig and olive which have produced a vast literature. Issues related to their domestication and large scale production (wine, dried fruit and oil) have attracted the most interest. In contrast, the role of other fruit trees and the practice of horticulture has been less central to mainstream archaeobotanical research.

The sites under consideration in this paper have yielded a large variety of fruit species. Apart from the abundant number of grapes (see above section for discussion), the inhabitants of Hondarribia and Elgoibar consumed fleshy fruits such as peaches, cherries, different types of plums, medlars, figs, apples, sloes and quinces from which some probably grew in local orchards or gardens.

Amongst the cultivated fruit trees, the genus *Prunus* is ubiquitous. It is represented by the peach (*Prunus persica*), the cherries (*Prunus cerasus/avium*) and the plums (*Prunus domestica/insititia*). The peach (fig. 9) is very abundant in the contexts studied except in the cesspit of Juan Laborda-San Nicolas site where faecal remains only include small size seeds. From China, where it was domesticated, the peach expanded with Greek colonizers and arrived into Europe with the Romans during the 1st century AD (Zohary *et al.* 2012) where it appeared in Italy (Sadori *et al.* 2009). In fact, large amounts of peach stones, dated to this period, were recovered in the area during the excavation of the nearby Roman harbour of Irun (Peña-Chocarro, Zapata 1996, 2005; Zapata, Peña-Chocarro 1997). Cherries and plums were widely used from the wild in prehistoric times and, as well as peaches, the Romans spread their cultivation. In the Roman harbour of Irun hundreds of cherry and plum stones were retrieved representing most probably the first introductions of these species into the area. Large numbers of stones from both species are represented in the contexts studied pointing to the importance of these fruits. Apples (*Malus domestica*) have been also identified and there is plenty of historical information on their cultivation in the area.

A rather interesting finding is represented by the quince (*Cydonia oblonga*) which is the first record of this species for the Iberian Peninsula. Six pips were retrieved from the cesspit of the Juan Laborda-San Nicolas site as part of food refuse or faecal material. The fruits are usually consumed in jams, compotes, pastes and beverages as the pomes are rather astringent to be eaten raw. Their presence in Hondarribia reflects the enormous variety of fruits available to the inhabitants of the village. Quince pips have been reported in other medieval sites in central Europe (Hellwig 1997) but findings are rare.

The most abundant fruit remain is the fig (*Ficus carica*) which is heavily present in the cesspit layers, corresponding to typical content of faecal material. Whether from wild plants or most probably from domestic trees locally cultivated in orchards or gardens, the fig was part of the diet of the inhabitants of this region.

Apart from orchards, home gardens were also an important feature in medieval and post medieval times. As today, they were productive spaces intensively cultivated within a larger farming system. A large variety of crops of specific values for the household (legumes, tubers, roots, oleaginous, medicinal, condiments, ornamental plants, etc) were cultivated. These microenvironments, as described by Eyzaguirre and Linares (2004) harboured high levels of species diversity and contributed to nutrition and food security of the medieval population.

Archaeobotany has contributed to the knowledge of the crops grown in home gardens. There is evidence since the Roman period of the growing of onions, garlic, leeks, carrots, fennel, cabbage, parsnips, asparagus, beet as well of the use of flavouring species such as dill, coriander, summer savory, marjorana, mustard, parsley amongst others (Dickson 1994; Bakels, Jacomet 2003) which continued during the medieval period. New species, many exotic, arrived into Europe in this period as a result of trading. Although for the Mediterranean area data is scarce, the information available for northern Europe has been recently discussed (Karg 2007; Livarda, van der Veen 2008; Livarda 2011).

Plant remains from the sites studied have provided little evidence about horticultural plants. Three species (represented by very few seeds) have been identified as possible candidates to this group, *Brassica/Sinapis* sp., *Lagenaria siceraria* and *Cucumis melo/sativus*. *Brassica/Sinapis* sp. refers to two different genera which have been not possible to differentiate. The genus *Brassica* includes the cabbages (*Brassica oleracea*), the turnip (*B. rapa*), the swede (*B. napus*) and the mustards (*B. nigra*) while the *Sinapis* genus includes the white mustard (*Sinapis alba*). Both genera comprise also many wild species which may have grown naturally in the area.

Fig. 10. Bottle gourd seed (*Lagenaria siceraria*) from Panpinot.

An interesting finding is the bottle gourd seed (*Lagenaria siceraria*) identified in Panpinot. The bottle gourd is a cultivated plant whose origin is still unknown although, by Roman times, this species is already under cultivation (Schlumbaum, Vandorpe 2012). Two different forms are distinguishable, the bottle-shaped type characterized by a thick rind which allows using the fruit as a vessel, and the elongated types whose young fruits were consumed as a vegetable (Janick *et al.* 2007). Both forms were represented in depictions and illustrations from the Middle Ages. The seed retrieved comes from the site of Panpinot (fig. 10) from two levels probably containing domestic waste. It is worth noticing that a fragment of the rind was also found in a nearby site dated to Roman times. Whether the bottle gourd was used as a vessel or consumed by the population is unknown. Two seeds of *Cucumis melo/sativus* (melon/cucumber) have been identified at San Bartolomé. Both species belong to the Cucurbit family which also includes other species of economic interest. Cucurbits were already known in classical times and described by authors such as Dioscorides, Columella and Pliny. A recent review of classical sources and images of Cucurbits (Janick *et al.* 2007) from the Mediterranean area has concluded that cucumbers (*C. sativus*) must have arrived into this region after Classical times and that most representations of what has been identified as cucumbers correspond to the so-called snake/chate melons (*C. sativus* ssp. *Melo* Flexuosus group).

Data from Hondarribia and Elgoibar, although limited, prove the existence of homegardens which contributed to the diet of the people living in these areas. Contemporary sites in the region have not produced any evidence of horticultural plants (Sopelana 2012).

3.3. Plants from the wild: the forests

Forests played a central role in medieval society. They were multi-purpose productive spaces which provided human communities a large range of products: timber for various uses (fuel, building, crafts, etc.), wild plants for human (berries, mushrooms, fruits, roots, tubers, etc.) and

animal consumption (pasture, leaf fodder), animals for hunting, honey, shade, etc. Their use was regulated by laws which helped to manage these rich environments and balance demands.

The samples analyzed in this paper have produced ample evidence on woodland use. Although, wood remains have not been included in this study, there is a huge amount of wood objects which indicate the exploitation of forested areas. Timber for building, wood for fuel (used in heating, cooking, industrial processes) and crafts, leaves and young branches for animal fodder were perhaps the most significant products from the forest together with hunting. In terms of seeds and fruits, many of the species identified correspond to wooded areas. Plant remains have produced significant amounts of seeds and fruits of chestnuts (*Castanea sativa*), hazelnuts (*Corylus avellana*), walnuts (*Juglans regia*), pine (*Pinus pinea*), acorns (*Quercus* sp.), medlar (*Mespilus germanica*), sloe (*Prunus spinosa*) and blackberries (*Rubus* sp.) in all three sites. With the exception of chestnuts and medlars all the species were already identified in the nearby harbour of Irun during the Roman period (Peña-Chocarro, Zapata 1996, 2005; Zapata, Peña-Chocarro 1997). Chestnuts and walnuts could have been grown in gardens or near the villages but it is likely that, together with other species like hazelnut, and the acorn grew in the woodlands and were managed to improve wood production. Historical sources from neighboring areas stress the practice of cyclical coppicing and pollarding on chestnuts and acorns already from the 14th century (Gogeascoechea 1996). These pruning techniques have been a common practice in the area until very recently (Zapata, Peña-Chocarro 2003) and were cyclically carried out in areas of the forest with the main aim of improving wood production and collecting wood avoiding clear cuts.

Apart from their wood, these species produced edible fruits which became important elements of the diet. Chestnut has been extensively used in large parts of southern Europe for both its wood and its fruits. Although it has been assumed that *Castanea* cultivation started with the Romans, it is likely that this species was preserved in *refugia* areas of the Iberian Peninsula as seems suggested by the finding of its pollen in several areas of the Cantabric Cordillera during the Late Pleistocene and the Early Holocene (refs in López-Merino *et al.* 2010). Their significant role in diet is related to its important role as source of carbohydrates. The largest number of remains comes from the site of San Bartolomé reflecting, perhaps, the arrival of waste material collected at the ditch. A complete fruit was also found at Panpinot. Walnuts are also abundantly present in all three sites, particularly in the form of pericarp fragments. As in the case of chestnut, *Juglans regia* survived in *refugia* areas and

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Figg. 11-12. (left). Whole walnut (*Juglans regia*) from Panpinot; (right) complete hazelnut fruits (*Corylus avellana*) from San Bartolomé.

during Roman times it expanded. Walnuts are extremely rich in oil and were part of human diet since the Roman period. Whole fruits were recovered from Panpinot (fig. 11). Hazelnuts, in contrast, have been ubiquitous in the archaeobotanical record of northern Iberia since prehistoric times. They were also represented in the material from the harbour of Irun, and were used by the villagers of Hondarribia and Elgoibar (fig. 12).

Other nuts such as those of pines (*Pinus pinea*) have been only identified in Panpinot and San Bartolomé (fig. 13). They are scarcely represented in the samples and it is difficult to explore their role within the diet. Pine nuts have been widely used in the Mediterranean area since the Palaeolithic, and during Roman times they become part of recipes and culinary preparations. Their presence together with other edible fruits and nuts suggest that this species was also part of the diet.

Acorns and beech seeds represent as well the gathering from forested areas. Acorns are not abundant (just some specimens and fragments of cotyledons from Panpinot) and this scarcity might be related to their use for animal feeding which would have prevented them to turn up in the contexts analyzed. The number of beech seeds identified (in Panpinot) is rather low but it was a frequent species in other waterlogged sites of the area. The seeds are very rich in oil which was traditionally used for lighting. Their presence in Panpinot might just be accidental reflection of the surrounding vegetation.

Medlars, sloes and blackberries grew also in woodlands. Their presence in some of the contexts studied clearly indicates human consumption. The cesspit from Juan Laborda-San Nicolas produced several blackberry seeds suggesting they were part of faecal material. The sloe appears in low numbers in the cesspit pointing to its use as part of the diet perhaps as part of jams or compotes, due to its astringent taste.

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Figg. 13-14. (left) Pine nut (*Pinus* sp.) from Panpinot; (right) fragment of medlar fruit (*Mespilus germanica*) from Panpinot.

The case of medlar (*Mespilus germanica*) is an interesting one. Brought in by the Romans, this species has been found in various Roman contexts in central Europe. According to Pollman and Jacomet (2012) it was probably cultivated in the area by the second half of the 2nd century AD. In the Iberian Peninsula, these remains are the first finding of this species (fig. 14). Medlars are left in the tree until the first frost when they are collected and stored until the flesh softens and the skin becomes brown in a process called bletting. Their flesh can be eaten raw or as kind of preserve.

In medieval times, the medlar achieved great popularity and it appears in many historical sources across Europe. Baird and Thieret (1989) indicate that medlars were commonly cultivated in England during the 17th and 18th centuries. In the Basque Country, this species is mentioned in several historical documents in various contexts. Municipal charters form the 14th century in Bizkaia established, for instance, the prohibition of cutting medlars (Hidalgo de Cisneros Amestoy *et al.* 1986). Other texts recalled the prohibition of gathering medlar fruits (Jiménez de Aberásturi Corta 1980). However, despite the popularity they had in the past, today it is a forgotten tree. In the some areas of the Basque Country, this tradition has passed from generation to generation, and it is still possible to find medlar fruits in local markets.

4. Conclusions

Food is a powerful and persistent element of human culture which has attracted much interest among researchers from different fields. From all

food categories, food plants were unquestionably important in the diet of the Medieval and Postmedieval inhabitants of Hondarribia and Elgoibar. Some of them were produced under farming regimes, like the cereals, and they were staples or the grapevines which were widely cultivated in the region. Others were grown at smaller scale in orchards and backyards, like fruit trees and garden plants. And, finally, others were either managed through pruning techniques, or gathered from the wild, like some trees and wild plants. Beyond contributing to the diet (which they significantly did), many of these species added diversity, provided new tastes and flavours and probably improved food preparation and cooking habits.

The three spaces analysed here (agricultural fields, orchards and gardens, and forests) complemented each other in the basic task of feeding people. Although cereals (free-threshing wheats, oats and barley) supplied most of the energy requirements of people, fruits and wild plants offered a rich supplement to diet. The large variety of cultivated fruits (peach, cherry, plums, figs, grapes etc) highlights the rich diversity existing and suggests fruit production had reached maturity.

The strategic use of the various ecosystems and food producing areas was key for the subsistence of most people. Plants were cultivated, cared for, tended, managed or gathered in the context of human-environment interactions and as part of a global food production strategy.

An exhaustive analysis of historical sources would certainly add more information to this scenario of plant use. However, archaeobotanical data still remains one of the most direct sources of knowledge for exploring the uses, practices, procedures, etc. that these communities put in motion.

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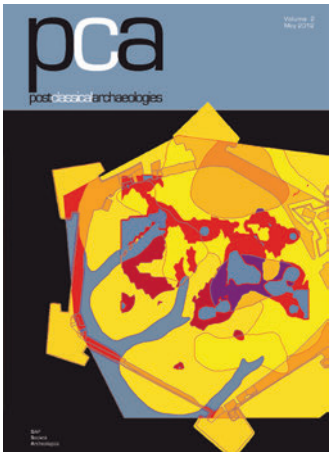

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