



ARCHAEOBOTANICAL FINDS FROM ULUCAK, WESTERN TURKEY (IZMIR REGION): A PRELIMINARY STUDY

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ABSTRACT

Nine samples of sieved carbonized material was taken at Ulucak Neolithic settlement excavation sections for archaeobotanical analysis. Preliminary results indicated presence of einkorn wheat, barley and acorn. A discussion is made with plant remains found during the excavation within neolithic houses.

KEYWORDS: Ulucak, barley, wheat, acorn, archaeobotanical

INTRODUCTION

The mound of Ulucak (Ulucak Höyük) is situated near the modern town of Ulucak, at about 25 km east of Izmir, on the extension of the Kemalpaşa plain. The Ulucak Höyük excavation, conducted by the Ege University (Department of Protohistory and Near Eastern Archaeology) and the Ministry of Culture (Izmir Archeological Museum) revealed an extended settlement (the mound) and the cemetery, located 200 m. east of the mound.

The cemetery is dated back to the Early and Middle Bronze Age while the Ulucak mound present several architectural levels with the latest belonging to the Late Roman-Early Byzantium period (Cilingiroglu *et al.* 2004). Another level detected in the Höyük dates back to the Early Bronze Age II and the Late Chalcolithic Age (level III). The best preserved cultural levels in Ulucak Höyük dates back to the Late Neolithic period and remains of that period have been discovered in almost every

trench excavated (Cilingiroglu *et al.* 2004). The Late Neolithic remains are represented in seven different layers. The Neolithic levels revealed the presence of buildings: in layer IV 19 buildings, 3 courtyards and 2 streets were uncovered. In Building 13, belonging to IVb1, a burnt level made of concentrated burnt soil, ceramic and a timber pile was found (Cilingiroglu *et al.* 2004). A large concentration of carbonized plant remains together with a milestone and grind material were also uncovered. This room was interpreted as a storeroom in the IVb1 level (Cilingiroglu *et al.* 2004). Another small concentration of carbonized cereals was discovered in building 8 (level IVb2). The archaeological material of building 8 indicates that, outside daily activities, it could have been used as a shrine.

It is important to note that this paper is a preliminary analysis of the plant remains; more archaeobotanical samples should be taken from the site in order to confirm the results presented here. The study of the Ulucak plant material is scheduled to be continued in the next excavation campaigns with the collection of more samples from all cultural levels.

MATERIALS AND METHODS

Nine samples of sieved carbonized material were taken at Ulucak and sent to the author for archaeobotanical analysis. Only four of the nine samples yielded plant remains.

	CLI-N13C Room 14	DKC N11a-Va	AUY-O11d Room 4	O11d Room 4
Cereals				
<i>Hordeum vulgare</i>	90		6	
<i>Triticum monococcum</i>			8.500	6.800
Fruits				
<i>Quercus sp.</i>		3		

Table 1: Plant remains from Late Neolithic Ulucak Höyük

Fragments of charcoal were also collected together with the carbonised plant remains.

It is important to note that no information regarding recovery techniques, sampling and the detailed chronology of the excavated levels was provided to the author. Therefore the information that could plausibly be extracted from the plant remains is somewhat restricted.

The identifications were conducted under stereoscopic microscope, using the comparative collection at Toulouse in France (Centre d'Anthropologie UMR 8555 CNRS) and the relevant literature (Schoch *et al.* 1988; Berggren 1981 and 1969; Beijerinck 1976). As a modern reference flora of the investigation area the ten volume *Flora of Turkey and the East Aegean Islands* by P.H. David (1965-1988) was used.

RESULTS

The charred plant assemblages in the four samples consisted of two large concentrations of einkorn wheat (*Triticum monococcum*) discovered in Room 4 of the building 13 (level IVb1) and 90 grains of six-row barley (*Hordeum vulgare*) discovered in Room 14 of the building 8 (level IVb2). Inside the sample of einkorn six grains of hulled barley were identified. In addition to these finds three large fragments of acorn (*Quercus sp.*) were present in the samples.

The results obtained are presented in Table 1.

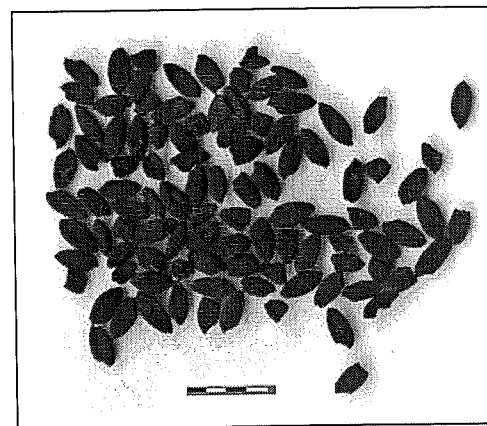


Fig. 1: Einkorn (*Triticum monococcum* L.) identified at Ulucak Höyük

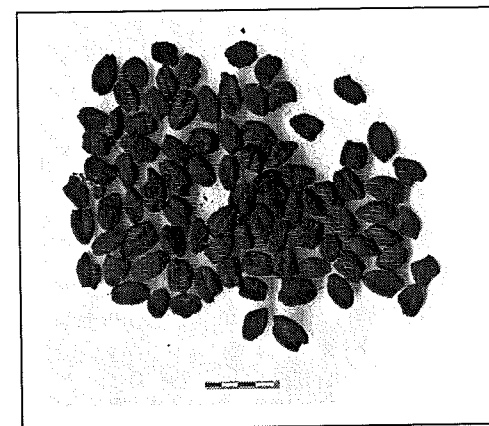


Fig. 2: Barley (*Hordeum vulgare* L.) identified at Ulucak Höyük

DISCUSSION

The crop species included into these samples were pure crop cereals and no weeds were observed. They are mainly composed of einkorn wheat which was probably one of the main crop produced during the Late Neolithic, at least at that site (figure 1).

The purity of the samples indicates that they result from the destruction of cleaned stored crops. The absence of any weed seeds shows that einkorn and barley were stored for human consumption and may reflect rigorous hand sorting. This is also confirmed by the archaeological context. The burnt einkorn deposit was discovered in a storeroom inside the building 13; since no einkorn by-products, such as spikelets, awns or glume bases, were discovered one can assume that the crop was stored already cleaned. The grains were grounded inside the room as it is indicated by the associated material (milestones and grinds).

The fact that six barley grains were found inside the einkorn sample could indicate that both species were cultivated together but stored separately. According to ethnographic works conducted at Amorgos, wheat and barley are usually grown as mixed "maslin"

crop but this is often not the form in which they are consumed (Jones 1984; Jones and Halstead 1995). The two cereals can be separated by a combination of winnowing and sieving. This results to a wheat- rich fraction which is used for food and a barley- rich fraction which is kept for fodder. Thus although a mixed crop is grown, both the food and fodder products can be pure (Jones 1998). It seems that in Ulucak barley and einkorn are grown together as a maslin crop and the grains were sieved (cleaned) and stored in different places. Both barley and einkorn were destined to human consumption as it is evidenced from the purity of the samples. The six grains of barley must have been accidentally added in the einkorn sample during the procedure of the cereals.

The second crop cultivated at the settlement is barley. A small concentration of barley was discovered in building 8 (figure 2). As it was the case of einkorn, the barley sample result from the destruction of stored cleaned crop and no weeds or barley by-product were found.

Einkorn is a hulled wheat which means that it has its seeds enclosed by a tough husk, the glumes, and thus is safer regarding fungal or insect attack (Halstead 1989). This could

have been a reason of choosing this cereal. In the samples other hulled wheats such as emmer are absent. Mark Nesbitt in his ethnographic work at Turkey observed that there is no mixture of einkorn and emmer during the processing of the cereals and maybe this practice is reflected in the samples from Ulucak.

Most authorities have considered einkorn to be predominant over emmer in Northern Greece and in the Balkans (McLaren and Hubbard 1990; van Zeist 1978; Kroll 1991; Hansen 1988). This has also been noted for Neolithic Cyprus and Anatolia (Miller 1991). However the predominance of einkorn over emmer does not seem to exist if we consider the frequency of the species (present-absent) and not the total number of individuals (Megaloudi 2004). Statistical analysis conducted on archaeobotanical data from 77 archaeological Greek sites showed that einkorn wheat is recorded in almost all Prehistoric and Proto-historic sites in Northern Greece together with emmer wheat: einkorn and emmer are present with almost the same frequency from the Early Neolithic to Proto-geometric period, which indicates that einkorn could not be considered the typical wheat of Northern Greece¹ (Megaloudi 2004). In addition to that, recent finds from Anatolia do not support the predominance of einkorn over wheat, at least for Anatolia (M. Nesbitt in Valamoti 2004).

The predominance therefore of einkorn at Ulucak merits some form of explanation. Its presence could reflect a cultural preference (related to cultural origins or contacts) for this species, that it was probably locally grown. This situation was also observed in contemporary Greek sites such as the Sarakinos cave (Megaloudi unpublished) and Balomenos Toumba (Sarpaki 1995). In both sites the persistence of growing only einkorn was interpreted as a cultural traditionalism as environmental conditions could not explain

this choice. However the available macrofossil evidence from neolithic western Turkey is still too scarce to support such a hypothesis and defined answers to this question depend only on the collection of more archaeobotanical information from Ulucak Hoyuk as well as from contemporary sites situated at the Izmir region.

In the samples the wild fruits are limited to three large fragments of acorn (*Quercus* sp.). In the Ulucak region the vegetation consists of evergreen shrubs (maquis) typical of the Mediterranean-type climates and oaks occur as a natural element of the landscape (Cilingiroglu *et al.* 2004). Acorns are rich in starch and oil and the mature fruits are bitter-tasted and unpalatable due to the tannin that they contain (Zohary and Hopf 2000). However all species do not contain the same amount of tannins and there is a variation in the intensity of bitterness. Acorns have the potential to occupy the same role in subsistence as cereals and are known to have been an important, sometimes staple food in Eastern North America and Japan (Mason 1996).

In traditional peasant communities in Europe and the Near East acorns are collected in autumn as a supplement feed for domestic animals and in times of famine are even consumed by humans (Zohary and Hopf 2000). The tannins can be eliminated by roasting or boiling the acorns and the fruits are then suitable for human consumption. Acorns have been found in Neolithic villages of the Near East, including Catal Huyuk, where some were found next to a fireplace as "if they were just being roasted" (Helbaek 1964). Acorns were eaten in Classical times and even in the 19th century (Racham 1983). According to Strabo (*Geography* 3.3.7) people in mountainous northern Spain lived on acorn bread for much of the year. Acorn bread was also consumed by people living in the mountainous district of Arcadia in the

Peloponnese as we learn from Herodotus (*Historia* 1.66) and Pausanias (*Description of Greece* 8.4).

It seems that in Ulucak acorns were collected from the wild but the limited number of finds does not allow any statements on the use of the species. Their presence in the settlement does not necessarily mean that they are evidence of use as human food. Acorns may have been used as animal feed, as they are eaten by pigs and by a wide range of domestic animals.

The botanical remains of Uluçak are of great importance since very few archaeobotanical studies are available from neolithic western Turkey. It seems that the

agriculture of the Neolithic inhabitants of this site was mainly based on einkorn cultivation although this hypothesis should be further investigated. However the persistence in growing einkorn has parallels in neolithic sites from Greece and the Balkans. At the present stage of research only assumptions can be made as many questions are still to be answered. The complete absence of pulses is very surprising but this could be due to the limited number of collected samples. The archaeobotanical investigation of Uluçak Höyük will be continued in the future and more samples will be collected and studied in order to investigate the economy of this important site.

¹ In Northern Greece einkorn and emmer are present in 80% of Early Neolithic sites, 90% in Middle Neolithic, 75% in Late Neolithic and Early Bronze Age. In Middle and Late Bronze Age emmer is present in 60% of the sites over 50% for einkorn wheat. In Proto-geometric Greece both species are recorded in the 75% of the sites. These percentages represent the frequency of the species (present-absent) and not the number of individuals, (see Megaloudi 2004).

REFERENCES

- Beijerinck, W. (1976) *Zadenatlas der Nederlandsche flora Ten Behoeve van de Botanie, Palaeontologie, Bodemcultuur en Warenkennis*. Backhuys et Meesters, Amsterdam.
- Berggren, G. (1969) *Atlas of Seeds and Small Fruits of Northwest European Plant Species Part 2 Cyperaceae*. Swedish Natural Science Research Council. Arlöv, Berlings.
- Berggren, G. (1981) *Atlas of Seeds and Small Fruits of Northwest European Plant Species Part 3 Salicaceae - Cruciferae*. Swedish Natural Science Research Council. Lund, Berlingska Boktryckeriet.
- Cilingiroglu, A., Derin, Z., Abay, E., Saglamtimur, H., Kayan, I. (2004) *Ulucak Höyük. Excavations Conducted between 1995 and 2002*. Ancient Near Eastern Studies Supplement Series 15.
- Halstead, P. (1989) The economy has a normal surplus: economic stability and social change among early farming communities of Thessaly, Greece. In: Halstead P. et Shea O J. (dir.). *Bad Year Economics. Cultural Responses to Risk and Uncertainty*. Cambridge University Press.
- Hansen, J. (1988) Agriculture in the prehistoric Aegean: data versus speculation. *American Journal of Archaeology*, 92, 39-52
- Helbaek, H. (1964) First impressions of the Catal Huyuk plant husbandry. *Anatolian Studies* 14, 121-3.
- Jones, G. (1998) Distinguishing Food from Fodder in the archaeobotanical record. *Environmental Archaeology* 1: 95-98

- Jones, G. (1984) Interpretation of archaeological plant remains: Ethnographic models from Greece. In: van Zeist W. et Casparie W.A. (dir.). *Plants and Ancient Man: Studies in palaeoethnobotany*. Balkema, Rotterdam: 43-61.
- Jones, G. and Halstead, P. (1995) Maslins, mixtures and monocrops: on the interpretation of archaeobotanical crop samples of heterogeneous composition. *Journal of Archaeological Science* 22, 103-14.
- Körber-Grohne, U. (1987) *Nutzpflanzen in Deutschland. Kulturgeschichte und Biologie*. Stuttgart: Konrad Theiss Verlag.
- Kroll, H. (1991). Südosteuropa. In: Zeist, W. van, Wasylikowa, K., Behre K.-E. (eds) *Progress in Old World palaeoethnobotany*, Balkema, Rotterdam, pp 161-177.
- Mc Laren, F. S. and Hubbard, R.N.L.B. (1990) The archaeobotanical remains. In: Tringham R. And Krstic D. (eds). *Selevac, A Neolithic Village in Yugoslavia, 247-254*. Los Angeles, Institute of Archaeology, University of California.
- Mason, S. (1996) Acornutopia? Determining the role of acorns in past human subsistence. In: Wilkins, J., Harvey, D. & Dobson, M. (eds) *Food in Antiquity*. Exeter Press, pp 12-24.
- Megaloudi, F. (2004) *Economie végétale et alimentation en Grèce du Néolithique (7000 av. J-C) à l'époque hellénistique (31 av. J-C): les apports de la carpologie*. Thèse de Doctorat, EHESS Paris.
- Miller, N. F. (1991) The Near East. In: Zeist, W. van, Wasylikowa, K., Behre K.-E. (eds) *Progress in Old World palaeoethnobotany*, Balkema, Rotterdam, pp 133-160.
- Rackham, O. (1983) Observations on the historical ecology of Boeotia. *British School Athens Ann. Report* 78: 291-351
- Sarpaki, A. (1995) Toumba Balomenou, Chaeronia: plant remains from the Early and Middle Neolithic levels. In: Kroll H. et Pasternak R. (dir.). *Res Archaeobotanica*. 9th Symposium IWGP, Kiel: 281-300.
- Schoch, W.H., Pawlick, B. et Schweingruber, F.H. (1988) *Botanische Makrorestes*. P. Haupt, Bern.
- Valamoti, S.M. (2004) *Plants and people in Late Neolithic and Early Bronze Age Northern Greece. An archaeobotanical investigation*. BAR. International Series 1258.
- Zeist, W. Van (1978) Charred plant remains from tell Gomolava. *Rad Vojvodanskich Mezeja* 23-24, 5-18
- Zohary, D. and Hopf, M. (2000) *Domestication of Plants in the Old World*. Clarendon Press, Oxford.