PRELIMINARY ANALYSIS OF THE MACROBOTANICAL REMAINS FROM THE LATE ANTIQUE AND BYZANTINE PHASES OF THE DOMUS AT POMPEIOPOLIS

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Keywords: *Archaeobotany • Contextual interpretation • Domestic • Late Antique and Byzantine Archaeology • Medieval Anatolia • Black Sea*

Abstract: Archaeological excavations of the Domus complex at Pompeiopolis reveal significant information about the evolution of the settlement beginning from its foundation in the second half of the 3rd c., its transformation through the Late Antiquity - Early Byzantine – Transition Period (Dark Ages) and the Middle Byzantine phase of the complex before its abandonment sometime after the 11th-12th c. In the 2021 excavation season, 32 flotation samples were processed representing the multi-period occupation of the domestic complex. In this paper, macrobotanical materials recovered from the flotation samples are analyzed. The results are discussed in relation to the sample contexts representing different phases of the Domus.

POMPEİOPOLİS'TE BULUNAN DOMUS'UN GEÇ ANTİK ÇAĞ VE BİZANS DÖNEMİ EVRELERİNDEN ELDE EDİLEN MAKROBOTANİK KALINTILARIN ÖN DEĞERLENDİRMESİ

Anahtar Kelimeler: *Arkeobotanik • Bağlamsal yorumlama • Domestik • Geç Antik Çağ ve Bizans Arkeolojisi • Ortaçağ Arkeolojisi • Karadeniz*

Özet: Pompeiopolis'te gerçekleştirilen arkeolojik kazılar Domus kompleksinin 3. yüzyılın ikinci yarısında inşa edilmesinden, 11.-12. yüzyılın sonrasında terkedilmesine kadar geçen zaman içinde Geç Antik Çağ – Erken Bizans – Geçiş Dönemi (Karanlık Çağ) ve Orta Bizans dönemlerindeki dönüşümü hakkında önemli bilgiler sunmaktadır. 2021 kazı sezonunda bu konutsal alanın çok dönemli iskanını temsil eden 32 flotasyon örneği incelenmiştir. Bu makalede flotasyon örneklerinden ayrıştırılmış olan makrobotanik kalıntılar analiz edilmiş, Domus kompleksinin farklı dönemlerini temsil eden örneklerden elde edilen sonuçlar bağlamlarıyla ilişkili olarak tartışılmıştır.

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Introduction

Archaeobotanical studies predominantly focus on prehistoric and pre-classical periods in Anatolia, compared to later periods. While there are more contributions in the last decade to Late Antique, Medieval and Ottoman periods[1], we are strongly indebted to the archaeobotanical research done in the earlier diachronic excavations such as Beycesultan, Amorium, and Kilisetepe[2] (Fig. 1). This preliminary archaeobotanical data studied from Pompeiopolis, representing Late Antique and Medieval periods, aims to contribute to the limited archaeobotanical assemblages of related periods in Anatolia, and is therefore worth consideration.

Also, the chronological resolution of data recovered from the Domus complex at Pompeiopolis is high compared to the majority of Late Antique and Medieval excavations. In most cases, the chronological representation of the archaeobotanical data is defined as Byzantine or Medieval for the entire assemblages. However, this definition represents the 4th-15th c., therefore it is low resolution and insufficient for providing data relating to any specific research questions. Especially, there are multiple social, religious, political, and economic breaking points (i.e. de-urbanization/ruralization, domestic organization, economic strategies, Persian wars, Arab attacks (dark ages or transition period), Iconoclasm, Middle Byzantine revival) during the Late Antique and Medieval periods apart from the environmental and climatic factors. For instance, palynological research proves that there were favorable climatic conditions, and agricultural practices and animal husbandry increased during the Middle Byzantine period and this is also supported by archaeological and historical data[3]. Archaeobotanical data at Pompeiopolis provides information for all significant periods.

In this preliminary analysis, primarily the proportions of the economic species were identified and the patterns were compared with other contemporary archaeobotanical assemblages in Anatolia. The dominant presence of some species is taken as an important indicator of economic strategies and various unfavorable conditions (i.e. wheat vs barley cultivation). Also, contextual patterns were emphasized in chronological differentiation, therefore kitchen, storage, and drainage contexts were associated with consumption, storing, and discard behaviors respectively, and thus the domestic organization of the community through the occupation history of the Domus complex. Component parts of plants were included in the analysis to make inferences about the condition in which they were brought to the domestic unit, how they were stored and whether the diachronic absent/present pattern of component parts within the Domus

[1] see Giorgi 2012; Ramsay – Eger 2015; Pişkin – Tatbul 2015; De Cupere et al. 2017; Cassis et al. 2019.

[2] see Helbaek 1961; Harrison – Christie 1993; Bending –Colledge 2007.

[3] see Izdebski 2012; Haldon et al. 2014; Xoplaki et al. 2016; Roberts et al. 2018.

context might indicate anything about the ruralization process.

Context of the Study

The archaeological site of Pompeiopolis is located in Taşköprü, Kastamonu. The Roman city was founded by Gnaeus Pompeius Magnus in 65/64 BCE, after defeating Mithridates VI[4]. The settlement (Zımbıllı Tepe) was continuously inhabited from the 1st c. CE until its final abandonment sometime after the 11th-12th c. The public and functional structures of the Roman city were discovered and documented both through geophysical prospection and excavations revealing limited parts of the structures, mostly in the upper parts of the settlement[5].

From 2009 an Italian team directed by Prof. Musso (University of Roma 3) ran an extensive excavation of a whole block of the ancient city on the north-eastern slope of the hill[6]. The block was entirely occupied by a Late Antique Domus built around the mid-3rd c. and continuously inhabited until the Middle Byzantine period with a succession of transformations that can be summarized as follows: Period I (mid-3rd to 6th c.) - rich residential grand house; Period II (6th to 7th c.) - transformation of the house into several premises hosting storerooms and manufacturing facilities; period III (8th to 10th c.) - loss of the original townscape and formation of a hamlet; Period IV (11th-12th c.) - construction of a Christian religious building and formation of a small cemetery around (Table 1).

Period I provides continuous occupation history of the Domus during the transition from the Late Antique to the Early Byzantine period. Period II represents the 6th-7th c. occupation of the Domus, which was subjected to major architectural transformation[7]. In Anatolia, 6th-7th c. is known for political instability due to the Persian and early part of the Arab invasions, therefore this phase bears the potential to enlighten the less known part of Anatolia during this period of political instability[8]. An interruption of communication starts in this period between the capital Constantinopolis and the cities of Anatolia, resulting in new administrative and economic organizations, and the lands were divided into *themata*[9]. 6th c. is also taken as the beginning of de-urbanization and ruralization of Byzantine Anatolia[10].

Period III was dated to the 8th-10th c.[11], which represents the Transition period (Dark Age)[12] and the early part of the Middle Byzantine period, when there was a rural revival, establishment of new domestic and industrial units and prosperity of diminished urban settlements (castra)[13]. The Domus area at

[4] Summerer – von Kienlin 2013, 115.
[5] Summerer – von Kienlin 2013.
[6] Musso et al. 2011; Brizzi et al. 2021; Summerer 2008, 2012, 2013, 2014, 2016, 2017, 2018; Summerer – Çevik 2015; Summerer – von Kienlin 2009; Summerer et al. 2010.
[7] Brizzi et al. 2021.
[8] see Decker 2016.
[9] see Haldon 2010; Brubaker – Haldon 2011.
[10] see Saradi 2006.
[11] Brizzi et al. 2021.
[12] see Decker 2016.
[13] see Holmes 2008; Harvey 2008; Whittow 2008.

Pompeiopolis was transformed into a hamlet in this period[14].

Period IV, which is the final occupation of the settlement, is dated to the 11th-12th c. A Middle Byzantine chapel and associated graves were attested in the excavations[15]. This phase has the potential to provide information about the transition from the Byzantine to Seljuk period in the region. Many Byzantine settlements were abandoned or transformed and continued under Seljuk rule in the region during the 11th-12th c.[16]

Flotation samples taken from the Domus and its neighborhood represent domestic contexts: storage room, kitchen, street sewer, and internal drainage. Archaeobotanical data at Pompeiopolis sheds light on storing plant-based food, food preparation, consumption, and discard behaviors.

Methodology

In the 2021 excavation season, a total number of 32 samples from the Domus area were floated (637 liters), sorted, and identified (Fig. 2) (Table 2). Of those, 12 samples from the depot belong to previous years and 20 samples were newly taken simultaneously with the ongoing excavations.

Sampling Strategy

The archaeobotanical work at Pompeiopolis in the 2021 season mainly focused on understanding the contextual relationship between the Domus complex and the recently explored street of the settlement. During the excavations, a main drainage system below the street pavement was explored, which had connections to the internal drainage system of the Domus. Apart from that, burnt contexts and utility features at the Domus that might have the potential for plant remains were considered for sampling. Therefore, the sampling strategy was judged following the excavation of these related stratigraphic units. No limits were defined for the sampling volumes. Each sample is calculated per liter while comparing the identified materials in the further stages of the research. Potential stratified contexts were sampled gradually at depth to distinguish intrusive materials in the upper parts of the stratigraphic unit, which might originate from disturbance and post-depositional processes.

Flotation

A siraf type flotation barrel was used to process the soil samples. It was designed and first used at Pompeiopolis by Evangelia Pişkin from METU in the 2012 season. The barrel had two valves: one for water intake and the other for air, which was connected to an air compressor to mobilize and resolve the intact soil and help to easily float the charred materials minimizing the physical contact during the process. The floated light fractions (LF) were collected in a tulle cloth (woven ca.100 microns) and set on a perforated bucket at the mouth

[14] Brizzi et al. 2021.
[15] Brizzi et al. 2021.
[16] see Tatbul 2021; Böhlendorf-Arslan 2017, 367; Cassis 2009, 5-6; Haldon 2018, 251; Erciyas 2019.

of the barrel, where the water overflowed. The sunken heavy residue (HR) was collected in plastic mesh (1 mm). Volumes of all soil samples were measured by a scaled bucket in liters before floating.

Sorting

After the flotation and drying process of the samples, all LF and HR were sieved through 2 mm, 1 mm, and 500-micron sieves. Only the LF and HR over 2 mm in size were sorted and identified. Materials smaller than 2 mm were kept in the depot for further study. Due to bureaucratic reasons and a general prohibition on all excavations by the Ministry in the last few years, the samples could not be moved to scientific institutions, universities, and laboratories. Therefore, in the limited time, only the samples over 2 mm had to be sorted, identified, and analyzed within the boundaries of the excavation facilities.

Identification

The aim of this analysis of the 32 samples analyzed in 2021 was to investigate the economic plants within different contexts of the Domus through its architectural and occupational evolution from the Late Antique to the Middle Byzantine periods. After the sorting of seeds and fragments from the larger charcoal remains with the naked eye, each separated material was observed under a stereo microscope for identification at the species level. Visual documentation of plants were made through a Celestron MicroDirect 1080p digital microscope.

Plant remains recovered from the samples were identified by using the *Digital Atlas of Economic Plants in Archaeology*[17], *A Manual for the Identification of Plant Seeds and Fruits*[18], and *Jacomet's manual Identification of Cereal Remains from Archaeological Sites*[19]. Due to the restrictions that limited the performance of the identification procedures on-site, no reference collections could be appealed to other than the very limited examples the authors had. Some plants, which needed further checks in the laboratory with reference collections, could not be identified properly, and are therefore recorded as unidentified in the database, but excluded in this article.

Quantification

All identified specimens were quantified. Seeds were counted as one when they were in complete form. For grapes, the tips of the seeds were counted. When there are stalks (i.e. grape pedicle) they were counted as one. For legumes, the half seed was counted as one if the other halves were not in the same rational size.

Data Analysis

Proportions among species

The count of identified specimens was 109 among the plant remains recovered from 32 soil samples having a total volume of 637 liters (Fig. 3). The dominating species were the cereals with

[17] Neef et al. 2012.
[18] Cappers – Bekker 2013.
[19] Jacomet 2006.

47% of the total assemblage. *Triticum spp.* (wheat) was represented with 18%, *Hordeum spp.* (barley) with 10% and *Cerealia* with 19%, which includes grasses and unidentified members of the *Poaceae* family.

Legumes comprise 4% of the identified plant taxa. It was surprising that no lentils (*Lens culinaris*), peas (*Pisum sativum*), and chickpeas (*Cicer arietinum*) were recovered within the Domus samples. A limited number of *Lathyrus sativus* (grass pea) and *Vicia sativa* (common vetch) represented the legumes.

While cereals were the dominating family of the assemblage, *Vitis vinifera* was the most abundant individual species with 28%. Very limited fruits and nuts were recovered other than grapes. 1 *Prunus cerasus* (sour cherry), 1 *Olea europea* (olive), and 1 *Juglans regia* (walnut) were found among the samples. 18% of the total assemblage was weeds, where the vast majority was preserved in uncharred condition, which might originate from modern contamination.

For the component parts of the plants, *Cerealia* culm nodes were the most abundant component parts of the cereals, where 30 fragments were found within the samples. Straw fragments were the second in abundance with 21. The number of *Cerealia* rachises and spikelet forks was 12 in total. Other than *Cerealia* component parts, 7 grape pedicles were found in the samples.

Significant Clusters and Patterns of Species Among Sampling Contexts

While *Triticum spp.* were only found in storage and drainage contexts, the majority of *Hordeum spp.* was in storage contexts. The vast majority of *Cerealia* and component parts of the cereals were in the kitchen context. Legumes were absent in the kitchen samples. Grape was significantly dominant in the storage context (Fig. 4).

The taxonomic composition of Samples 22-23, taken from a burnt kitchen context, was the most significant (Table 3). It dates to Period III, which represents sometime between the Transition Period (Dark Age) and the beginning of the Middle Byzantine Period. This kitchen context was represented by cereals and fruits while legumes were missing. Among the cereals was *Hordeum spp.* (3) (Fig. 5a), *Cerealia* (16), and component parts such as rachis (9), spikelet forks (2), nodes (26) (Figs. 5b-c-d), and straw fragments (10). It might be taken as an indicator that the final cleaning of the cereals was performed in the kitchen area. There was a lack of *Triticum spp.* within the sample, but it might be due to the discretionary sampling spot and the sample size, which was only 24 liters. Samples 22-23 were also one of the richest in *Vitis vinifera* having 6 grape pips and 1 pedicle. The other two fruits, 1 *Prunus cerasus* (Fig. 5e), and 1 *Olea europea* (Fig. 5f), were only found in this sample. Also, 4 weeds were found in the sample.

Four different groups of samples representing storage facilities were significant. The first group, Samples 7-8-

9 (taken from three different spots), was from a multi-functional room with an earthen floor. This sample group dates to Period II. It is significant due to the presence of cereals and grapes. *Triticum spp.* (4), *Hordeum spp.* (3), other cereals (3), and component parts such as nodes (3) and straws (4) were found. This might be an indicator of storage of cereals in a half cleaned state and the rest of the cleaning processes being performed before the preparation of the food. *Vitis vinifera* pips (6) and pedicles (6) were also found in the samples besides cereals (Figs. 5g-h). The second sample group (Samples 36-37), was only significant for grape pips (4). They were recovered from the content a pithos located in a storage room. This sample also dates to Period II. Another significant sample (10) was taken from basement storage destroyed by fire, based on the evidence of a carbonized pole. The sample was comprised of *Vicia sativa* (2) and component parts of cereals (1 node, 7 straws). The context dates to Period II-final phase.

The fourth important sample recovered from a storage context was Sample 3. It was taken from a pithos in a storage room. It dates to Period III. It had the most cereal and grape-rich content with 7 wheat, 4 barley grains, and 11 grape pips.

7 samples taken from the drainage context have charred plants, of those 4 are from internal channels of the Domus and 2 represent the main street sewer content. Sample 29, from an internal channel context, had only 1 barley grain. Sample 30, taken from the catch pit of the latrine, has 4 wheat grains. Both samples date to Period I- final phase. Sample 33, taken from an internal channel dating to the 6th-7th c., had 1 wheat, 1 *Juglans regia* fragment in mineralized condition (Fig. 5l), and 2 weeds, and Sample 38 from the same phase (Period II) had only 1 grape pip. Sample 27, taken from the debris below an *in situ* lid on the main street sewer, had the richest sample content with 3 wheat grains (Fig. 5i), 1 cereal, 1 rachis fragment, 1 *Vicia sativa* (Fig. 5j), and 2 grape pips. The sample dates to Period I-II (Road III). This context was significant because it represented the ashy refuse of the Domus, which was dumped into the main street sewer through an offtake channel. Sample 1 from Period I-II (Road III) street channel context had 1 *Lathyrus sativus* (Fig. 5m) and Sample 19 from the same period had one wheat grain.

Distribution of Macrobotanical Remains Among Occupation Phases

Macrobotanical remains were mostly recovered from Period III samples. While cereals were most abundant in these samples, wheat (*Triticum spp.*) had a more equal distribution among periods, and barley (*Hordeum spp.*) was only absent in Period I samples (Fig. 6). Parts of cereals such as rachis, spikelet fork, culm node, and straw appeared to be richest in Period III and moderately present in the Period II occupation of the Domus. It can be questioned whether the cereals were brought to the Domus complex cleaner during the 4th and 5th c. and the presence of the component parts *terminus postquem* 6th c. was indicative of the performance of grain separation within the complex, and the earliest phase of the ruralization process in the city.

Discussion

The vast majority of the Domus assemblage was comprised of cereals at Pompeiopolis throughout its occupation history. The dominance of cereals is a common pattern in many Late Antique and Byzantine contemporary archaeological sites. Similar patterns of species proportions were reported at Amorium during the Late Roman and Byzantine periods[20]. Archaeobotanical samples at Sagalassos and Düzen Tepe, in its territory, show that cereals were the primary crops through the Early and Middle Byzantine periods[21]. A variety of crops were attested at Byzantine Kilisetepe including cereals such as wheat types (einkorn, emmer, spelt, free-threshing) and barley, pulses (bitter vetch, grass pea, common pea, and lentil), and fruits including grape, olive, fig and pomegranate[22]. Also, during the Byzantine period, cereal cultivation was suggested as the primary agricultural practice at Çadırhöyük[23]. Other than cereals, grapes, chickpeas, lentils, and flax were also attested in the samples[24]. Contrary to the common patterns of cereals in the Medieval assemblages, individual cases in special contexts might give significant clusters of other plants. Archaeobotanical samples at Kinethöyük dating to the Abbasid and 10th c. Middle Byzantine period had special domination by the *Chenopodium album* (Fat Hen) with 90% of the samples. The rest of the assemblage was mostly wheat and a few legumes[25].

At Pompeiopolis half of the plant remains were found in the samples taken from storage contexts of the Domus dating to different phases. Samples representing the 6th-7th c., 7th-8th c., and 8th-10th c. phases confirmed the continuous presence of plants in the storage facilities. Their survival was due to the destructive events that caused the plants to have been subjected to fire. At Beycesultan, mixed wheat, barley, and rye (*Secale cereale*) were found within the contents of a large storage vessel dating to the 10th c. Middle Byzantine period[26].

Only one sample context was from a kitchen at Pompeiopolis dating to the 8th-10th c. and it was one of the richest, having cereals, fruits, and component parts of both cereals and grapes. Wheat, barley, and cereal component parts were reported in an oven or burnt area context related to a barn on the terrace at Byzantine Çadırhöyük[27]. Clean and semi-clean crops such as barley and spelt were found in burnt storage pit contexts in Byzantine Kilisetepe[28].

At Pompeiopolis, plant seeds and charcoal fragments were found in abundance within the samples taken from the drainage system contexts. The presence of charred economic plant remains both within the internal channels of the Domus complex and the main street sewer indicated that the food

[20] Harrison et al. 1993, 152-3; Giorgi 2012.
[21] De Cupere et al. 2017, 7.
[22] Bending – Colledge 2007, 588.
[23] Cassis et al. 2019, 345.
[24] Cassis et al. 2019, 346.
[25] Ramsay – Eger 2015, 40, 43.
[26] Helbaek 1961, 78-9.
[27] Smith 2007, 174, 180-1; Cassis et al. 2019, 346.
[28] Bending – Colledge 2007, 591.

activity-related refuse was dumped into the main street sewer for all periods (between 4th-7th c.) of its operation. Although the number of seeds is limited within the samples, charred fragments and possibly ash were abundant. Refuse disposal of ash, originating from food preparation or possible heating, might be on purpose for sanitary reasons to disinfect the channels having latrine content.

Barley comes as the second cereal after wheat and it is mostly cultivated when the quality of soil is low, there is high salination, and unfavorable climatic conditions[29]. It is mentioned that when the habitation decreased in Sagalassos during the Early Byzantine period (AD 450-650) barley was more important than wheat, and there were new crops such as millet and rye[30]. Cultivation of millet was interpreted as a backup strategy if the other cereal crops fail to grow[31]. Barley comes after wheat at Pompeiopolis but it was abundant in the samples giving *terminus postquem* 6th c. Only one specimen was found in the 4th-5th c. context. It is too early to make clear suggestions but political and economic i34nstability in Anatolia increased from the 6th c. onwards and the appearance of barley increases within the samples later than the 6th c. at Pompeiopolis.

At Sagalassos, crop processing by-products were found in the archaeobotanical samples dating to the Early Byzantine period (late 6th c.), while they were absent in the Roman period archaeobotanical record. This data was interpreted as agricultural practices that were performed in the Sagalassos urban center during the Early Byzantine period[32].

According to archaeobotanical data, there was an increase in ruralization during the Early Byzantine period in Sagalassos and intensive crop cultivation and arboriculture were abandoned at the end of the Early Byzantine period when the economy became more dependent on ovicaprid herding[33]. At Pompeiopolis, component parts of cereals were mostly found in the samples *terminus postquem* 6th c. Only one rachis fragment was found in a 5th c. drainage sample. And also the majority of the weeds were found in *terminus postquem* 6th c. samples, while the minority were in the drainage context.

The presence of crop weeds (*Bromus sp.*, *Asperula sp.*, *Galium sp.*, *Lolium sp.*) indicated that the animals were foddered or grazed in harvested agricultural fields at Çadırhöyük[34]. *Galium sp.* was only found in 6th-7th c. storage context samples at Pompeiopolis (Fig. 5k). This might be taken to question whether the ruralization process of Pompeiopolis started after the 6th c.

Conclusion

In the light of the preliminary archaeobotanical data, some research questions were put forward and proportions of plant species through the occupation history of the Domus were identified, and distribution patterns of

[29] Helbaek 1961, 93-4.
[30] De Cupere et al. 2017, 9, 12.
[31] De Cupere et al. 2017, 13.
[32] De Cupere et al. 2017, 12.
[33] De Cupere et al. 2017, 14.
[34] Cassis et al. 2019, 346.

species and elements among contexts were analyzed. The first aim was to understand the food quality, crisis management, and economic behavior of the inhabitants of the area through time. However, the size of the assemblage was still small, therefore the evaluations are preliminary. The second aim was to understand the domestic organization, food preparation, consumption, and refuse behaviors through time. But spot finds for food preparation such as oven contents and consumption refuse contexts such as garbage pits, which normally provide the vast majority of the remains in archaeobotanical studies, were absent,. Limitations in the variety of species also stem from the same issue.

The big question about deurbanization or ruralization of the complex was observed and indicated by the excavators through the architectural and organizational evolution of the complex. Archaeobotanical data slightly supports the hypothesis, is still preliminary, but promising. Finding answers to all of these research questions was not possible with the current archaeobotanical data but needs more data collection from various contexts. Also, proxy data from zooarchaeology, ceramics, numismatics, and architecture should be integrated to make suggestions related to economic behavior, social organization, and political atmosphere of the periods at Pompeiopolis.

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Uzun Özet

Anadolu'da yapılan arkeobotanik çalışmalar genellikle tarihöncesi ve klasik dönem öncesi araştırmalara odaklı gerçekleştirilmektedir. Son yıllarda Geç Antik Çağ, Orta Çağ ve Osmanlı dönemlerini içine alan yeni çalışmaların artığı görülmekle birlikte, bu alanda elde edilmiş daha erken verileri Beycesultan, Amorium ve Kilisetepe gibi diyakronik belgelemenin yapıldığı münferit kazı projelerine borçluyuz. Pompeiopolis antik kentinin Geç Antik Çağ ve Orta Çağ evrelerini temsil eden başlangıç niteliğindeki bu çalışma Anadolu'nun bu dönemleri için kısıtlı olan arkeobotanik çalışmalarına katkıda bulunması bakımından önemlidir.

Geç Antik Çağ ve Orta Çağ yerleşmeleriyle karşılaştırıldığında Pompeiopolis'te Domus kompleksinden elde edilen verinin kronolojik çözünürlüğü oldukça yüksektir. Bu dönemleri temsil eden arkeobotanik verilerin kronolojik tanımlaması çoğu zaman Bizans Dönemi ya da Orta Çağ olarak verilmektedir. Fakat bu tanımlama 4. yüzyıl ile 15. yüzyıl arasındaki oldukça uzun bir zaman dilimini temsil eder. Bu nedenle belirli araştırma sorularının yanıtlanmasında zamansal çözünürlük yetersiz kalır. Geç Antik Çağ ve Orta Çağ boyunca iklimsel ve çevresel koşullarda yaşanan değişimlerin yanı sıra kentlerin çöküşü/kırsallaşma, konut alanlarının değişen organizasyonu, yeni ekonomik stratejiler, Pers savaşları, Arap akınları (karanlık çağ/geçiş dönemi), ikonoklazma, Orta Bizans Dönemi iyileştirmeleri gibi pek çok sosyal, politik, ekonomik ve ideolojik kırılmalar yaşandığını görürüz. Buna ek olarak arkeolojik ve tarihi verilerle de desteklenmiş olduğu üzere polen analizleri Anadolu'da Orta Bizans Dönemi'nde iklim koşullarının öncesine göre daha elverişli olduğunu, bunun tarım ve hayvancılığın gelişimine etki ettiğini ortaya koymaktadır. Pompeiopolis'ten elde edilen arkeobotanik kalıntılar sözünü ettiğimiz bu kırılma noktalarının her biri için veri sağlama potansiyeline sahip olması bakımından önem taşır.

Bu çalışma kapsamında gerçekleştirilen arkeobotanik incelemelerde öncelikle ekonomik türlerin oranı tanımlanmış, ardından Anadolu'daki diğer çağdaş yerleşimlerde bulunan arkeobotanik veri gruplarıyla karşılaştırma yapılmıştır. Bazı türlerin baskın olması ekonomik stratejilerin ve olumsuz koşulların (örneğin buğday yerine arpa yetiştirmeye yönelme) önemli göstergeleri olmalıdır. Çalışmada ayrıca bağlamsal dağılım örüntüleri farklı dönemler arasında değerlendirilmiş, mutfak, depo ve kanalizasyon sistemi bağlamları sırasıyla tüketim, depolama ve atık davranışı ile ilişkilendirilmiş, böylelikle Domus kompleksini iskân eden topluluğun domestik örgütlenmesi anlaşılmaya çalışılmıştır. Bitki kalıntılarının ikincil bileşenlerine incelemede yer verilerek, bitkilerin domestik alana hangi koşullarda getirildikleri, nasıl depolandıkları ve yerleşimde hangi zaman diliminde bulunduğu sorularından hareketle kırsallaşma sürecinin başlangıcına yoğunlaşılmıştır. Çalışmada alınan toplam 637 litre hacme sahip 32 örnek suda yüzdürülmüş, ayrıştırılan kalıntılardan 109 numune tanımlanmıştır.

Alınan ön sonuçlara göre, baskın tür %47 ile tahıllar olurken, buğday (Triticum spp.) %18, arpa (Hordeum spp.) %10 ve Poaceae ailesinin tanımlanamayan türlerini olan Cerealia %19' luk bir oranla temsil edilmektedir. Domus kompleksinden alınan örneklerde mercimek (Lens culinaris), bezelye (Pisum sativum) ve nohut (Cicer arietinum) olmaması şaşırtıcıdır. Baklagiller tanımlanan türlerin 4%'ünü oluşturmaktadır. Bunlar az sayıda mürdümük (Lathyrus sativus) ve fiğ (Vicia sativa) ile tanımlıdır. Yüzdesel olarak tahılları %28 ile üzüm (Vitis vinifera) takip eder. Tanımlanan türler arasında az sayıda olmakla birlikte zeytin (Olea europea), kiraz (Prunus cerasus) ve ceviz (Juglans regia) gibi meyve ve kabuklu yemişler de bulunmaktadır. Yabani bitki türlerine ait tohumlar %18 oranındadır.

İkincil bitki bileşenleri arasında tahıllara ait eklemli/boğumlu ot en fazla bulunan grup olurken, saman kalıntıları, başak ekseni ve başakçık (çatal) da tespit edilmiştir. Ayrıca, üzüme ait sapçıklar bulunmuştur.

Bitki türlerinin mekansal dağılımı yapıldığında buğdayın (Triticum spp.) yalnızca depo ve kanalizasyonda, arpanın (Hordeum spp.) ise çoğunlukla depo alanlarında olduğu anlaşılmaktadır. Cerealia ve tahılların ikincil bileşenleri mutfakta tespit edilmiştir. Baklagiller mutfakta bulunmaz, üzüm özellikle depo alanlarında baskın tür olarak karşımıza çıkar.

Makrobotanik kalıntılar en fazla evre III'te bulunmuştur. Örnekler içinde tahıllar baskın grubu oluştururken, buğday (Triticum spp.) evreler arasında daha eşit bir dağılım göstermektedir. Arpa (Hordeum spp.) ise evre I'e tarihlenen örnekler arasında bulunmaz. Tahıllara ait ikincil bileşenler en fazla Domus'un III. evresi ve daha az olmakla birlikte II. evresinde bulunmuştur. Tahılların Domus kompleksine 4. yüzyıl ve 5. yüzyılda daha temiz getirilip getirilmediği ve 6. yüzyıla tarihlenen örneklerde ikincil bileşenlerin varlığının tahıl tanelerinin ayrıştırma işleminin domestik alanda yapıldığının bir göstergesi olup olmadığı yanı sıra 6. yüzyılın kentin kırsallaşma sürecinin erken evresi olup olmadığı soruları bu noktada önem kazanır.

Domus kompleksinin tüm iskân tarihini temsil eden makrobotanik kalıntıların büyük çoğunluğu tahıllardan oluşur. Bu bakımdan Pompeiopolis, Anadolu'daki çağdaş diğer Geç Antik Çağ ve Bizans yerleşimleriyle benzerlik içerisindedir.

Pompeiopolis'te tanımlanan bitki kalıntılarının çoğu Domus kompleksinin farklı evrelerine tarihlenen depolarda bulunmuştur. Bu da 6. yüzyıl-7. yüzyıl, 7. yüzyıl-8. yüzyıl ve 8. yüzyıl-10. yüzyıl evrelerini içine alan depoların kesintisiz olarak kullanıldığını doğrular. Bitki kalıntılarının korunma koşulları ateşe maruz kalmalarına neden olan yıkıcı olaylar sonucunda oluşmuştur.

Pompeiopolis'te incelenen örneklerden sadece bir tanesi 8. yüzyıl-10. yüzyıla tarihlenen bir mutfaktan alınmıştır ve bu örnek tahıllar, meyveler ve hem tahıl hem de üzüm türüne ait ikincil bileşenler bakımından en zengin olanıdır. Kanalizasyondan alınan örneklerde yoğun olarak kömürleşmiş bitki kalıntıları ve yanmış ağaç parçaları bulunmuştur. Yanmış ekonomik bitki kalıntılarının (arpa, buğday, üzüm) gerek Domus kompleksinin kanal sistemi gerekse caddenin drenajında bulunmuş olması 4. yüzyıl ile 7. yüzyıl boyunca besin hazırlığında kullanılan türlerin atığa dönüştüğünü gösterir. Tohumların azlığına rağmen kömür ve kül kalıntıları daha yoğun olarak karşımıza çıkar. Bunun yanı sıra besin hazırlığı ve olasılıkla ısınma gibi aktivitelerden artakalan külün tuvalet (latrina) ile bağlantılı olan drenaj kanalının dezenfeksiyonu için hijyen sağlanması amacıyla kanalizasyon sistemine atıldığı da düşünülebilir.

Pompeiopolis'te bulunan tahıllar arasında arpa yoğunluk bakımından buğdaydan sonra ikinci sıradadır. Arpanın tamamına yakını 6. yüzyıl sonrasına tarihlenen bağlamlarda bulunmaktadır. Sadece bir numuneye 4. yüzyıl-5. yüzyıl örneğinde rastlanır. Daha çok hayvan besini olarak tercih edilen arpanın Domus kompleksinde 6. yüzyıldan itibaren artış göstermesi yerleşimin hayvancılığa ağırlık verdiğinin ve çevresel koşullar nedeniyle alternatif ürün olarak arpaya yöneldiğinin bir göstergesi olabilir. 6. yüzyıl sonrasında aynı zamanda politik ve ekonomik istikrarsızlığın yaşandığı da bilinmektedir. Bu nedenle yerleşimin kırsallaşmaya başladığı önerilebilir.

Pompeiopolis'te tahıllara ait ikincil bileşenlerin büyük çoğunluğu 6. yüzyıl sonrası örneklerde bulunurken yalnızca bir başak ekseni 5. yüzyıl drenaj örneğinde tespit edilmiştir. Ayrıca yabani

türlere ait tohumların büyük çoğunluğu 6. yüzyıl sonrasına ait örneklerde bulunurken drenajdaki örnek sayısı oldukça azdır.

Çadırhöyük'te ekinlerle birlikte bulunan yabani tohumlar (Bromus sp., Asperula sp., Galium sp., Lolium sp.) hayvanların hasat edilmiş tarlalarda otlatılmış olduklarının bir göstergesidir. Pompeiopolis'te yoğurtotu (Galium sp.) yalnızca 6. yüzyıl-7. yüzyıla tarihlenen depoda bulunmuştur. Bu bağlamda Pompeiopolis'te kırsallaşma sürecinin 6. yüzyıl sonrasında başladığını önermek mümkündür.

Pompeiopolis'te arkeobotanik veri üzerinde yapılan ön incelemenin sonucunda, bazı araştırma soruları ortaya konulmuş, Domus kompleksinin iskanı boyunca kullanılan bitki türleri tanımlanmış ve bunların dağılımı yapılmış, tür ve bileşenlerin bağlamlar arasındaki dağılım örüntüleri belirlenmiştir. Çalışmanın amaçlarından biri yerleşimi iskân eden topluluğun incelenen tarih aralığındaki ekonomik davranışını beslenme kalitesi, kriz yönetimi gibi parametreleri de içerecek şekilde anlamak üzerinedir. Mevcut arkeobotanik verinin az miktarda olması nedeniyle bu konuda elde edilenler ön sonuç niteliğindedir. İkincisi yerleşimin dönemler arası domestik örgütlenmesi, yiyecek hazırlığı, tüketim ve atık davranışını anlamaya odaklıdır. Bu çerçevede arkeobotanik çalışmalarda yiyecek hazırlığına dair en yoğun kalıntı grubuna sahip ocaklar ile tüketim ve atık davranışını temsil eden çöp çukuru gibi bağlamlardan alınacak örneklerin de incelenmesi gerekmektedir. Bu çalışma kapsamında tanımlanan türlerin beklenen çeşitlilikte olmaması büyük ölçüde bundan kaynaklanmaktadır. Sözü edilen bağlamlardan alınarak incelenecek örneklerle daha çok ve çeşitlilikteki bitki türlerine ulaşma potansiyeli vardır.

Kent niteliğinin kaybedilmesi ve kırsallaşma sorunsalı Domus kompleksinin mimarisi ve örgütlenmesindeki değişimler gözlemlenerek kazıyı gerçekleştiren arkeologlar tarafından önerilmiştir. Arkeobotanik ön sonuçları şu an için bu önermeyi desteklemektedir.

Sorulan tüm araştırma sorularına yanıt vermek eldeki kısıtlı veriyle mümkün değildir, öte yandan farklı bağlamlardan toplanacak arkeobotanik veriyle çeşitli önermelerde bulunulabilecektir. Özellikle, zooarkeoloji, seramik çalışmaları, nümizmatik ve mimari gibi farklı uzmanlık alanlarının verileriyle birlikte Pompeiopolis'te dönemler arasındaki ekonomik davranış, sosyal organizasyon ve politik atmosferin yansımalarına dair daha genel bir resim çizmek mümkün olacaktır.

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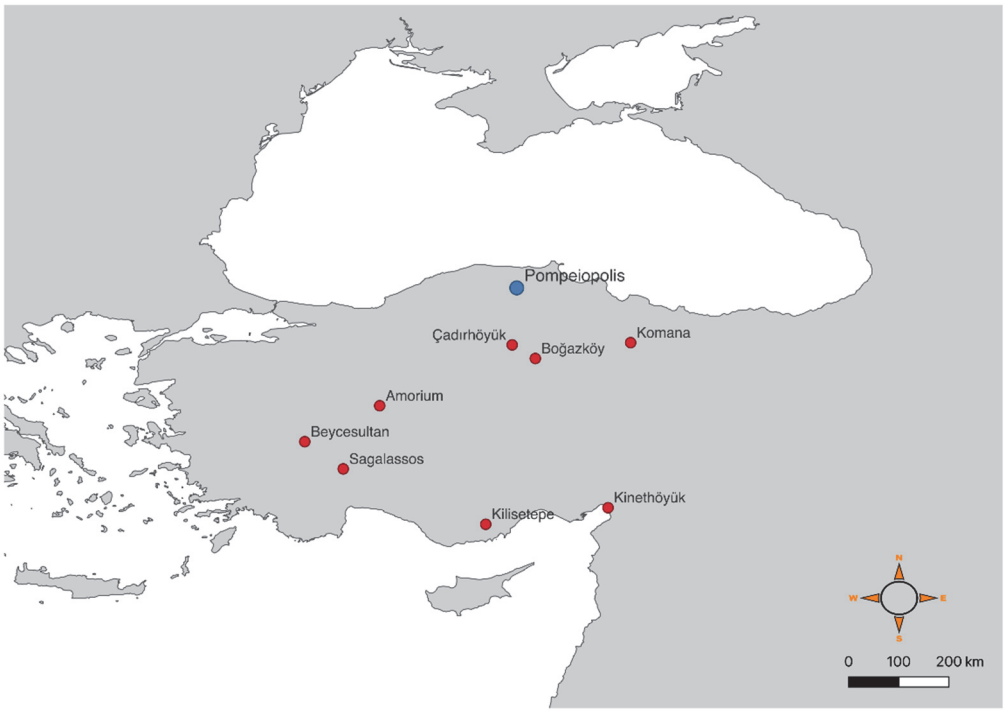

Figure 1. Archaeological sites mentioned in the text

Figure 2. Sample locations and architectural plan of the Domus Domus

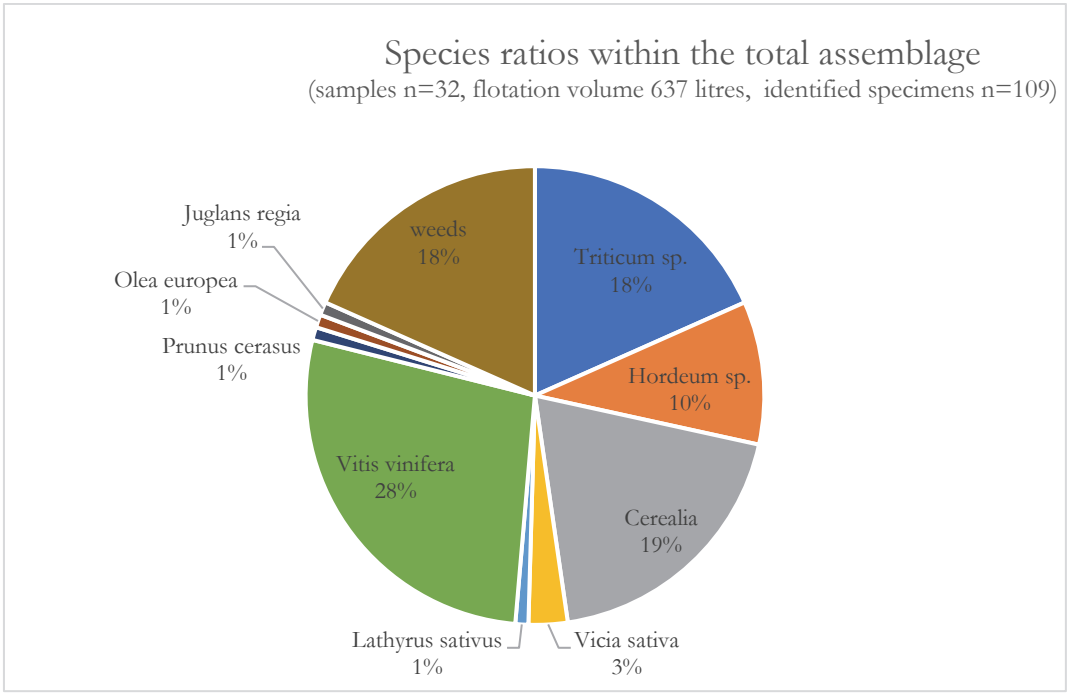

Figure 3. Species ratios within the total assemblage

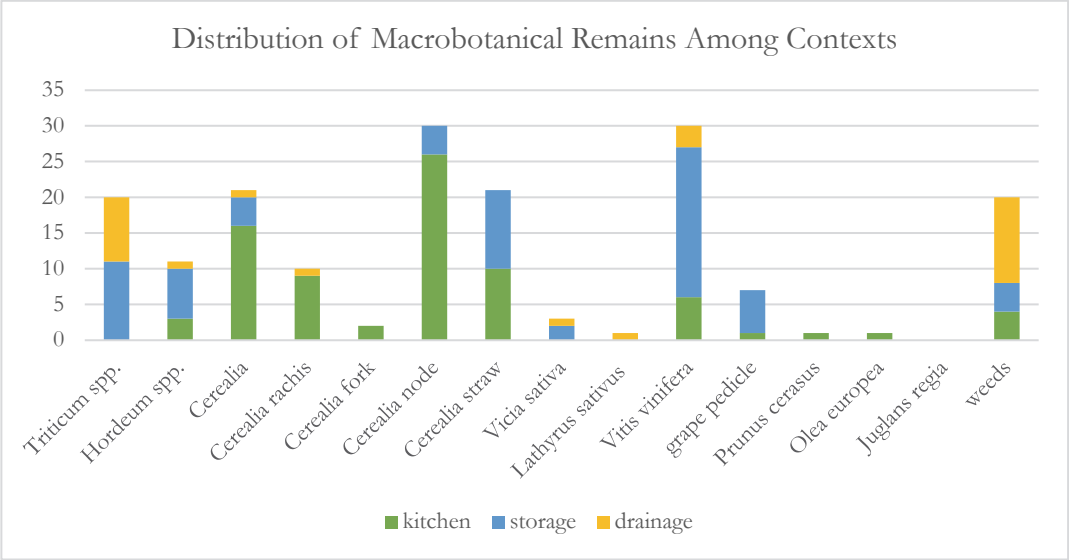

Figure 4. Distribution of Macrobotanical Remains Among Contexts

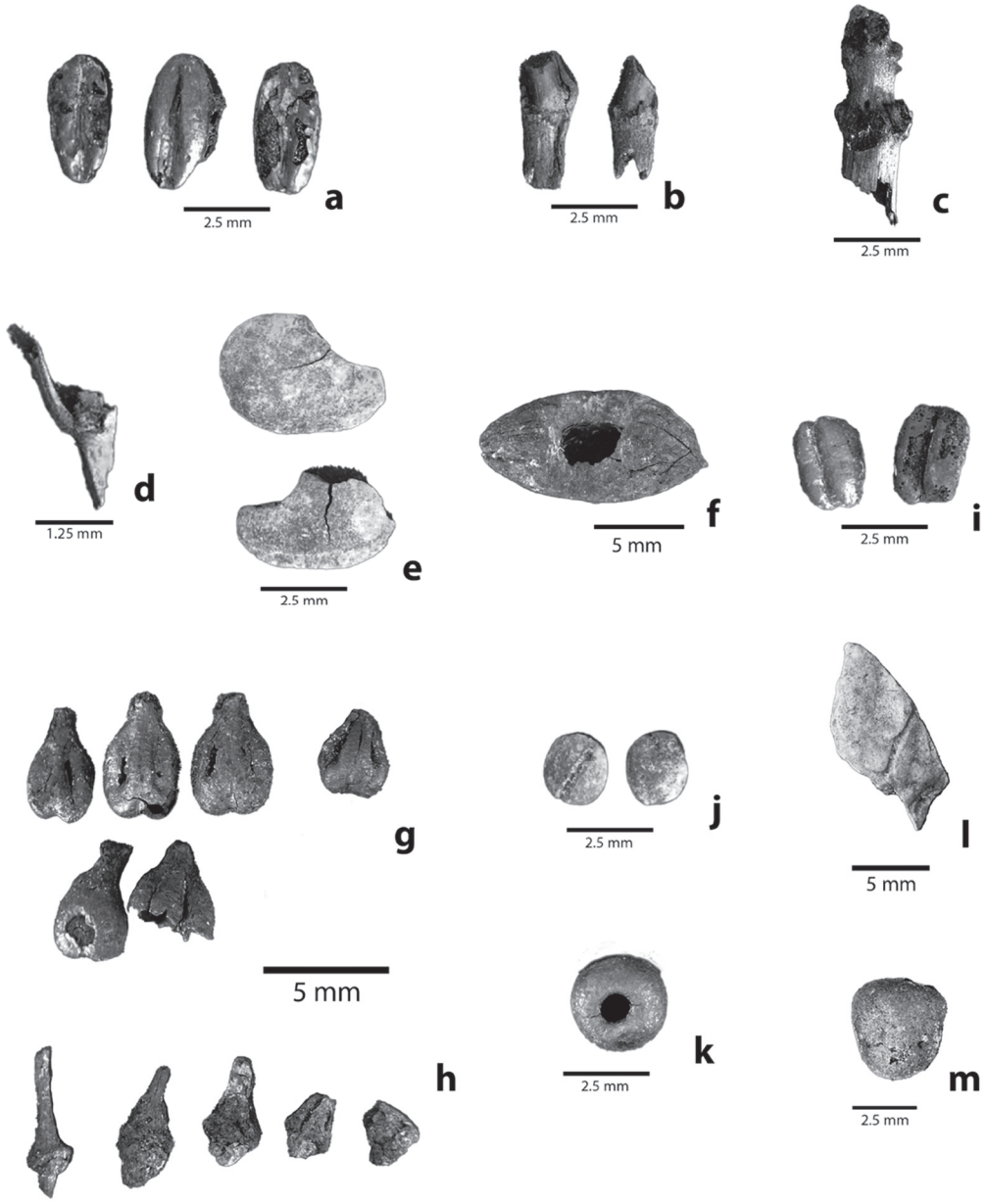

Figure 5. a) Hordeum sp. (Sample 23) b) Cerealia culm nodes (Sample 23) c) Cerealia rachis (Sample 23) (d) Cerealia spikelet fork (Sample 23) (e) Prunus cerasus (Sample 23) (f) Olea europea (Sample 22) (g) Vitis vinifera pips (Sample 8) (h) Vitis vinifera pedicles (Sample 8) (i) Triticum sp. (Sample 27) (j) Vicia sativa (Sample 27) (k) Galium sp. (Sample 7) (l) Juglans regia (Sample 33) (m) Lathyrus sativus (Sample 1).

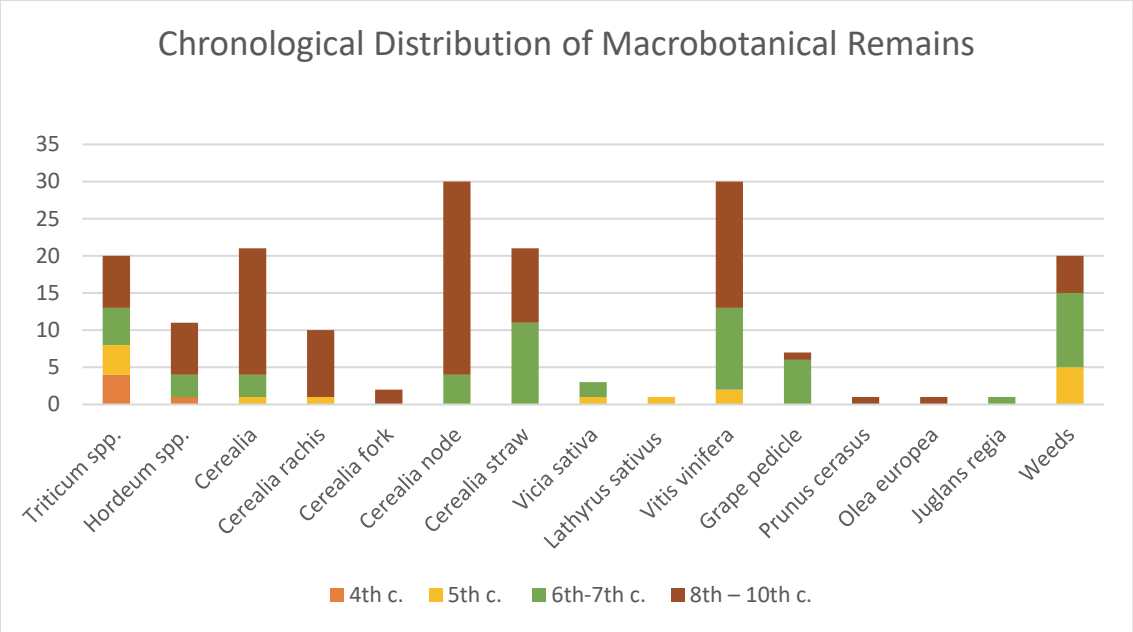

Figure 6. Chronological Distribution of Macrobotanical Remains

Sample n.	Year	Area	Room	Stratigraphical unit	Sample volume (litre)
1	2019	V14	RR	1266	10
2	2019	V14	RR	1265	8
3	2017	V11	JJ - pithos 909	908	56
4	2017	V11	KK	930	1
5	2017	V11	KK	937	21
6	2016	V4	J	802	6
7	2015	V8	R	585.1	32
8	2015	V8	R	585.2	19
9	2015	V8	R	585.3	34
10	2012	V4	K-O	333	4
11	2012	V4	K-O	323	3
12	2009	V2-V3	C	68	2
19	2021	V17	RR - strada drainage up_lower	1414	43
20	2021	V17	RR - strada drainage up_upper	1413	27
21	2021	V17	RR - strada drainage up_middle	1413	62
22	2021	V16	VV	1424	4
23	2021	V16	VV	1424	20
24	2021	V17	RR	1426	10
25	2021	V17	RR - strada drainage down_lower	1414	16
26	2021	V17	RR - strada drainage down_middle	1413	91
27	2021	V17	RR - strada drainage lid	1445	35
28	2021	V17	RR - strada drainage lid	1445	12
29	2021	V16	VV	1444	14
30	2021	V16	UU	1443	19
31	2021	V16	NN2	1456	11
32	2021	V16	NN2	1432	6
33	2021	V16	XX	1439	42
34	2021	V16	UU	1446	1
36	2021	V16	XX	1497	8
37	2021	V16	XX	1506	1
38	2021	V2	H	1515	10
39	2021	V16	UU	1499	9

Table 1. Sample information

Sample n.	Phase	TPQ	Context	Function
1	Period 1 - final phase	5th c.	Street channel content	Drainage
2	Period 1 - final phase	Late 5th – 6th c.	Street channel content	Drainage
3	Period 3	8th – 10th c.	Pithos content	Storage room
4	Period 2 - final phase	7th-8th c.	Pot content	Storage room
5	Period 3	8th-9th c.	Pithos content	Storage room
6	Period 1	2nd half of 4th-5th c.	Ashy locus	Garden
7	Period 2	6th-7th c.	Earthen floor	Multi-functional room
8	Period 2	6th-7th c.	Earthen floor	Multi-functional room
9	Period 2	6th-7th c.	Earthen floor	Multi-functional room
10	Period 2 - final phase	7th-8th c.	Destruction by fire (carbonized pole)	Basement storage
11	Period 2 - final phase	7th-8th c.	Destruction by fire (carbonized beam)	Basement storage
12	Late Period 1 - Initial Period 2	5th-6th c.	Reverse pot content	Garden
19	Period 1 - Period 2 (Road III)	5th to ?? (6th or 7th) c.	Street channel content	Drainage
20	Period 1 - Period 2 (Road III)	5th to ?? (6th or 7th) c.	Street channel content	Drainage
21	Period 1 - Period 2 (Road III)	5th to ?? (6th or 7th) c.	Street channel content	Drainage
22	Period 3	8th – 10th c.	Burnt layer	Kitchen
23	Period 3	8th – 10th c.	Burnt layer	Kitchen
24	Period 2 (Road IV)	6th - 7th c.	Channel content	Internal channel
25	Period 1 - Period 2 (Road III)	5th to ?? (6th or 7th) c.	Street channel content	Drainage
26	Period 1 - Period 2 (Road III)	5th to ?? (6th or 7th) c.	Street channel content	Drainage
27	Period 1 - Period 2 (Road III)	5th to ?? (6th or 7th) c.	Street channel content	Below drainage lid
28	Period 1 - Period 2 (Road III)	5th to ?? (6th or 7th) c.	Street channel content	Below drainage lid
29	Period 1	4th c.-5th c.	Connection from VV to main street channel	Internal channel
30	Period 1	4th c.-5th c.	Catch pit of the latrine flushed by channel US1526	Internal channel
31	Period 0	2nd-mid 3rd c.	Lower fill of the drainage US1450	Pre-Domus drainage
32	Period 2	6th-7th c.	Burnt	Small kiln
33	Period 2	6th-7th c.	Channel content	Internal channel
34	Period 1	Mid-3rd c.-4th c.-5th c.	Deposit in the syphon	Flushing if the latrine
36	Period 2	6th-7th c.	Pithos content	Storage room
37	Period 2	6th-7th c.	Pithos content	Storage room
38	Period 2	6th-7th c.	Channel content	Internal channel
39	Period 1 - Initial phase	2nd half of 3rd c.	Sand and ashes (fire?)	Indeterminable

Table 2. Chronology and context of samples

	Triticum spp.	*Hordeum spp.*	*Cerealia*	*Cerealia rachis*	*Cerealia spikelet fork*	*Cerealia node*	*Cerealia straw*	*Vicia sativa*	*Lathyrus sativus*	*Vitis vinifera*	*Grape pedicle*	*Prunus cerasus*	*Olea europea*	*Juglans regia*	*Weeds*	*Twing*
1									1						1	
2																
3	7	4	1							11					1	
4																
5																
6																
7	1		1			1	2								1	
8	1		2			2				6	6				2	
9	2	3					2									
10						1	7	2								1
11																
12																
19	1															
20															4	
21																1
22				1						1			1			
23		3	16	8	2	26	10			5	1	1			4	
24															5	1
25																
26																
27	3		1	1				1		2						2
28																
29		1														
30	4															
31																
32																
33	1													1	2	1
34																
36										3						
37										1						
38										1						
39																
TOTAL	20	11	21	10	2	30	21	3	1	30	7	1	1	1	20	6

Table 3. Identified plant species and elements