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PETROS LYMBERAKIS & GIORGOS ILIOPOULOS

Snakes and other microfaunal remains from the Sanctuary of Poseidon at Kalaureia

Abstract

The microfaunal remains recovered at the Sanctuary of Poseidon at Kalaureia (Poros island, Greece) are abundant and varied. They belong to a number of different animal taxa, including snakes, frogs, lizards, and some micromammals. They have been found in several locations but the largest concentration originates in a closed Late Hellenistic/Early Roman deposit within a cistern (Feature 03). The snakes in this assemblage are numerous, belonging to terrestrial and aquatic species, and to both venomous and non-venomous varieties. Bones of some of them along with certain frog bones show traces of burning, which may suggest some type of manipulation before the deposition. The microfaunal remains from the Sanctuary of Poseidon at Kalaureia also strongly suggest that these types of animal were involved in ritual activities—dead or alive.

Keywords: Kalaureia, Poros, sanctuary, Poseidon, microfauna, mice, frogs, snakes

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Introduction

The microfaunal material from the Sanctuary of Poseidon on Kalaureia (excavated 2003–2005)[1] was mostly collected from water-floated soil samples. A few of the bones were hand-collected. Only Area D has produced microfaunal remains (see *Fig. 1*). This report focuses on micromammals, snakes, lizards, and frogs. Their bones are presented in detail and their ecological significance is discussed. It is not the aim of this paper to provide an in-depth zooarchaeological analysis of this material and of its cultural significance in the context of the Sanctuary of Poseidon and cult more generally. The archaeological ramifications of the macrofaunal remains' presence on site are discussed elsewhere.[2] This paper only provides details on the physical attributes of the microfaunal remains and on their spatial distribution, hopefully making them accessible to the wider scientific community. The material examined here originates from 18 different contexts of the 2003–2004 excavations at the sanctuary (*Tables 1–5*). Material from the 2005 excavations, which originated exclusively from the cistern (Feature 03) has only been examined through photographs.[3]

For the identification of the material we used scientific literature as well as reference collections of comparative osteological material already prepared and/or specifically prepared for this task, at the Natural History Museum of Crete. There is an obvious qualitative difference among identifications of various taxa. Mammal identifications are facilitated by the fact that mammal teeth are the most informative elements for the group and at the same time they are the part of the animal which is best preserved. In contrast, identification of snakes from osteological material and especially vertebrae is very difficult and in some cases it is impossible to reach the species level.[4]

The snake remains

Snake bones have been identified to the family, genus, or species level, according to the works mentioned above, taking into account the extant reptile fauna of the Peloponnese. Information on the biology and ethology of the identified snakes that might be relevant to the interpretation of their presence on the site are presented in table form (*Appendix*).

[1] Wells *et al*. 2005; 2006–2007.
[2] Mylona 2013; 2019.
[3] The identifications of the microfaunal remains from Feature 03, below stratum 6 are based on bone photographs and are, at the moment, generalized, because no direct access to the material has been possible.
[4] Szyndlar 1991a; 1991b.

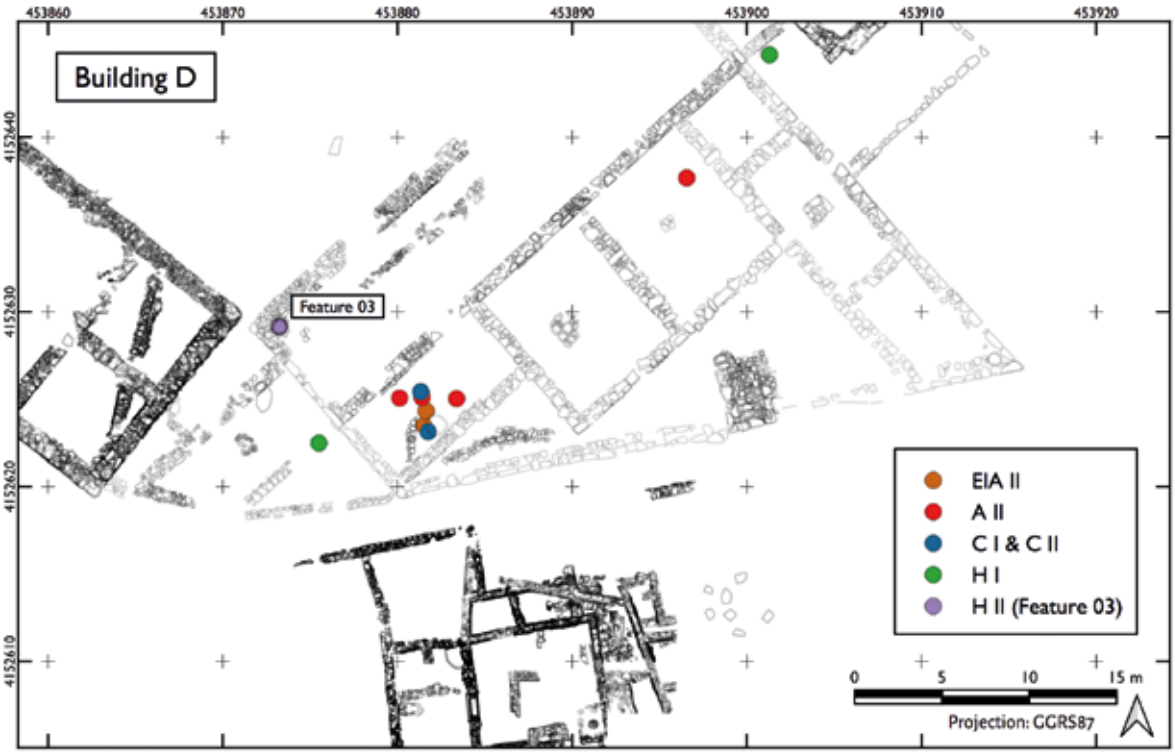

Fig. 1. Plan showing locations of soil samples in which bones from microfauna and snakes were found. By R. Rönnlund.

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; this contribution by Petros Lymberakis and Giorgos Iliopoulos; Syrides 2019; Ntinou 2019; Sarpaki 2019. 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.

Fig. 2. Burned snake bones. Photograph by C. Mauzy.

Table 1. Microfaunal remains from the Early Iron Age strata.

Date	Context	Sample	Taxon	Vertebrae	Jaws	Teeth	Ribs	Limbs	Other	Burned (b) Recrystallized (r)	Total
750–700 BC (EIA II)	Floor level	WF30	Snake	1			1				2
750 BC (EIA I)	Fills	WF35	Micro-mammal					1			**1**

Table 2. Microfaunal remains from the Archaic strata (c. 6th century BC).

Phase	Context	Sample	Taxon	Vertebrae	Jaws	Teeth	Ribs	Limbs	Other	Burned (b) Recrystallized (r)	Total
AI	< 650 BC—a fill	WF28	Frog					1			**1**
AI	< 650 BC—a fill	WF27	Micro-mammals						2		2
AII	650–525 BC—slowly accumulated material	WF23	Micro-mammals					1			**1**
			Snake	1							**1**
Archaic disturbed	650–525 BC—slowly accumulated material	WF18	Micro-mammals?				2				2

The microfaunal bone assemblage from the Sanctuary of Poseidon on Kalaureia produced three families of snakes which include several genera and species. More specifically, the Colubridae are represented by *Hierophis gemonensis*, *Malpodon monspessulanus*, *Elaphe quatuorlineata*, *Zamenis longissima*, and *Telescopus fallax*. The Viperidae are represented by *Vipera ammodytes* and the Natricidae by *Natrix natrix* and *Natrix tessellata*.

The preservation of the snake bones is very good, with no distinct erosion traces apparent. No cut marks have been discerned on any of them. A small number of the examined bone specimens (*Tables 1–5*) present significant alterations in their preservation. In these specimens we were able to identify two types of alterations (*Fig. 2*). The first type (41 bones) is characterized by a distinctive black colour while the second (37 bones) by white colour. Eight specimens bear both these alterations. The first type of alteration is attributed to burning, or to what Sam Roberts *et al.*[5] described as the burning/incineration process. The second type of alteration is attributed to the recrystallization of the bones' original hydroxyapatite, again due to exposure to heat.[6] In this case however, the bones have been altered, either by submission to heat that precluded direct contact with fire, or alternatively the bones' colour could have changed due to post-burial diagenetic alterations.[7] Given the fact that the same burning patterns are apparent on other categories of bones as well[8] and that burning of various materials is widely attested on site,[9] the first scenario seem more plausible.

The chronological distribution of snake remains on site is uneven, with the highest density of remains produced by the Late Hellenistic/Early Roman deposits from within the

[5] Roberts *et al.* 2002.
[6] Shipman *et al.* 1984; Stiner *et al.* 1995.
[7] Indicatively Shahack-Gross *et al.* 1997; Stathopoulou *et al.* 2004.
[8] Mylona 2019.
[9] Ntinou 2019; Sarpaki 2019.

Table 3. Microfaunal remains from the Classical strata (C I: 325 BC).

Context	Sample	Taxon	Vertebrae	Jaws	Teeth	Ribs	Limbs	Other	Burned (b) Recrystallized (r)	Total
Fill	WF06	Micromammals (squirrel-sized rodent)			2					**2**
Fill	WF21	*Suncus etruscus*		1						**1**

Table 4. Microfaunal remains from the "dining deposit" (H I: c. 165 BC).

Sample	Taxon	Vertebrae	Jaws	Teeth	Ribs	Limbs	Other	Burned (b) Recrystallized (r)	Total
WF05	Micromammals			1	3		3		7
WF38	Micromammals cf *Apodemus mystacinus*						4		**4**
WF38	Micromammals			1			2	3 b	**3**

cistern (Feature 03). Here follows a description of the snake remains for different periods (*Tables 1–5, Fig. 1*).

EIA II (*C.* 750–700 BC, *TABLE 1*)

(1 vertebra, 1 rib)
The snake remains have been collected from the floor fill in a building dated to the late Early Iron Age.[10] The vertebra belongs to a natricine snake.[11] Most likely it is a vertebra of a nose-horned viper (*Vipera ammodytes*).

A II (6TH CENTURY BC–HELLENISTIC, *TABLE 2*)

(1 vertebra)
Only one snake vertebra has been recovered from the Archaic strata and more specifically from the A II horizon.

C I–II (*C.* 325–*C.* 275 BC)

No snake bones have been retrieved from the Late Classical/Early Hellenistic deposits.

H I (*C.* 165 BC)

No snake bones have been retrieved from the Hellenistic H I deposits.

H II (*C.* 50 BC–*C.* AD 100, *TABLE 5*)

All the Late Hellenistic/Early Roman snake remains originate from the fill of the cistern (Feature 03).[12] Here follows a stratum-by-stratum description of these remains, and some implications of their presence are discussed.

Stratum 4 (11 vertebrae, 14 ribs)

All vertebrae probably belong to the same individual, possibly a Montpellier snake (*Malpolon monspessulanus)* of great dimensions (>150 cm). None of the bones is burned.

Stratum 5 (291 vertebrae, 10 jaws, 238 ribs)

The collection contains vertebrae and jaws of animals of many different sizes and species. Genera identified are *Malpolon* (Montpellier snake), *Hierophis* (whip snake), *Natrix* (grass or/and dice snake), *Vipera* (nose-horned viper), *Elaphe* (four-lined snake), without excluding the possibility of the collection containing other small colubrines as *Zamenis* (Aesculapian or/and leopard snake) and *Telescopus* (cat snake). The Montpellier snake seems to dominate (~30% of the material, containing animals of various sizes) followed by other colubrine snakes (~30% again with animals of various sizes). The proportion of natricine snakes (i.e. belonging to the genera *Natrix* and *Vipera*) is in the area of 20%, while the remaining proportion was difficult to identify. Among the snake remains from this stratum there have been found five burned and three recrystallized bones.

Stratum 6 (208 vertebrae, 2 jaws, 76 ribs, 1 other)

Among these five were found burned and three recrystallized.

Stratum 11–18[13]

The deeper strata were equally rich in snake remains. Although no exact identification of these remains has been possible (see

[10] Wells *et al.* 2006–2007, 17, 45–48.
[11] Szyndlar 1991a; 1991b.
[12] Wells *et al.* 2006–2007, 73–80; for the spatial distribution of snake and other animal remains in the cistern see Mylona 2019.
[13] The numbering of strata is disrupted at this point but stratum 11 lies directly underneath stratum 6.

Table 5. Microfaunal remains from fill of Feature 03—the cistern (H II: c. AD 100).

Stratum	Sample	Taxon	Vertebrae	Jaws	Teeth	Ribs	Limbs	Other	Burned (b) Recrystallized (r)	Total
4	WF67	Micromammals				1		1		**2**
		Snakes	11			14				**25**
5	WF71	Micromammals cf *Rattus*			3	1	2	6		**12**
		Snakes	281	10		235			3 vert. b, 2 rib b, 1 vert. r, 2 ribs r	**526**
		Frog cf *Pelophylax*					1		1 limb bone b	**1**
		Frog indet.	1				6	+		**7+**
5	1510	Snakes	10			3				**13**
6	WF77	Snakes	205	2		73			5 vert. b, 6 ribs b, 2 vert. r	**280**
		Lizard		2			2			**4**
		Frog cf *Pelophylax*	2				2	2		**6**
		Micromammals *Rattus* sp.	6		4					**10**
		Micromammals cf *Mus*			3					**3**
		Micromammal indet.				3	1	4		**8**
6	1522	Snakes	1							**1**
6	1540	Snakes	3			3		1		**7**
		Frog				1				**1**
11	1569	Snakes	5			8			1 vert. b	**13**
		Frogs					9	1		**10**
12	1586	Snakes	2			2				**4**
12	WF78	Snakes	63	4		78			1 vert. b, 2 ribs r	**145**
		Frogs	1			5	3	10		**19**
		Micromammals			1		1			**2**
12	WF87	Snakes	81	1		28			4 vert. b/r	**110**
		Frogs	6				3			**9**
		Micromammals	9		4		4			**17**
13	1592	Snakes				2				**2**
13	WF81	Snakes	200	5		160			4 ribs b/r	**365**
		Frogs	4				5			**9**
		Micromammals		2	1		2			**5**
14	1606	Micromammals					2			**2**
		Frog					1			**2**
14	1634	Snakes				5				**5**
		Micromammal cf *Rattus* sp.					1			**1**
14	1648	Micromammals					3			**3**
		Snakes		4		44			2 ribs r	**48**

n. 3), the composition appears to be very similar to the above-mentioned strata.

On the basis of the taphonomic observations concerning the animal bone assemblage from the cistern as a whole,[14] we assume that the snake remains in it are connected to some type of a special deposition. It appears that there is no preference in the species chosen for the activities that led to this deposition. The Montpellier snake (*Malpolon monspessulanus)* seems to predominate in this collection of snakes. Its agility, large size, and its uniform back colour makes it quite conspicuous and could be reasons for the preferential selection of this species in comparison to the rest. Most of the other large species recorded (i.e. *Elaphe quatuorlineata, Hierophis gemonensis*, and *Natrix* sp.) are also quite abundant.

Both natricine genera (*Natrix* and *Vipera*) and especially the latter are rather underrepresented. The two snakes of the first genus (*Natrix natrix* and/or *Natrix tesselata*) have an aquatic mode of life. It is possible that these snakes had been brought to the sanctuary from elsewhere.[15] Moreover species of the genus *Natrix* have a mechanism of defence (they readily squirt a liquid from their anal glands on their predator leaving a repulsive "fishy" smell) which may have had an impact on the frequency of their capture. The second genus (*Vipera*) is represented by a single species in the area, namely the nose-horned viper (*Vipera ammodytes*). This is the only dangerous, venomous snake in the area. This fact may have had an impact on the proportion the animals captured and used.

None of the identified snakes could have lived in the cistern, due to their physiological need to be regularly exposed to the sun for thermoregulation purposes. Their remains had definitely been brought into the cistern from

[14] Mylona 2019.

[15] Research on the sanctuary has not revealed so far the presence of any sizeable open water feature that might sustain a population of aquatic snakes. See Mylona 2015 for discussion on the presence of marshy habitats in the area of Kalaureia.

elsewhere. The same idea is implied by the presence of burned bones, which indicates that the snakes' carcasses had been manipulated before deposition. This manipulation involved exposure to fire and possibly eating of the flesh.[16]

The micromammalian remains

Predominant species of the micromammalian fauna are the anthropophilic. The domestic mouse (*Mus*) and the rat (*Rattus*) are common. The pygmy white-toothed shrew (*Suncus etruscus*) is also identified. One more species, the rock mouse (*Apodemus mystacinus*) is considered to be present but the material does not permit a definitive identification. Finally, one sample (WF06) from a Late Classical/Early Hellenistic deposit contains two parts of rodent incisors of a squirrel-sized animal, which, however, cannot be more precisely identified. The mole rat (*Nanospalax leucodon*) is a rodent of similar size that can be found in the area and could be another candidate for these remains (*Tables 1–5*).

Small mammal remains have been uncovered from deposits of almost every period on the site (*Tables 1–5*). This might be an indication of their constant presence in the sanctuary. Only in one case, the "dining deposit" (H I), have some micromammal remains been found burned black. Their burning in that case might be related to the refuse disposal strategies employed, that are attested by the other animal remains as well.[17] Any interpretation of these animals' presence in the Sanctuary of Poseidon on Kalaureia should take into consideration the following:

—The most commonly occurring species have an anthropophilic character, thus living close to humans, in human-made environments.

—All species are fossorial, i.e. live in borrows. Consequently they could be intrusive to the archaeological deposits.

—The pygmy white-toothed shrew is designated as the world's smallest mammal, not exceeding 52 mm in length and 2.5 g in weight. It is rarely seen and/or captured by laymen. Therefore, their presence in the archaeological deposits must be accidental.

FROGS AND LIZARDS

The lizard remains, although well preserved, could not be identified due to the lack of comparative material. However they do not belong to the very conspicuous green lizards of the family Lacertidae as one would expect (genus: *Lacerta*) but to smaller species. All other lizard species that exist in the area today are dull coloured in contrast to the green lizards.

Most, if not all the frog remains probably belong to species of the genus *Pelophylax* (a genus only recently separated from the more widely known genus *Rana*), commonly known as marsh frogs. All the species of the genus are directly dependent on the presence of freshwater. The same genus includes all the edible species of Europe's frogs. The presence of burned frog bones might be an indication of their consumption, probably in a way similar to that of snakes.[18] Almost all the lizard and frog remains originate from the fill of the cistern (Feature 03, H II, *Table 5*). Only one frog leg bone has been retrieved from an Archaic deposit (A I, *Table 2*).

Concluding remarks

The assemblage of microfaunal remains from Area D in the Sanctuary of Poseidon at Kalaureia is large and varied, but, at the moment it stands alone in the literature. This is probably the result of the restricted use of suitable retrieval techniques during excavation of cultic sites that date to the historical period.[19] This paper presented these remains in detail along with their chronological and spatial distribution but it did not attempt to offer any interpretations regarding their significance for cult or the environment in the area of the sanctuary. This is partly done elsewhere.[20] It becomes clear however, that the detailed identification of the remains and the knowledge of the animals' biology and ethology are instrumental in formulating interpretations about the use of these animals that are usually neglected in zooarchaeological studies of cult-related materials.

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[16] For a discussion of these remains in the context of Feature 03 and their possible significance in cult see Mylona 2013; 2019.

[17] Mylona 2019.

[18] Lizard and frog remains, as well as the remains of other small animals, that are found in archaeological sites are often linked to the presence of birds of prey, such as owls (Andrews 1990, 65–74, 79–88). Here, however, the find-spot of the bones of such animals (the closed, undisturbed deposits within Feature 03) and the fact that several were burned, suggest that their accumulation was a result of human action.

[19] See discussion on the importance of field methods for the retrieval of bioarchaeological remains see Mylona *et al*. 2013.

[20] Mylona 2013; 2019.

Appendix. Ecological information on the snake species that are encountered at the Sanctuary of Poseidon at Kalaureia[21]

	Latin name	Common English name	Greek name	Information
Fig. 3	*Hierophis gemonensis*	Balkan whip snake	Δενδρογαλία	Max. L. > 1 m. Often found in trees where it feeds on birds, eggs etc.
Fig. 4	*Malpolon monspessulanus*	Montpellier snake	Σαπίτης	Max. L. 2 m. Lives in rocky places. Venomous, but cannot bite humans easily because its teeth are at the back of its mouth. When threatened its posture resembles the cobra.
Fig. 5	*Elaphe quatuorlineata*	Four-lined snake	Λαφιάτης	L. usually 1.60–1.80 m, max. L. 2.60 m. Found in stone walls and ruins, climbs in trees. Non-venomous.
Fig. 6	*Natrix natrix*	Grass snake	Νερόφιδο	L. up to 1.20 m. Lives near water and feeds on frogs and fish. When threatened expels a very strong fishy smelling fluid.
Fig. 7	*Natrix tessellata*	Dice snake	Λιμνόφιδο	L. usually 1–1.30 m, max. L. 2 m. Lives on lake coasts and rivers/ravines. Feeds on fish and frogs. When threatened expels a strong fishy smelling fluid.
Fig. 8	*Vipera ammodytes*	Nose-horned viper	Οχιά	L. up to 0.65–0.90 m. Lives in rocky places and dry grassland. Highly venomous.
Fig. 9	*Zamenis longissima*	Aesculapian snake	Λαφιάτης του Ασκληπιού	Max. L. 2.30 m. Found in dry places with Mediterranean vegetation. Snake sacred to Asklepeious.
Fig. 10	*Telescopus fallax*	Cat snake	Αγιόφιδο	L. up to 0.50–0.60 m. Found in rocky places. Modern folklore concerning it: worshipped in Kephallonia during the 15 August festivities in honour of the Virgin Mary. People collect the "Φιδάκι της Παναγίας" (Mary's little snake) which they carry to the homonymous church.

[21] Photographs by A. Trichas, Natural History Museum of Crete, except for *Elaphe quatuorlineata* (I. Ioannides) and *Telescopus fallax* (V. Paravas).

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