Charcoal analysis for the Neolithic of the Ionian Islands, western Greece: the case of Drakaina Cave at Poros, Kephalonia

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Summary: *The paper presents the results of wood charcoal analysis from Drakaina Cave for the Neolithic and the Chalcolithic period. The site is located at Poros Gorge, Kephalonia Island, Greece. According to the wood charcoal analysis, a rich environment would have existed in the gorge where both evergreen and deciduous species as well as some conifers would have grown. Among these* Phillyrea *and both evergreen and deciduous oaks would have been the most abundant. No significant changes occurred in the vegetation of the area from the Late Neolithic to Chalcolithic. The microenvironments of the gorge would have played their role in preserving the dynamic and rich ecosystems but the critical factor would have been the specialized, discontinuous use of the cave.*

Key words: *Neolithic, Chalcolithic, vegetation, microenvironment, specialized site.*

INTRODUCTION

Drakaina Cave is located in the south-eastern part of Kephalonia Island in the Ionian Sea, Western Greece (Fig. 1a). The cavity lies at an altitude of *ca.* 70 m in the steep-sloped Poros Gorge (Fig. 1b). At present, Drakaina forms a rock shelter extending over an area of approximately 90 m^2.

The site has been systematically excavated between 1992-1996, 1999-2002 and 2004-2005 by the Hellenic Ministry of Culture and Tourism – Ephorate of Palaeoanthropology-Speleology of Southern Greece (Chatziotou *et al.*, 1995; Stratouli, 2005). Human activity on-site started at about the mid 6th millennium cal BC and continued up to the beginning of the 4th millennium cal BC, based on radiocarbon dating. During the Early Bronze Age the cave hosted cultural activity only periodically and later on from the late 7th century BC to the beginning of the 2nd century BC it became a place of cult activity.

The earliest chrono-cultural periods attested at the sequence of the cave, i.e. Late Neolithic (Late Neolithic I: *ca.* 5600/5500 – 4900/4800 cal BC) and Chalcolithic (= Late Neolithic II: *ca.* 4800 – 3700 cal BC) (Fig. 1c) have been the focus of intensive research that has revealed the following aspects (Stratouli, 2005):

- Construction and special care of/for a series of lime plastered floors, overall an unusual practice for cave sites.
- Lack of evidence of grain storage and limited food preparation on site.
- Consumption of various foodstuffs on site at intervals, probably during formal or other feasts and by no means during routine visits.
- High fragmentation of pottery pointing to the practice of deliberate breakage.
- Transportation into the site of various local and imported to the island artifacts and raw materials.
- On site pigment processing.

These characteristics may be read as a system of signs of particular meaning that attribute a symbolic significance to the cave for the Neolithic community in the region. This idea may be also supported by the specific location of the cave in the Poros Gorge, which links the coastal zone with an interior basin of fertile farming land.

At Drakaina Cave, well-organized and systematic sampling of the excavated prehistoric deposits for environmental data has yielded great amounts of wood-charcoals. The wood-charcoal material on which this presentation focuses represents the majority of the excavated squares and the totality of the Neolithic stratigraphic sequence of the Cave, comprising two major chrono-cultural phases, i.e. Late Neolithic and Chalcolithic, as well as a possible intermediate phase, i.e. Late Neolithic/Chalcolithic.

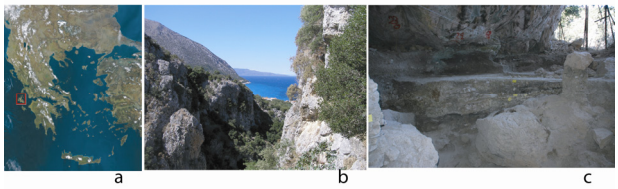

FIGURE 1. Location of Drakaina Cave: a. Kephalonia Island, western Greece, b. the gorge of Poros, c. the stratigraphy of Drakaina Cave.

DATA AND RESULTS

A total of 2793 wood-charcoal pieces have been analyzed and they have produced a rich plant list, which shows that a large number of both evergreen and deciduous species as well as some conifers would have grown in the gorge (Table 1). Among the identified taxa we can distinguish between those that would have probably grown to form the tree level of the formations, the components of the understorey (bushes and shrubs) and possible climbers. The qualitative and quantitative wood-charcoal results are presented as assemblages

corresponding to each one of the three major chrono-cultural periods mentioned above.

The frequency of occurrence of the identified taxa shows that *Phillyrea* and both evergreen and deciduous oaks would have been the most abundant. Oaks and sporadic Aleppo pines would have constituted the tree-level of the formations. A rich understorey is represented by a large number of smaller trees and shrubs among which strawberry tree, turpentine tree and the almond hold a special place. Riverside vegetation would have grown at the bottom of the gorge and along the watercourse. Some indication of this may be seen in the presence of poplars, elms and ash.

DISCUSSION AND CONCLUSIONS

The wood-charcoal assemblages show a rich plant environment that may have been the result of: a) the geographical and latitudinal location of Kephalonia that receives a mean annual rainfall between 750-1000 mm and has mild winter temperatures (January average 10-15 ^{o}C) (Polunin, 1980, 14-19), and b) the microenvironments existing within the gorge.

The qualitative and quantitative results of the wood-charcoal assemblages do not show significant changes from the Late Neolithic to the Chalcolithic (Table 1). The above-mentioned climatic and environmental parameters might have played their role in preserving the dynamic and rich ecosystems. However, we believe that the main reasons should be looked for in the frequency, continuity and intensity of human presence in the gorge and the type of activities that the cave accommodated. The characteristics of the vegetation for over a millennium of human presence at the cave indicate that either its use as a habitat was discontinuous and quite sporadic or that it was used for specialized activities other than animal keeping, which seems improbable since it would have caused some changes to the vegetation. In the case of specialized hunting actions, social gatherings and feasting or a ritual combination of them, the abundant use of firewood for e.g. meat processing and food preparation would have been required. However, such activities would have been periodical and spaced in time and therefore, no matter how large quantities of firewood would have been needed in each occasion they would have caused overall little alteration to the surrounding vegetation.

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	LN		LN - CH		CH	
TAXA	**n**	**%**	**n**	**%**	**n**	**%**
cf. *Abies cephallonica*	3	0.30			1	0.12
Acer sp.	5	0.50				
Angiosperm	24	2.40	27	2.81	42	5.20
Arbutus unedo	64	6.39	128	13.32	62	7.68
Carpinus/Ostrya	2	0.20	1	0.10		
Cistus sp.	3	0.30	2	0.21		
Cistaceae	3	0.30	1	0.10	1	0.12
cf. *Clematis* sp.	2	0.20				
Conifer	4	0.40	1	0.10	6	0.74
Erica sp.					3	0.37
cf. *Erica* sp.	1	0.10				
Ficus carica	1	0.10			2	0.25
Fraxinus sp.	1	0.10				
Juniperus sp.	35	3.50	10	1.04	14	1.73
cf. *Juniperus* sp.	1	0.10				
Labiatae	3	0.30	4	0.42	1	0.12
Laurus nobilis			2	0.21		
Leguminosae	1	0.10			3	0.37
Maloideae	9	0.90	19	1.98	3	0.37
Monocotyledon	1	0.10				
Olea europaea	8	0.80	1	0.10		
Phillyrea/Rhamnus alaternus	257	25.67	285	29.66	179	22.18
Pinus halepensis	1	0.10	11	1.14	5	0.62
cf. *Pinus halepensis*	3	0.30	1	0.10	2	0.25
Pinus halepensis/Pinus pinea type					1	0.12
Pinus nigra			1	0.10		
Pinus sp.			7	0.73		
cf. *Pinus*	1	0.10				
Pistacia terebinthus	25	2.50	43	4.47	46	5.70
Pistacia lentiscus			2	0.21		
Pistacia sp.	7	0.70	5	0.52	2	0.25
Populus sp.	2	0.20	1	0.10		
Prunus amygdalus	24	2.40	33	3.43	46	5.70
Prunus amygdalus/Prunus spinosa type	5	0.50	5	0.52	11	1.36
Prunus amygdalus/Prunus webbii type	2	0.20	2	0.21	3	0.37
Prunus spinosa type			2	0.21	2	0.25
Prunus webbii	4	0.40	1	0.10	6	0.74
Prunus sp.	4	0.40	4	0.42	17	2.11
Quercus sp. deciduous type	144	14.39	124	12.90	80	9.91
Quercus sp. evergreen type	240	23.98	150	15.61	118	14.62
Quercus sp.	103	10.29	86	8.95	149	18.46
Ulmus/Celtis	1	0.10				
Undetermined I			1	0.10		
Undetermined II	1	0.10				
Undetermined III	1	0.10				
Nut shell	3	0.30	1	0.10	2	0.25
Bark	2	0.20				
Sub-total	**1001**	**100**	**961**	**100**	**807**	**100**
Non identifiable	13	1.28	6	0.62	5	0.62
TOTAL	**1014**	**100**	**967**	**100**	**812**	**100**

TABLE 1. Qualitative and quantitative results for the wood charcoal assemblages of the Late Neolithic, the Late Neolithic-Chalcolithic and the Chalcolithic periods.

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