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ANAYA SARPAKI

Plants in the sanctuary

Charred seeds from Areas C and D at the Sanctuary of Poseidon at Kalaureia, Poros

Abstract

Excavations at the Sanctuary of Poseidon at Kalaueria in the years 2003–2005 produced a small but quite interesting assemblage of charred seeds and fruits. Their analysis adds to a small existing body of such evidence and sheds light on several issues including aspects of the physical environment in the past, the agricultural economy in the area of the sanctuary, the role of plants in cult, and also the preparation and eating of plant foods and the possible alternative uses of them. The charred seeds that are presented here are part of a larger body of bioarchaeological remains that illuminate daily life in the sanctuary.

Keywords: archaeobotany, plants, cult, offerings, carbonised seeds, Kalaureia

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Introduction

The material presented in this paper originates from an archaeological site with adverse preservation conditions for fragile bioarchaeological remains such as charred seeds. The area of the sanctuary had, over the centuries since its abandonment, suffered intensive disturbance due to agriculture, terracing, and stone extraction.[1] Many of the excavated contexts are of a disturbed nature and as a consequence the carbonized seed remains in them are few and poorly preserved. As a result this study is not meant to be exhaustive. It aims at reporting on the existing evidence, and discussing in an indicative way possible environments and activities, with more detailed treatment of the finds wherever possible. Attempts are made to highlight the complementarity of these data to other finds in the sanctuary, e.g. wood charcoal, tools etc. Only a small range of the possibilities offered by archaeobotanical analysis can be explored here due to the preservation problems mentioned above.[2] Ninety one soil samples representing 1,603 litres of soil were processed by water flotation for Area C and Area D.[3] The samples which contained seeds are discussed here.

The archaeobotanical material will be presented here in a certain order: first Area C and then Area D. Archaeobotanical material is being presented in a broad chronological sequence in order to concentrate, not so much on details, but on trends in the use of plants.

Area C (*Table 1*, *Fig. 1*)

From this area, out of the nine water-floated samples, only seven had archaeobotanical remains, one of which belonged

[1] For a detailed discussion on these processes see Penttinen & Mylona 2019. For earlier reports on the excavations, see Wells *et al.* 2003; 2005; 2006–2007.

[2] Charred seed remains could indicate environmental information of a general nature, such as possibly the major vegetation zones around the site, for example forests versus *maquis* and/or garrigue, being complementary to the wood charcoal analysis. Information related to agriculture could be extracted, such as varieties of cultivated crops, and/or cultivation regimes, indirect evidence of agricultural technology (i.e. the use of irrigation or not), manuring, and possible tools used in cultivation (e.g. whether plants are pulled at harvest or cut with sickles, etc). Economic aspects could be expressed through the crops used (e.g. whether they were local crops or imported plants). Moreover, plants could be social indicators, such as types of offering and how these can portray social differences amongst the suppliants (e.g. a poor person would present different offerings or less in quantity). Maybe some guilds would make offerings of their crafts. Social questions could also be portrayed, such as the "sociability" of space, in other words the social use of the man-made environment, such as storage, food preparation, eating/feasting, use of plants for other things such as hallucinogens, bait, and/or poison.

[3] For the details of sampling and methodology, see Penttinen & Mylona 2019.

Editorial note

The section on the bioarchaeological remains from the Sanctuary of Poseidon at Kalaureia, published in the *OpAthRom* 12, includes seven articles: Penttinen & Mylona 2019; Mylona 2019; Serjeantson 2019; Lymberakis & Iliopoulos 2019; Syrides 2019; Ntinou 2019; and this contribution by Anaya Sarpaki. Summary of chronological phases (presented in Penttinen & Mylona 2019):

Abbreviation	Phase	Chronology	Area	Comment
EIA I	Early Iron Age	*c.* 750 BC	D	Fills of Features 07, 08, and 09 (three pits). Fill underneath Early Iron Age building.
EIA II	Early Iron Age	*c.* 750–700 BC	D	Floor accumulation in Early Iron Age building.
A I	Archaic	7th century BC	D	–
A II	Archaic–Hellenistic	6th century–Hellenistic	C	Construction of Wall 24.
			D	Remains from outdoor activities. Feature 05 (supposed altar).
A III	Archaic	*c.* 500 BC	C	–
			D	Construction of Stoa D and Features 03 and 04 (interconnected cisterns). Feature 10 (kiln).
A IV	Archaic	after *c.* 500 BC	D	Life span of buildings constructed during A III.
C I	Late Classical/Early Hellenistic	*c.* 325 BC	C	Construction of Building C.
			D	Construction of back part of Building D, including Feature 06 (staircase), Feature 01, and Feature 02 (unknown, altar?).
C II	Late Classical/Early Hellenistic	after *c.* 325 BC	D	Finds in the dirt floors of Building D.
H I	Hellenistic	*c.* 165 BC	D	"Dining deposit" west of Building D.
H II	Late Hellenistic/Early Roman	*c.* 50 BC–*c.* AD 100	D	Fill of Feature 03 (cistern). Finds from trench against Wall 11, which exposed Wall 33.

Other abbreviations used: LA = Late Antique; MM = Mixed and modern; WF = Water flotation.

to a mixed and modern (MM) layer.[4] No levels dated to the Early Iron Age were sampled but there were two Archaic (A II) levels, two Late Classical/Early Hellenistic (C I), and two Late Antique. The only fruits were fragmented olives (*Olea europaea*). The cereals and the legumes were fragmented too and, therefore, identification could not be more precise.

Area D

THE EARLY IRON AGE PERIOD (*TABLE 2*, *FIG. 2*)

There are reasons to believe that the site had been a cultic place since the Early Iron Age, if not before. This period has been divided into two phases, EIA I (*c.* 750 BC) and EIA II (750–700 BC), represented by fills in pits (Features 07, 08, and 09), a fill and a floor level. They will be treated together, as the five samples from EIA I are chronologically close to the one from EIA II. Archaeobotanically, phase EIA II was rather poor but EIA I, the fill, contained a mixed population of seeds which accumulated from various contexts[5] and seem to have been battered around, hence the large numbers of unknown seeds due to their damaged state.

Samples of soil collected from these Early Iron Age pits in Area D had very few archaeobotanical remains. The small number of archaeobotanical finds does not allow us to examine this data statistically, and so no pattern is discernable. However, what is obvious is that there are very few remnants of what could have been eaten. There are fruit remains, the olive, the grape (*Vitis vinifera*), and the almond (*Prunus amygdalus*) but what is found is their inedible parts, the hard, woody component which cannot be consumed. Under the circumstances, the consumable part could have been preserved, as charring did occur, but it did not. It is obvious that they were discards of "nibblings", especially the almonds, of which only the shells were retrieved. The other categories, such as fragments of cereals (2) and legume (2), as well as the food (?) lumps, most

[4] Penttinen & Mylona 2019.

[5] Some are weeds, therefore, would probably represent remnants of storage but, also, remnants of disposal (see foods) and, generally, cleanings/sweepings.

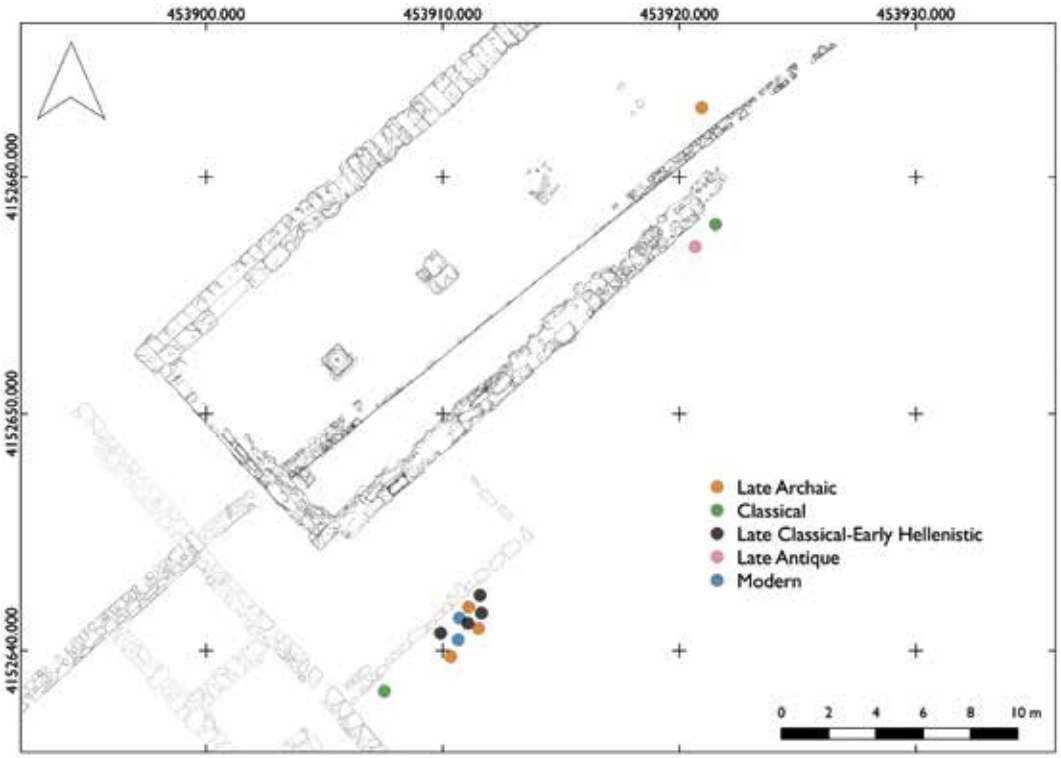


Fig. 1. Distribution of water-floated samples collected in Area C. By R. Rönnlund.

Table 1. Samples from Area C which include archaeobotanical (seed) data.

Sample no.	**WF12**	**WF42**	**WF07**	**WF08**	**WF36**	**WF39**	**WF02**
Area	**C03**	**C06**	**C03**	**C03**	**C05**	**C05**	**C01**
Quantity searched	**all**	**all**	**all**	**all**	**all**	**all**	**all**
Chronology	**A II**	**A II**	**C I**	**C I**	**LA**	**LA**	**MM**
Litres washed	**21**	**25**	**22**	**22**	**25**	**25**	**25**
Fruit							
Olea europaea frags.				1			11
Cereal							
Cerealia frag.		1					
Cerealia frag. (*Triticum*/*Hordeum*)							2
Legumes							
cf. Legume frags.					4		
Weeds							
Mercurialis annua							5
cf. Compositae (min.)							1
Trees/*maquis*							
Quercus sp. frags.						3	
cf. *Quercus* sp. frags.						2	
Shell frags.		1					3
Other							
cf. bulb frag.			1				
Ignota							
Ignota (identifiable)							1
Ignota (v. damaged)	1	5	2		1	4	19
Subfossil							28
cf. spore capsule				1			
Total	**1**	7	**3**	**2**	**6**	**9**	**71**

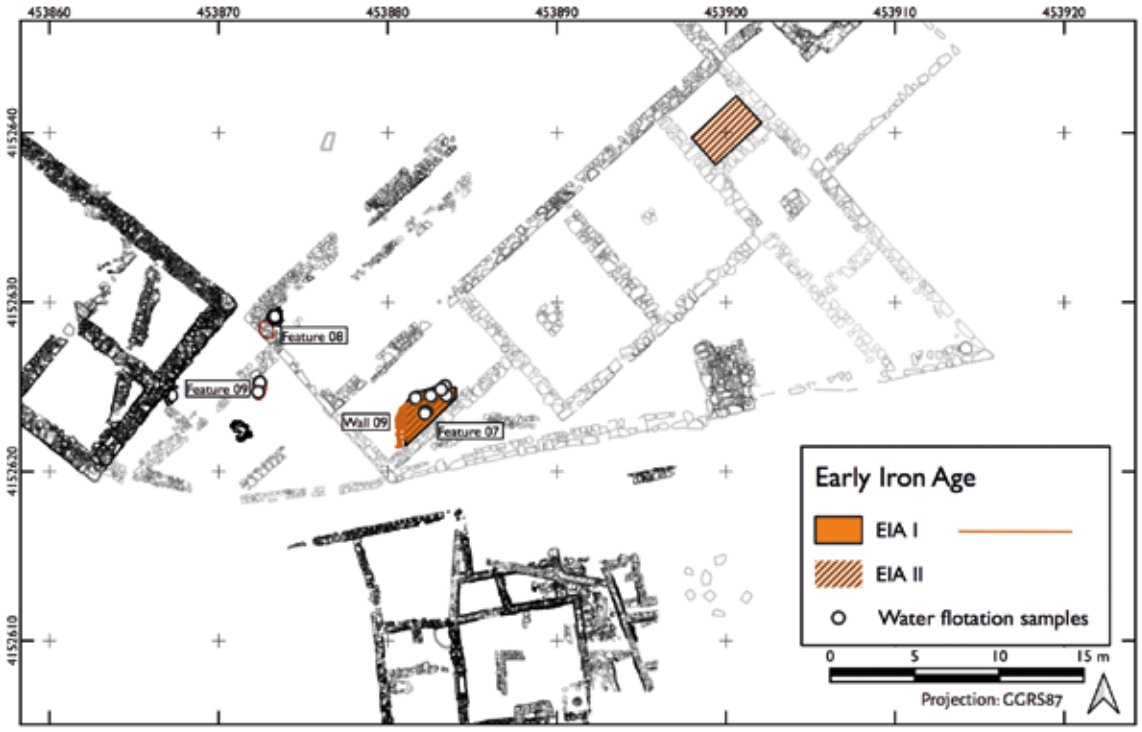


Fig. 2. Distribution of archaeobotanical remains in Early Iron Age contexts in Area D. By R. Rönnlund.

Table 2. Area D: Early Iron Age samples with archaeobotanical (seed) remains.

	Fill under floor		Feature 08	Feature 09		Floor level
Sample no.	**WF34**	**WF41**	**WF80**	**WF68**	**WF72**	**WF30**
Area	**D01**	**D01**	**D04**	**D05**	**D05**	**D01**
Quantity searched	**all**	**all**	**all**	**all**	**all**	**all**
Chronology	**EIA I**	**EIA I**	**EIA I**	**EIA I**	**EIA I**	**EIA II**
Litres washed	**10**	**12**	**2**	**10**	**12**	**22**
Fruit						
Vitis vinifera frag.	1					
Vitis vinifera pip				1		
Prunus amygdalus frags.	1					
Olea europaea frags.	1	5		5	6	1
Cereal						
Avena sp.		1				
cf. Gramineae frag.		1				
Legumes						
Legume sp. cotyl.—medium		1			1	
Weeds						
Spergula arvensis		2				
Onopordum sp.	1					
Food						
Lump of organic material (food?)	1			1		
Lump of organic material (food?) with bacteria		5				
Ignota						
Ignota (identifiable)			1	1		
Ignota (v. damaged)		3		1	5	
Ignota (featureless)				1		
cf. spores				1	2	
Total	**5**	**18**	**1**	**11**	**14**	**1**

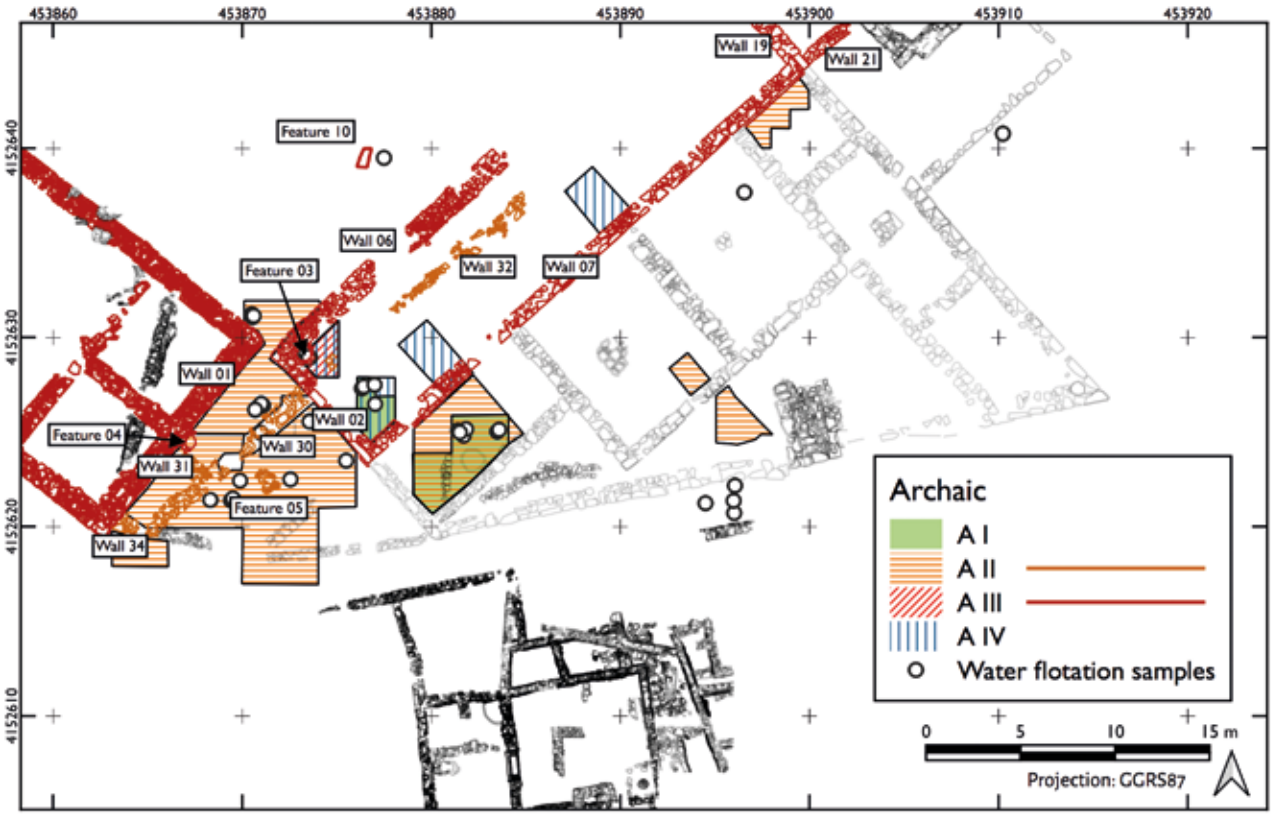


Fig. 3. Distribution of archaeobotanical remains in Archaic contexts in Area D. By R. Rönnlund.

probably, were trapped in these contexts by accident. Were these, especially when found within the pits (Features 07, 08, and 09) the mixture of sweepings which had been burnt? Were people trying to burn the sweepings and then bury them, in order that they would not be trampled on? It brings to mind the Christian feasts, *panygyria*, whereby the left-overs are not supposed to be discarded in the normal dump, nor to be trampled upon. They are generally burnt[6] and the ashes thrown in places which would not be trodden upon.[7] However, if that is the case, it is interesting to observe that almonds would have been presented whole in such contexts and only cracked immediately before consumption.[8] Keeping almonds in the shells would have prolonged their shelf life and would have avoided their turning rancid. Yet, in that case, in storage contexts—if we ever find them—almonds should be found unshelled or fully in their shell. This gives us an insight into in what form they must have been traded and brought to the site.

THE ARCHAIC PERIOD (*TABLES 3A–D*; *FIG. 3*)

The Archaic period is represented by 24 samples; two from A I (7th century BC—a fill), 14 from A II (6th century–Hellenistic—slowly accumulating layer), six from A III (*c.* 500 BC—brief phase), and two from A IV (after 500 BC—terrace fill).[9]

The Archaic period appears on archaeological grounds as a period of the flourishing and expansion of the sanctuary and, therefore, due to all the landscaping and building action, much of the previous Early Iron Age strata had been disturbed resulting in meagre evidence of archaeobotanical remains from previous periods and from this one.

Regarding the fruits, the same pattern occurs as in the previous period, that is the presence of grape, almond, and olive. A very damaged fragment has been identified, tentatively,

[6] If not burnt, they are often thrown in areas which could not be trodden, such as precipices.

[7] This hypothesis is based on what we know about the disposal of the "sacred" in some cultures Rathje & Murphy 2001; Rieger 2016. Very often even today in the Greek Orthodox faith, holy bread, when not consumed, is disposed in a place where it would not be trodden upon or it is burnt, as it is consecrated and should not be blemished. The same goes for all the holy furnishings.

[8] In other words almonds arrived whole at the site and were shelled in the area.

[9] For detailed information see the Penttinen & Mylona 2019.

Table 3a. Building D and Area D: Archaic (A I) samples with archaeobotanical (seed) remains.

Sample no.	**WF40**	**WF50**
Area	**D01**	**D06**
Quantity searched	**all**	**all**
Chronology	**A I**	**A I**
Litres washed	**25**	**25**
Fruit		
Olea europaea frags.		4
cf. *Pyrus* sp./*Malus* sp.	1	
Berries (?)	2	
Cereal		
cf. cerealia sp.—eroded	1	
Weeds		
cf. Compositae (min.)		
Nuts		
Shell (min.)	1	
Ignota		
Ignota (identifiable)	1	
Ignota (v. damaged)	3	
Total	**10**	**4**

Table 3c. Building D and Area D: Archaic (A II) samples with archaeobotanical (seed) remains. Archaeobotanical remains associated with the use of the supposed altar (Feature 05).

Sample No	**WF73**	**WF76**	**WF83**	**WF85**
Area	**D05**	**D05**	**D14**	**D14**
Quantity searched	**all**	**all**	**all**	**all**
Chronology	**A II**	**A II**	**A II**	**A II**
Litres washed	**30**	**30**	**12**	**11**
Fruit				
Vitis vinifera frags.			5	2
Olea europaea frags.	26	4		
cf. *Olea* frag.		1		
Ignota				
Ignota (v. damaged)	10			
Total	**36**	**5**	**5**	**2**

Table 3b. Building D and Area D: Archaic (A II) samples with archaeobotanical (seed) remains.

Sample no.	**WF01**	**WF18**	**WF23**	**WF24**	**WF25**	**WF37**	**WF51**	**WF52**	**WF54**	**WF79**
Area	**D01**	**D01**	**D01**	**D02**	**D01**	**D01**	**D05**	**D05**	**D05**	**D04**
Quantity searched	**all**	**all**	**All**	**all**	**all**	**all**	**all**	**all**	**all**	**all**
Chronology	**A II**	**A II**	**A II**	**A II**	**A II**	**A II**	**A II**	**A II**	**A II**	**A II**
Litres washed	**22**	**22**	**22**	**22**	**22**	**25**	**30**	**4**	**30**	**12**
Fruit										
Vitis vinifera frags.	5									1
Vitis vinifera pip		1								1
cf. *Vitis* frag.	1									
Olea europaea frags.	1	1			2	4	1	1	3	
Shell frags. (cf. *Corylus* sp.)	1									
Berries (?)						1				
Legumes										
Legume sp. cotyl.—medium	2									
Weeds										
Euphorbia helioscopia	1									
Rumex sp.		1								
cf. *Onopordum* sp.	1,5					1				
Ignota										
Ignota (identifiable)	5			1		1				
Ignota (v. damaged)	10		6			2				1
Ignota (leaves)										12
cf. spores	abundant						2			1
Total	**27,5**	**3**	**6**	**1**	**2**	**9**	**4**	**1**	**3**	**16**

Table 3d. Building D and Area D: Archaic (A III–IV) samples with archaeobotanical (seed) remains.

Sample No	**WF56**	**WF58**	**WF61**	**WF62**	**WF65**	**WF44**	**WF55**	**WF29**
Area	**D06**	**D05**	**D04**	**D04**	**D04**	**D06**	**D06**	**D04**
Quantity searched	**all**	**all**	**all**	**all**	**0,5**	**all**	**all**	**all**
Chronology	**A III**	**A III**	**A III**	**A III**	**A III**	**AIV**	**AIV**	**MM**
Litres washed	**25**	**30**	**5**	**20**	**10**	**25**	**25**	**22**
Fruit								
Vitis vinifera frags.	1	1					1	
Olea europaea frags.	9	1				2	1	1
cf. *Olea* frag.					1			
Ficus carica							1	
Berries (?)						2		
Cereal								
Cerealia frag.	2							
Legumes								
cf. *Pisum* sp.				1				
Weeds								
Adonis sp.	1			1		1		
Fumaria sp.						2		
Euphorbia helioscopia	5			2		17		
Umbelliferae (cf. *Conium maculatum*)						1		
Lolium sp. frags.	1			1				
Malva sp. (cf. *sylvestris*)	1							
Ignota								
Ignota (identifiable)			1					
Ignota (v. damaged)	2					1	1	
Ignota (featureless)		1						
Total	**22**	**3**	**1**	**5**	**1**	**26**	**4**	**1**

as hazelnut (*Corylus* sp., WF01), and the fig (*Ficus carica,* WF55) appears for the first time on this site in the A IV phase. The hazelnut tree has a long presence in Greece; it was surely present in the Mesolithic and Neolithic of Greece,[10] and we have shell evidence of the use of hazelnuts from the Late Neolithic at Dispilio in Macedonia.[11] At the Sanctuary of Hera, on the island of Samos (7th century BC) fragments of hazelnuts were also found.[12] Although their presence in the area is proven, we know hardly anything about their cultivation and their position in the agriculture of Greece, even in the Classical period.[13]

Cereals and legumes, as before, are sparingly present. What is interesting, though, and needs further investigation, is the higher presence of weed species in phases A III and A IV. What could be the meaning of this presence? It could signify several things. Presence of weeds[14] is usually linked to the cleaning of stored crops that contained them.[15] Absence of weeds might indicate that edible foodstuffs were neither stored nor cleaned anywhere near Area D in the A I and A II phases (absence of weeds), and that, for some reason, unknown to us, crops were either cleaned or stored not very far from Area D in A III and A IV (presence of weeds). In other words, either storage distance or the behaviour involved in cleaning a crop could have changed. A different interpretation could have been that quality standards in food had relaxed for some reason over time. Were cleaning the crop, preparing it and consuming it undertaken in the same general areas? In other words, did it reflect lower social standards with less pernickety food habits? The sun spurge (*Euphorbia helioscopia*,

[10] Ntinou 2002; Kotzamani & Livarda 2014; 2018.
[11] Mangafa 2000, 192.
[12] Kučan 1995.
[13] References are made to hazelnut by Theophrastus (*Hist. pl.* III.XV.1–2) and also see Meiggs 1982, 420–421. Meiggs (269) mentions that coppice wood is an easy way to produce fuel and hazelnut is a tree which is easily coppiced.
[14] By the term "weeds" we refer to wild low plants and grasses that are not intentionally cultivated. Some are weeds of cultivation and some not. Here we use the all encompassing term "weeds" without making such differentiations.
[15] Valamoti 2004, 54–55.

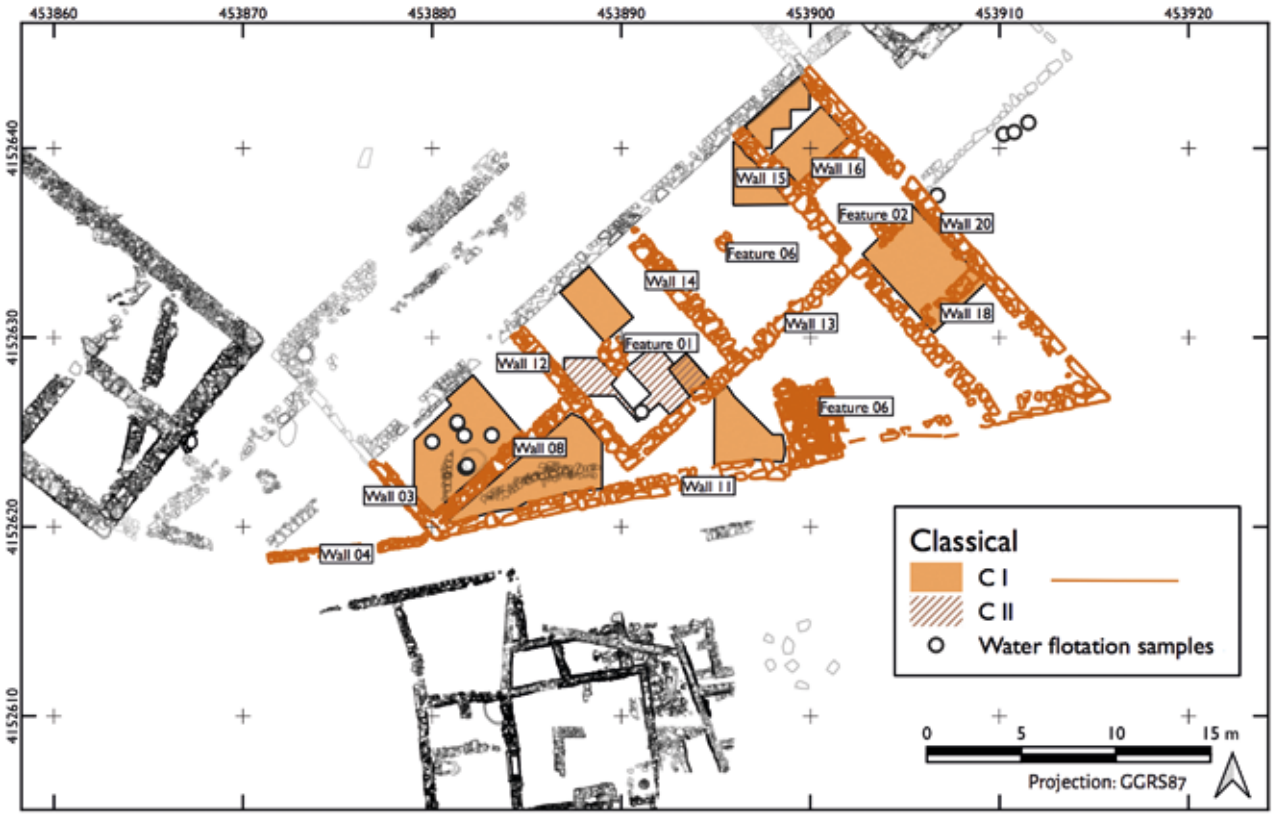


Fig. 5. Distribution of archaeobotanical remains in Late Classical/Early Hellenistic contexts in Area D. By R. Rönnlund.

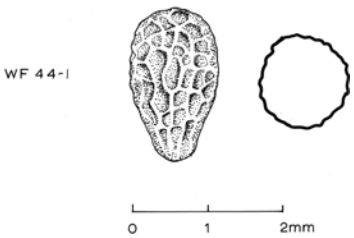


Fig. 4. Drawing of seed of sun spurge (Euphorbia helioscopia) by A. Hooton.

WF01, WF44, WF56, WF62, *Fig. 4*) appears for the first time in A II and for the rest of the period.

In this period, the A II Feature 05, supposed to be an altar, could be important, and yet the samples found in its context were archaeobotanically poor (WF73, WF76, WF83, WF85). The presence of fruit remains is limited to two species, olives and grapes, similar to other areas. If we accept that this feature is indeed an altar, the olive and grape fragments could have been part of the fuel burnt on the supposed altar, perhaps used as tinder. Had they been part of offerings, I believe, we should have found them whole. Nevertheless, small fragmented grape pips could have been part of cake (?) offerings (bloodless offerings). What is interesting is that from an archaeobotanical point of view, phase A II which is associated with activities in the vicinity of the supposed altar has not very much to show, except from two samples (WF01 and WF18). Perhaps it could indicate either a sign of cleanliness or lack of burning of grains and fruits. The evidence however is inconclusive.

THE LATE CLASSICAL/EARLY HELLENISTIC PERIOD (*TABLE 4*, *FIG. 5*)

The Late Classical/Early Hellenistic period in the sanctuary has two phases, C I (*c.* 325 BC—fill) and C II (after *c.* 325 BC—floor). This period is again characterized by levelling, as well as industrial activities, as metal slag has been found.[16] All these disturbances must have had a negative effect on the survival of bioarchaeological materials in general and archaeobotanical data in particular.

Nine samples from C I deposits were retrieved. The same pattern of fruits is to be seen. It is interesting to note, though, that figs are more numerous and are preserved only as fruit fragments. However, one sample (WF06) has just weeds and by-products of what seems to be crop processing related to

[16] Pers. comm Yannis Bassiakos.

Table 4. Building D and Area D: Classical (CI and C II) samples with archaeobotanical (seed) remains.

Sample no.	**WF06**	**WF10**	**WF11**	**WF14**	**WF17**	**WF19**	**WF21**	**WF16**	**WF63**	**WF75**
										Feature 01
Area	**D01**	**D01**	**D01**	**D01**	**D01**	**D01**	**D01**	**D02**	**D08**	**D11**
Quantity searched	**all**	**all**	**all**	**all**	**all**	**all**	**all**	**all**	**all**	**all**
Chronology	**C I**	**C I**	**C I**	**C I**	**C I**	**C I**	**C I**	**C I**	**C I**	**C II**
Litres washed	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**25**	**25**
Fruit										
Vitis vinifera pip			1							
Olea europaea frags.			1		1					1
Ficus carica fruit frag.			1				1		1	
Berries (?)									1	
cf. *Junglans* sp.		1								
Cereal										
Cerealia frag. (T./H.)		1				1				
Legumes										
Legume sp. cotyl.—medium		1							1	
Weeds										
Atriplex sp. (cf. *A. patula*)	1									
Bifora sp.	1									
Plantago sp. cf. *lagopus*	2									
Polygonum sp. (cf. *P. persicaria*; *P. orientale*)	1									
Papaver cf. *dubium*			1							
Papaver somniferum					1					
Euphorbia sp.	1									
Cruciferae	1									
Trees/*maquis*										
Pistacia sp. (cf. *terebinthus*)	1									
Shell frags.			1							
Ignota										
Ignota (identifiable)			3	1				1		
Ignota (v. damaged)	11		3							
Ignota (featureless)			3							
Total	**19**	**3**	**14**	**1**	**2**	**1**	**1**	**1**	**3**	**1**

cleaning. Amongst these sweepings we might be seeing indirect evidence of the consumption of terebinth (*Pistacia terebinthus*). This is noted with much caution as it could be the remnants of burning of *Pistacia*, if the branches happened to have borne fruit.[17]

Another element which occurs for the first time is the walnut (*Junglans* sp., WF10), but again we do not have the fruit but the outer shell, so here too we are dealing with by-products and not food. Although this tree surely makes its appearance in the Bronze Age and more specifically probably in the Late Bronze Age,[18] the macrofossil crop evidence is thin on the ground. Even in the nearest sites such as Isthmia and Corinth there is no presence of this fruit, or of hazelnut.[19]

Two other plants are worth noting. One is spurge (*Euphorbia* sp., WF06) and the other is opium poppy (*Papaver somiferum*, WF17, *Fig. 6*) but there is only one seed, so we can-

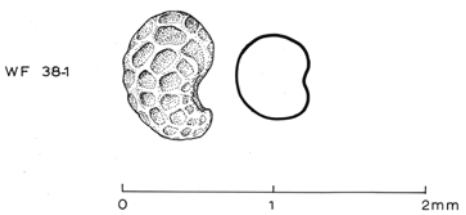


Fig. 6. Drawing of common poppy (Papaver somniferum) by A. Hooton.

[17] See Ntinou 2019. Only five out of 142 charcoal fragments are from *Pistacia* and only one fruit fragment.

[18] Evidence of its wood is noted by Ntinou 2002.

[19] Hansen forthcoming.

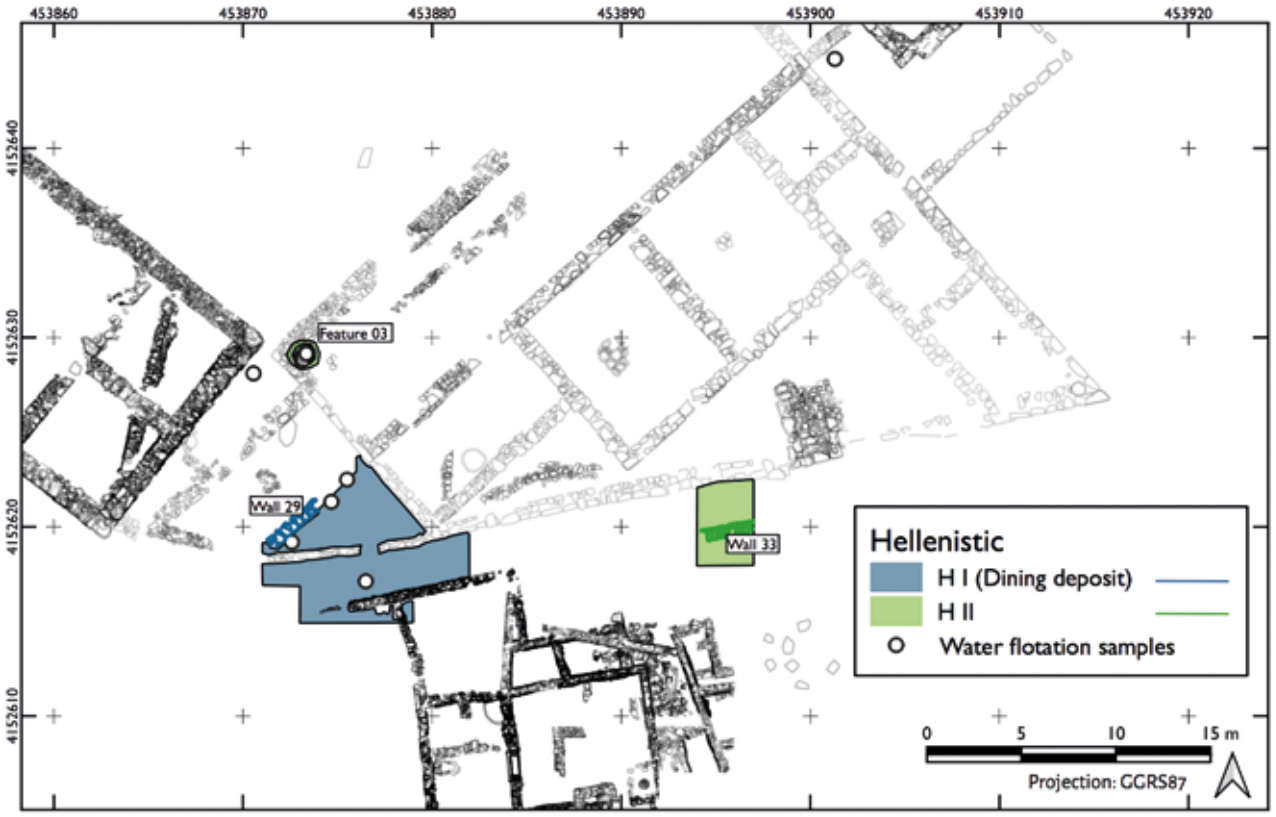


Fig. 7. Distribution of archaeobotanical remains in Hellenistic and Early Roman contexts in Area D. By R. Rönnlund.

not make much of this find for the time being, especially as it can also exist spontaneously as a weed.

THE HELLENISTIC PERIOD (*TABLE 5*, *FIG. 7*)

For the Hellenistic period we shall, again, concentrate on the levels which produced archaeobotanical remains. This is the so called "dining deposit", a one-time deposition, dated to H I, *c.* 165 BC. The "dining deposit", which produced six soil samples (WF05, WF13, WF38, WF43, WF45, and WF47), provides the same pattern as in previous periods, which is the presence mainly of fruits. However, hazelnuts and walnuts did not make their reappearance. It is interesting though that three out of the six samples had whole olive stones (WF05, WF13, WF43), remnants of food, and not mere fragments, which is the case for most other samples. It does reinforce the "dining deposit" interpretation and could indicate some evidence that olives were consumed as snack food or nibbles.

The pattern of cereals and legumes is also exactly the same as in other periods, that is a meagre presence, but sample (WF38) surprises us with the relatively high presence of weeds of cultivation which was totally unexpected for a dining area. Does this mean that, even in the Hellenistic period, storage was not always far from dining areas and that crop cleaning was conducted nearby?

THE LATE HELLENISTIC/EARLY ROMAN PERIOD (*TABLE 6*, *FIG. 7*)

The fill in Feature 03, the cistern deposit, which is dated to the Late Hellenistic/Early Roman period, *c.* 50 BC–*c.* 100 AD, also produced some archaeobotanical remains. From Feature 03 eight samples (WF71, WF77, WF78, WF84, WF87 WF89, WF90, and WF91) were collected from its fill, which provides the same picture. Of the fruits only olive stone fragments and fig fruit fragments are present, also few cereals and legumes. There is a lump of food but most of the other seeds are damaged. The pattern indicates trampling and sweepings. However, the archaeobotanical material is rather poor considering that it might have been a type of dump. The reason for this poverty is the material itself. Had it not been charred, bacterial degradation would have attacked all uncharred material, leaving no trace behind. No water was kept in the cistern at the time of fill accumulation to preserve organic material in

a waterlogged state, nor was it a latrine which would have mineralized organic material.[20]

The crops—in brief

As has become obvious, the fruit crops are the olive, the grape, the fig, the almond, the walnut, and the hazelnut (*Table 7*). Unfortunately for the last two, they only appeared once, hazelnut in the A II phase and walnut in the C I. All the other fruits had a diachronic presence.

For the cereals (*Table 8*), the presence of barley (*Hordeum vulgare*) is secure but wheat (*Triticum* sp.) is probably present, yet all the seeds are ambiguously identified as wheat/barley, due to their bad preservation. Oat (*Avena* sp.) is probably present as well, but it is not possible to say whether it was the domesticated strain grown for human consumption. Indeterminate cereals were found fragmented, in other words were processed for consumption. The crops, though, with the poorest visibility in the archaeobotanical record are the legumes, and even when they are present, they are processed to such an extent that they are not identifiable, even to genus. Perhaps, the fashion of preparation, that is the making of some form of broth with cereals and/or legumes[21] might be responsible for this condition. It is known that fragmented cereals and specifically barley were sprinkled on wine.[22]

In this light, it is important to compare what was found in some other sanctuary sites, such as the Sanctuary of Apollo and Artemis at Kalapodi (Late Helladic IIIC),[23] and of Demeter and Kore at Corinth (Classical).[24] The pattern of barley at Corinth is the same as at Kalaureia but there is the additional presence of bread wheat (*Triticum aestivum* s.l.) and millet

Table 5. Building D and Area D: Hellenistic (H I)—Feature 06, "dining deposit"—samples with archaeobotanical (seed) remains.

Sample No	**WF05**	**WF13**	**WF38**	**WF43**	**WF45**	**WF47**
Area	**D03**	**D03**	**D05**	**D05**	**D05**	**D05**
Quantity searched	**all**	**all**	**all**	**all**	**all**	**all**
Chronology	**H I**	**H I**	**H I**	**H I**	**H I**	**H I**
Litres washed	**55**	**22**	**30**	**30**	**4**	**30**
Fruit						
Vitis vinifera frags.	3	1	1			1
Prunus amygdalus frags.	3					
Olea europaea (stone)	1	1		1		
cf. *Olea europaea*						
Olea europaea frags.	15	18	1	14		2
Ficus carica (min.)			4	1		
Cereal						
Cerealia frag. (T./H.)	1					
Legumes						
Legume sp. cotyl.—medium	1					
cf. Legume frags.	2				1	
Weeds						
Papaver (min.) cf. *rhoeas*			1			
Galium sp. (cf. *G. aparine*)			1			
Galium sp. (cf. *G. tricornutum*)						1
Portulaca sp.			1			
Spergula arvensis			1			
Mercurialis annua			7			
Fumaria sp.					1	
Ignota						
Ignota (very damaged)	4	3	7			
Ignota (featureless)	3	3				
Subfossil indeterminate		12				
Total	**33**	**38**	**24**	**16**	**2**	**4**

Table 6. Building D and Area D: Late Hellenistic/Early Roman—Feature 03—samples with archaeobotanical (seed) remains.

Sample No	**WF46**	**WF49**	**WF59**	**WF69**
Area	**D07**	**D07**	**D07**	**D01**
Quantity searched	**all**	**all**	**all**	**all**
Chronology	**H II**	**H II**	**H II**	**H II**
Litres washed	**25**	**25**	**25**	**25**
Fruit				
Olea europaea frags.		2	1	
Ficus carica fruit frag.				1
Legumes				
Legume sp. cotyl.—medium		1		
Ignota				
Ignota (v. damaged)	2			
Total	**9**	**3**	**2**	**1**

[20] Lime, which in prehistoric times was used to disinfect areas such as latrines, was probably not used either, for otherwise, mineralization of at least some archaeobotanical material would have been visible in the state of preservation of the seeds, i.e. the seeds would have been mineralized. E.g. Green 1979.

[21] Pedley 2005, 85.

[22] Linders 1994, 76. Also see Baudy 1995, 179, who states "a mixed drink made of bruised barley grain" for celebrating the first corn.

[23] Kroll 1993.

[24] Bookidis *et al.* 1999.

Table 7. Cumulative table for Building C and Area C; Building and Area D for all periods: the fruits.

Plant species	Common name	Quantity—qualitative
Olea europaea	Olive	Abundant
Vitis vinifera	Grape	Common
Ficus carica	Fig – mostly fruit frags.	Scarce
Prunus amygdalus	Almond	Scarce
cf. Juglans—C I	Walnut	Presence
cf. Corylus—A II	Hazelnut	Presence

Table 8. Cumulative table for Area C; Building and Area D for all periods: the cereals.

Triticum sp.	Wheat—variety?	Mere presence (?)
Hordeum vulgare—hulled	Barley—hulled	Mere presence
Avena sp.—EIA I	Oat	Mere indication

(*cf. Panicum* sp.). At Kalapodi, the same cereals occur with the addition of oats (*Avena* sp.) and rye (*Secale cereale*).

Legumes, by contrast, have a wide repertoire in both sites. There was lentil (*Lens culinaris*), bitter vetch (*Vicia ervilia*), pea (*Pisum sativum*), chickpea (*Cicer arietinum*), and grass pea (*Lathyrus* sp.). At Kalapodi the pea identification has been refined to *Lathyrus sativus/cicera*.

Fruits are more or less the same as at Kalaureia, and olives are the most abundant. It is interesting to see that they are also mostly fragmented, a fact which might indicate their possible connection to fuel rather than food. Figs and grapes are also present but pomegranate (*Punica granatum*) has been found there but, so far, not at Kalaureia. At the Palaimonium pit A at Isthmia, dated to *c.* AD 50–100, in addition to the plants mentioned, a date stone fragment was retrieved, as well as an apple or pear seed, and pistachio nuts.[25]

The plant material studied from a 3rd-century BC heroon (monument dedicated to a local hero) at Mesine[26] provides some interesting and different results. The presence of pine cones (*Pinus pinea*) together with bracts, whole cones, and fragments, whole almonds, whole fruits of sweet chestnuts (*Castanea sativa*), apple/pear seeds (*Malus/Pyrus* sp.), and also grape and olive, as at Kalaureia, was observed.

Further afield, in the Samian Heraion dated to the 7th century BC,[27] on the island of Samos, plant remains were exceptionally well preserved due to the waterlogged conditions there. In addition to the normal crops such as wheat, barley, lentil, figs, grape, olive, almond, and pomegranate, there was the evidence of black mulberry (*Morus nigra*), melon (*Cucumis melo*), watermelon (*Citrullus lanatus*), and peach (*Prunus persica L.*). In addition, evidence was recovered of spices, fruits, and vegetables such as coriander (*Coriandrum sativum*), dill (*Anethum graveolens*), nuts of acorn (*Quercus* sp.) and hazelnut, okra (*Hibiscus esculentus L.*), celery (*Apium graveolens*), wild lettuce (*Lactuca serriola*), radish (*Raphanus raphanistrum*), opium poppy, and pomegranate, amongst others.

The above comparisons, with all the similarities and differences that have been observed are, up to a certain point, a reflection of the different taphonomic conditions in each site. In the waterlogged deposits in the Samian Heraion for example where preservation is optimal we observe the widest variety of plants. They also reflect, however, different practices, cultic and commensal, in each case. These differences merit further exploration, but are outside the scope of the present report.

WEEDS (*FIG. 8*)

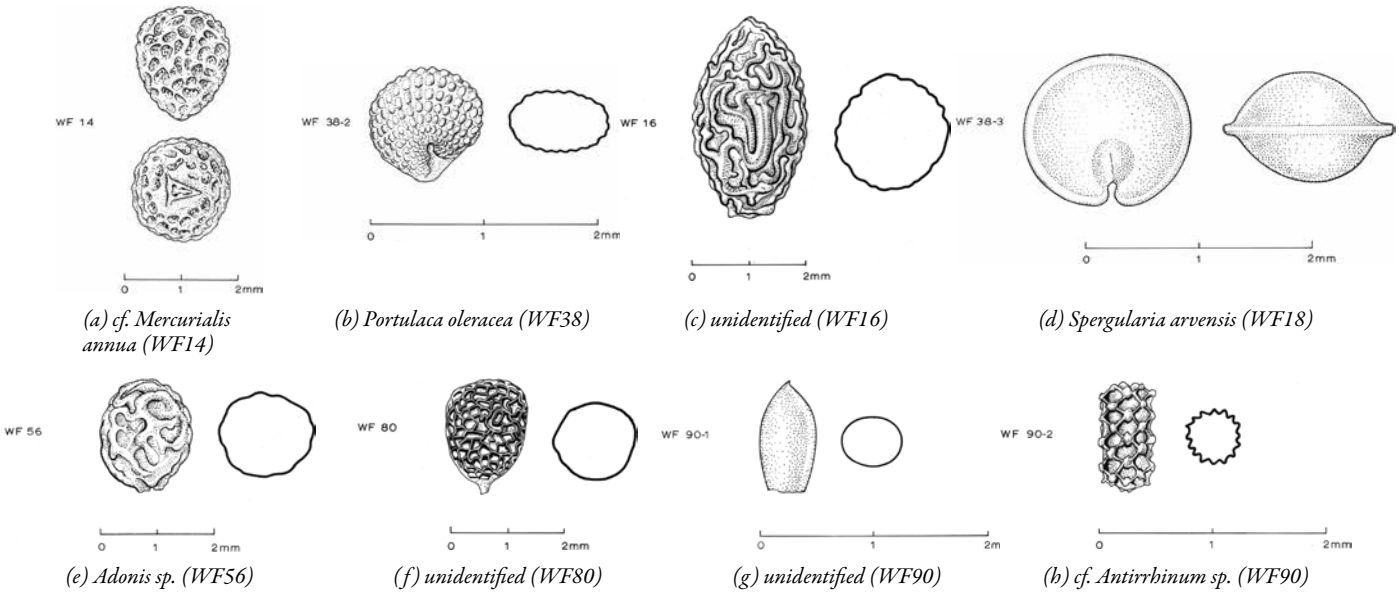
Weeds are a very important part of archaeobotanical studies, if we have large enough numbers in order to apply some statistics and identify patterns.[28] Unfortunately, at Kalaureia we do not have a high concentration, in any one sample, but from all the soil samples we collected, we have formed a list of species (*Table 9*), which is more qualitative than quantitative. What is striking is that the majority are plants that like rich and wet soils. Purslane (*Portulaca oleracea)* is a plant that grows in wet and irrigated areas and is eaten as a salad today and most probably in the past too.

The presence of sun spurge (*Euphorbia helioscopia,* first appearance in A II), in several samples is very interesting, for although it is a weed of fields and gardens, its use in water to stun fish might already have been known in the past, in order to facilitate the catch. Its presence in a sanctuary related to the God of the Sea might not be fortuitous, especially given the marked presence of fish remains in most of the excavated contexts.[29] Furthermore, the mere presence of the opium poppy and hemlock (*cf. Conium maculatum, Table 9*), plants with narcotic qualities needs further verification, especially in order to understand their possible use in the sanctuary site.

FOOD REMAINS

Some food remains, collected as charred lumps, have been collected from Early Iron Age, Archaic and Late Hellenistic/Early Roman deposits. These lumps would never have reached us had they not been charred, as bacteria would have disintegrated the material and absorbed it. The "dining deposit",

[25] Bookidis *et al.* 1999. 31.
[26] Megaloudi 2005.
[27] Kučan 1995.
[28] Küster 1991; Charles *et al.* 1997; Bogaard *et al.* 2005.
[29] Mylona 2019.



(a) cf. Mercurialis annua (WF14) *(b) Portulaca oleracea (WF38)* *(c) unidentified (WF16)* *(d) Spergularia arvensis (WF18)*

(e) Adonis sp. (WF56) *(f) unidentified (WF80)* *(g) unidentified (WF90)* *(h) cf. Antirrhinum sp. (WF90)*

Fig. 8. Drawings of weed seeds, all by A. Hooton.

where lumps of food would have been expected, is devoid of such finds.

Two such lumps were analysed and identified by Ann Marie Hansson, of the Archaeological Research Laboratory, Stockholm University, with the assistance of Maria Wojnar Johansson.[30] The lumps are both of an Archaic date and originate from the supposed altar to the east of Building D (Feature 05, A II). The samples were analysed under a stereomicroscope and a Scanning Electron Microscope (SEM). The first lump had a distinct vegetal origin, but its cell structure seemed to be disturbed, or more accurately, squeezed (*Fig. 9*). Its structure does not resemble that of any known bread or cake but could possibly be part of a fruit preparation. The second lump has the discrete structure of bread. It seems likely that the fragment had been attached to something else, such as a bigger piece of bread.

"Bloodless" offerings in sanctuaries often consisted of cakes, doughs including fruit, and bread. These had different shapes and sizes, and were given various names such as πέμμα, πόπανον, πλακούς, φθόις ἔλατρα, επιπέμματα, ψαιστόν, αρεστήρες, μονόμφαλα, *or* ἑβδομοι βόες. The cake/bread known as the ἑβδομοι βόες was a remarkable one: it represented an ox complete with crescent-shaped horns sitting on a base of six moon-shaped cakes.[31] This tradition in Greece, of making replicas of people, animals, human parts, does not seem to be totally extinct, as in present-day Crete cakes in the shape of persons or human parts are still made as offerings and presented to the church of St. Antonios at Loutro in Sphakia.[32]

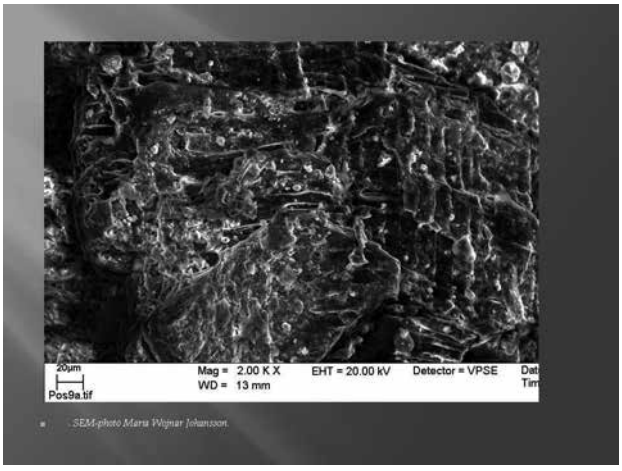


Fig. 9. The cell structure of a lump of vegetal origin. Photograph by Maria Wojnar-Johansson.

Concluding remarks

The excavations in Areas D and C of the Sanctuary of Poseidon during the period 2003–2005 produced a small and badly

[30] The following information is based on a preliminary report filed by A.M. Hansson in February 2009.

[31] Kearns 1994, 68.

[32] Psilakis 2004. There are undoubtedly other such ethnographic parallelsto be found elsewhere in Greece.

Table 9. Weeds found in Area C; Building D and Area D and their niche indicators.

Plant species	Annual	Perennial	Wet soil	Dry soil	Rich soil	Poor soil	Tall plannt	Medium height	Short plant	Indicating 1	Indicating 2	Uses 1	Uses 2	Ancient use 1	Ancient use 2
Atriplex sp. (cf. *A. patula*)	X		X		X		X			Garden	Vineyards				
Polygonum sp. (cf. *P. persic. P. orient.*)			X		X					Cultivation					
Papaver cf. *dubium*	X			X	X			X		Cereal					
Papaver somniferum										Cultivation and excape of cultiva-tion		Medicinal	Oil seeds		
Papaver (min.) cf. *rhoeas*	X		X		X			X	X	Cereal	Wet places	Medicinal			
Rumex sp.		X (mostly)	X				X								
Galium sp. (cf. *G. aparine*)	X		X		X		X			Cereal		Medicinal, diuretic			
Galium sp. (cf. *G. tricornutum*)	X				X			X	X	Cereal	Mainly in irrigated				
Portulaca sp.	X		X		X				X	Cultivation		Salads, cooked	Medicinal		
Spergula sp.			X						X	Cultivation					
Mercurialis annua	X				X				X	Garden	Vineyards				
cf. Compositae (min.)															
cf. Gramineae frag.															
Lolium sp. frags			X					X					Poisonous		
Adonis sp.										Cereal					
Fumaria sp.					X				X	Cultivation	Garden	Medicine for stomach			
Umbelliferae (cf. *Conium maculatum*)	X		X		X		X			Cultivation					
Malva sp. (cf. *sylv. estris*, *M. nicaensis* All.)		X	X		X		X	X		Garden	Wetland	Medicinal		Food	Dye from flowers
Euphorbia helioscopia							X			Field and garden				Purgative	
Euphorbia sp.															
Onopordum sp.	X (biennial)			X						Fallow	Perennial crops				

preserved assemblage of charred seeds, despite the programme of systematic soil sampling and water flotation. It appears that this is the combined effect of various factors. The intense disturbance of deposits both in antiquity and in later centuries apparently affected the fragile charred seeds more than other taxa of bioarchaeological finds, such as the bones or the molluscs. Given the fact that charring is a prerequisite for the preservation of seeds and fruits, a strong element of chance is involved in the recovery of plant remains. So the dearth of carbonized seeds may be linked to the way foods were used in this particular area of the sanctuary. It seems very likely that the preservation situation in other locations in the sanctuary may be very different. Preservation of the carbonized seeds may also be linked to their use. The poor state of cereals and of the few extant pulses, for instance, may be linked to their preparation and cooking.

Two features appear to be constant in all chronological phases in this area. One is the severe under-representation of cereals and pulses, two categories of plant remains which are fairly common in most domestic excavations of all dates and

which are more emphatically present in other sanctuaries. The other is the predominance of fruits such as olives, grapes, and figs and more rarely hazelnuts and walnuts. The scant evidence at our disposal suggest that in some cases only the shelled or woody seeds of these fruits were charred, perhaps as fuel. In some other cases, however, the fruit itself had been charred, as is the case with the figs. In this case also, it is not possible in this study to evaluate the significance of this observation, i.e. whether it is the result of taphonomic processes, or of conscious choice on the part of the worshippers in the sanctuary. The presence of masses of plant foods, modified fruit flesh in one case and bread in another is particularly interesting, suggesting eating practices that are known from the written sources.

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