

PLANT MATERIAL FROM THE KLISSOURA CAVE 1 IN GREECE

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Abstract

This paper presents the results of the investigation of the macroscopic plant remains (seeds and fruit) from the Upper Palaeolithic deposits at Klissoura Cave 1. A total of 115 samples were examined. Seeds and fruit were presents in 37 samples. The quantitative and qualitative composition of individual samples, preserved on the site, is very poor. For the entire sequence of layers we determined sixteen taxons of plants (Table 1). All seeds and fruits, excluding one seed of *Arenaria serpyllifolia*, are uncharred. A small number of diasporas are of uncertain origin and without a clear chronological position thus does not allow further characterization of the different cultural levels.

Key words: Upper Palaeolithic, seed, fruit.

INTRODUCTION

Klissoura Cave 1 is located in the eastern Peloponnese in Greece. The field investigation during 1996–2006 were conducted as a joint project of the Ephory for Palaeoanthropology and Speleology in Athens, Greece and the Institute of Archeology of the Jagellonian University in Kraków, Poland (Koumouzelis *et al.*, 2001). The excavations of this site revealed a long chronological sequence that contains the following cultural layers: 1. layers VI, VII and VIII are classified as Middle Palaeolithic, 2. layer V is dated to Early Upper Palaeolithic, 3. layer IV is a Lower Aurignacian layer, 4. layers IIIa to IIIg contain the sequence of the Middle Aurignacian assemblages, 5. layer III' is epi-Uluzzian, 6. layers III and III' assemblages are Mediterranean Gravettian and contain some backed blades I ndustry, 7. layers 6, 6a and 6/7 are Upper Aurignacian layers, 8. layers IIa, IIb and IIc are Epigravettian, 9. layers 1, 2, 3 and 5 contain Mesolithic and modern finds (Kozłowski, this issue).

MATERIAL AND METHODS

During the successive field campaigns samples were taken for archaeobotanical examination from the cultural layers. The size of samples varied from 0.5 to 2 liters. All samples were collected and floated with a sieve with 1.0 mm mesh, by an archaeologist. The obtained material was dried in the open air and then sent to botanical examination.

In total, 115 samples were studied. Each sample was first sorted in the laboratory under the binocular microscope with the magnification of 25. All seeds, fruit, charcoal pieces and other plant part were picked for taxonomical identification. Most of the charcoal pieces were delivered for anthracological analyses (Ntinou, this issue). Seeds and fruits were present in 37 samples and 19 samples had none. Several samples contain only very small pieces (the largest measuring 1mm) of charred wood and uncharred needle fragments.

Fruits and seeds were identified on the basis of their morphological characteristics, using the available literature (e.g., Cappers *et al.*, 2006). All specimens were compared with reference material

Table 1

Uncharred plant remains and charcoal from the Klisoura Cave 1

Taxa name	A	C	D		E	E/F	F/G
	1, 2, 3, 5	6, 6a, 6/7	III'	IIIa-IIIg	IV	IV/V	V/VI
	Number of specimens						
<i>Achillea</i>					1		
<i>Arenaria serpyllifolia</i> , ch					1		
<i>Chenopodium album</i> type			3	4	41		
<i>Echium</i>			1	3	6	5	
<i>Hyoscyamus</i>					3		
<i>Lithospermum arvense</i>	1	4	5	1		3	
<i>Malva</i>					6		
<i>Melandrium</i>					1		
<i>Polygonum aviculare</i> type					3		
<i>Sambucus</i>		3					
<i>Silene</i>					1		
<i>Solanum</i>					1		
<i>Spergula</i>			2	4	10	1	
<i>Taraxacum</i>					1		
<i>Urtica</i>					5		
Caryophyllaceae					1		
Poaceae straw					9		
Poaceae grain					10		
<i>Quercus</i> , charcoal		1	4	11	2	4	
<i>Pinus</i> , needle	2			3	65	37	
<i>Pinus</i> , cone fragm.					11	8	
Coniferae, needle					3		
undet., charcoal			1	126	23	13	2
undet., leaf					2		
undet., seed				1	1		
Musci					1		

Explanations: Sequence A, layers 1, 2, 3, 5 – Mesolithic and modern; Sequence C, layers 6, 6a and 6/7 – Upper Aurignacian layers; Sequence D, layer III' – Mediterranean Gravettian; Sequence D, layers IIIa-IIIg – Middle Aurignacian layers; Sequence E, layer IV – Lower Aurignacian layers; Sequence F, layer V – Early Upper Palaeolithic; Sequence G, layer VI – Middle Palaeolithic; ch – charred

of extant seeds and fruits in the collections of the Archaeological Station of Institute of Archeology and Ethnology of the Polish Academy of Sciences in Igołomia and Department of Palaeobotany, W. Szafer Institute of Botany of the Polish Academy of Sciences in Kraków.

RESULTS

The quantitative and qualitative composition of individual samples is very poor. For the entire layers we determined only sixteen taxa of

plants (Table 1). All seeds and fruits, excluding one seed of *Arenaria serpyllifolia*, are uncharred. Several of specimens showed various deformations and mechanically damaged shape. The only fruit of the *Taraxacum* genus bears the remnants of papus. Probably, this specimens was carried by the wind. Three samples contained leaves and chaff fragments belonging to the wild grasses of the Poaceae family.

Only a few pieces of charcoal, measuring ca. 3 to 6 mm, were determined as oak (*Quercus*). Some very small pieces of charcoal, two frag-

ments of leaves and two diasporas remained undetermined.

A few samples contained fragments of young cones and needles of *Pinus* and undetermined Coniferae. These specimens are fresh, the needles are green in color, and are undoubtedly modern specimens probably the results of contaminations during the drying the samples in the field.

The largest number of specimens was preserved in layer IV dated to Lower Aurignacian, but it should be also noted that this deposit provided the largest number of sample. In other layers only individual specimens occurred. The Epi-Gravetian layers (IIa, IIb and IIc) had no preserved plant remains.

DISCUSSION AND CONCLUSIONS

The interpretation of the collected samples is difficult. As already mentioned, almost all specimens (seeds, fruits and vegetative part of plant) were uncharred. In those archaeological sites located stratigraphically above the level of groundwater, it is assumed that only the remains that are burned are of the same period of formation of the cultural layers (van Zeist and Buitenhuis, 1983; Lityńska-Zajac and Wasylkowa, 2005: 41–44). When charred and uncharred botanical remains are found they are considered as evidence for admixture during later time. The presence of uncharred forms could be due to accumulation of plant remains caused by animals or the results of contamination during the handling of the samples in the field. In this case, fresh needles of pine can be evident for modern origin. In other cases, the contamination of material suggests no qualitative differences between plant remains from the deposits that accumulated over a long period of time. The successive layers accumulated under variable climatic conditions that probably impacted the diversity of the local vegetation (Koumouzelis *et al.*, 2001; Ntinou, this issue). In addition, plant remains in the hearths show both forms of preservation. Single samples contain charred wood and uncharred diasporas. This indicates the heterogeneous nature of their filling and the various ages of the seeds and charcoal. Fruits from the Boraginaceae family, such as *Lithospermum arvense* and *Echium*, may be preserved in dry archaeological deposits in uncharred condition due to their hard

Table 2

Plant remains from the 4 features
at Klissoura Cave 1

Taxa name	IIIa	IIIc	IIIg	IV
<i>Chenopodium album</i>			1	1
<i>Echium</i>			2	
<i>Pinus</i> , needle	2			2
<i>Quercus</i> , charcoal		5		
undet., charcoal		9		2
undet., seed			1	

coat impregnated with silica (Kulpa, 1974: 215–216; van Zeist and Buitenhuis, 1983). Only radiocarbon AMS dating will allow us to determine clearly the age of the seeds and fruits from Klissoura Cave. At the current state of research we must assume that the samples represent the contemporary vegetation in the vicinity of the archaeological site.

A few samples from Klissoura Cave yielded field gromwell *Lithospermum arvensis* fruits. This plant is a component of the steppic vegetation growing in rocky mountains and subalpine regions. Its remains were collected from the Upper Paleolithic cultural layers in Franchthi Cave (Hansen, 1980, 1991; Ntinou, this issue). In the Lower Aurignacian layers one seed of *Arenaria serpyllifolia* was present. *Arenaria serpyllifolia* is growing today as arable weed in cultivated fields and in open communities on mountains up to 2400 m above sea level (Strid, 1986: 89).

A small number of diasporas are of uncertain origin and without a secure chronological position, and thus does not allow further characterization of the different cultural levels.

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