Drewno 2014, Vol. 57, No. 193
DOI: 10.12841/wood.1644-3985.094.06

Barbaros Yaman, Halime Hüryilmaz

THE IDENTIFICATION OF WOOD CHARCOALS FROM AN EARLY BRONZE AGE MOUND (YENIBADEMLI) IN WESTERN TURKEY

Taxonomic identification on the basis of wood anatomy showed that 68.82% of wood charcoals from the Early Bronze Age Site at Yenibademli, on Gökçeada Island (Imbros) in the Northern Aegean region of Turkey belong to the genus Quercus*, 15.88% to* Pinus*, 13.51% to* Phillyrea*, 0.63% to Arbutus, 0.35% to* Ulmus*, and 0.23% to the Rosaceae family. The results revealed that the dominant tree genus was oak (*Quercus *sp.), 67.2% of which was deciduous oak, and the remaining 1.62% was evergreen oak.* Quercus *and* Pinus *as the most common two genera in the spectrum of taxa may have a link with oak and pine stands on Gökçeada (Imbros) in the Early Bronze Age. Moreover, the evergreen* Quercus *(sec. Ilex) and the genus* Phillyrea*, which was third in the spectrum, suggest that maquis and open vegetation were also present in the Early Bronze Age on Gökçeada.*

Keywords: anthracology, Early Bronze Age, Imbros, wood anatomy

Introduction

Apart from phytolith analyses on handaxes as evidence for woodworking dating back to between 1.7 and 1.5 m.y.a. [Dominguez-Rodrigo et al. 2001], the oldest archaeological wood remnants (dated to 780,000 years ago) were found at a Palaeolithic site at Gesher Benot Ya'aqov in Israel [Goren-Inbar et al. 2004; Werker 2006; Lev-Yadun 2007].

Raw materials such as obsidian, animal bone and wood were utilized by Anatolian people in order to produce a variety of tools throughout prehistoric periods. Wood has been found as a carbonized material in the excavations of sites dated to the Palaeolithic, Neolithic and Chalcolithic periods, and to the Bronze and Iron Ages in Anatolia. As for samples of the oldest archaeological wood in Anatolia, some wood charcoals belonging to different genera were identified in Öküzini and

Barbaros Yaman (*yamanbar@gmail.com*), Faculty of Forestry, Bartin University, Bartin, Turkey; Halime Hüryilmaz (*halimeh@hacettepe.edu.tr*), Archaeology Department, Faculty of Letter, Hacettepe University, Ankara, Turkey

the Karain B Caves dating back to the Epipalaeolithic period [Martinoli 2009]. From the Neolithic period to the Iron Age, the identification of many carbonized wood samples in different archaeological sites has shed light on the time-dependent change in woody vegetation, on the anthropogenic impact on vegetation history and on the genera of wood used for timber and firewood in Anatolia [Asouti, Hather 2001; Heinz et al. 2004].

The main anatomical properties remain unaffected in charred wood in spite of some physical and chemical changes, and thus they can be identified based on wood anatomy at the family or genus level [Prior, Gasson 1993]. However, due to a very similar cellular morphology of taxa within the same genus, it is generally hard to make species-level identification, although there are some exceptions [Tennessen et al. 2002]. Even if archaeological wood charcoals can be identified at only genus-level, anthracological and wood anatomical studies improve our understanding of wood culture in the past [Jankowska, Kozakiewicz 2013].

The Early Bronze Age Site at Yenibademli is located in the Büyükdere Valley to the north of Gökçeda Island (Imbros) in the Northern Aegean Region of Turkey (fig. 1) [Hüryılmaz 2002; Hüryılmaz 2007]. Archaeological excavations at Yenibademli have been conducted since 1996. Findings obtained from the excavations show that there was a mixed feeding-economy on this site [Hüryılmaz 2006; Hüryılmaz 2007]. Archaeobotanical studies carried out at Yenibademli suggest that plant-related agricultural activity was mainly based on cultivated cereals and domesticated legumes [Oybak Dönmez 2005]. In addition, archaeozoological investigations show that the inhabitants of the site consumed at least five kinds of domesticated and wild animals [Hüryılmaz 2007]. However, until 2008, there were no anthracological data for this archaeological settlement. Only the preliminary results of the anatomical properties of archaeological charcoal fragments have been published by Yaman [2011] so far. Numerous wood charcoal samples have been found in the mound since 2007. Thus, the present study aims to identify the wood charcoals found between 2007 and 2012 in this settlement, and to determine their annual and total percentage based on genus level.

Materials and methods

The materials for the study were wood charcoals, collected between 2007 and 2012, from Yenibademli mound (figs. 1 and 2). The charcoal collection strategy was not based on the systematic flotation method. The manual gathering of macro charcoals, as well as flotation, was also employed by the excavation team during the excavation works. Each charcoal fragment (more than 4 mm in size) was considered an observation unit, and taking into account the transverse, radial and tangential planes, the charcoal fragments were fractured with a razor blade [Heinz et al. 2004; Barnett 2008]. Using a reflected light microscope, charcoal identification was carried out on the basis of wood anatomy. Key features used for identification

were compared with those described in the books and atlases of wood anatomy [Benkova, Schweingruber 2004; Schoch et al. 2004; Akkemik, Yaman 2012], and with those in the reference collection of the Wood Anatomy and Dendrochronology Laboratory of the Faculty of Forestry of Bartin University.

Fig. 1. Gökçeada on map of the Aegean Sea (see arrow), map source: Norman Einstein

Fig. 2. Wood charcoals from an Early Bronze Age settlement, Yenibademli, Gökçeada

Results and discussion

A total sample quantity of 3102.66 gr was examined on the basis of its wood anatomy. Of this quantity, 55.83% were excluded from calculation due to the fact that they were not wood charcoal fragments. 99.42% of the wood charcoals were botanically identified at the genus level, while 0.58% could not be identified due to the excessive degradation of their secondary xylem. The results of the identification of the wood charcoals are presented in tables 1–6. Taxonomic identification on the basis of wood anatomy showed that 68.82% of the wood charcoals belonged to the genus *Quercus* (fig. 3), 15.88% to *Pinus* (fig. 4), 13.51% to *Phillyrea* (fig. 5), 0.63% to *Arbutus*, 0.35% to *Ulmus*, and 0.23% to the Rosaceae family. The results revealed that the dominant tree genus was oak (*Quercus*), 67.2% of which was deciduous oak, and the remaining 1.62% was evergreen oak. Of those identified as deciduous oak, a taxonomic section of 19.86% could not be decided (sect. *Quercus* and/or sect. *Cerris*).

Table 1a. Wood charcoals obtained from 2012 excavation in Yenibademli

Sample Code	Excavation Date	Total Quantity [gr]		Genus
YBD12-Kov23	21.07.2012	2.38		*Ulmus*
YBD12-Kov112	25.07.2012	449.36*		Undefinable[1]
YBD12-Kov186	31.07.2012	2.38		*Ulmus*
YBD12-Kov109	12.08.2012	39.08		*Quercus* (section *Quercus*)
YBD12-Kov100	17.08.2012	6.72		*Quercus* (section *Quercus*)
YBD12-Kov141	18.08.2012	196.13		*Quercus* (section *Quercus*)
YBD12-Kov128	18.08.2012	2.97		cf *Arbutus*
YBD12-Kov118	18.08.2012	119.74	0.54	cf *Phillyrea*
			1.84	cf *Arbutus*
			2.55	Indeterminate
			114.81*	Undefinable[1]
YBD12-Kov123	18.08.2012	140.12*		Undefinable[1]
YBD12-Kov241	24.08.2012	185.39		*Quercus* (section *Quercus*)
YBD12-Kov276	25.08.2012	43.40		*Quercus* (section *Quercus*)

[1] Only includes soil lumps with wood charcoal dust
* Excluded from calculation

Table 1b. The mean values of the results from 2012

Genus	[%]
Quercus (section *Quercus*)	97.38
cf *Arbutus*	1.00
Ulmus	0.98
cf *Phillyrea*	0.11
Indeterminate	0.53

Table 2a. Wood charcoals obtained from 2011 excavation in Yenibademli

Sample Code	Excavation Date	Total Quantity [gr]	Genus
YBD11-Kov107	16.08.2011	118.79	*Quercus* (section ?)
YBD11-Kov116	17.08.2011	46.03	*Quercus* (section ?)
YBD11-Kov151	17.08.2011	127.18*	Undefinable[1]
YBD11-Kov132	18.08.2011	68.53	*Quercus* (section ?)

[1] Only includes soil lumps with wood charcoal dust
* Excluded from calculation

Table 2b. The mean values of the results from 2011

Genus	[%]
Quercus (section ?)	100

Table 3a. Wood charcoals obtained from 2009 excavation in Yenibademli

Sample Code	Excavation Date	Total Quantity [gr]		Genus
YBD09-Kov57	21.07.2009	82.06	59.63	*Pinus*
			22.43	*Quercus* (section *Quercus*)
YBD09-Kov142	25.07.2009	532.68	25.88	*Quercus* (section ?)
			3.12	cf *Rosaceae*
			5.42	Indeterminate
			498.26*	Undefinable[1]
YBD09-Kov417	10.08.2009	18.68		*Quercus (*section *Quercus)*
YBD09-Kov418	10.08.2009	402.59*		Undefinable[1]
YBD09-Kov707	28.08.2009	184.60		*Phillyrea*

[1] Only includes soil lumps with wood charcoal dust
* Excluded from calculation

Table 3b. The mean values of the results from 2009

Genus		[%]	
Phillyrea		57.73	
Quercus	Sec.*Quercus*	12.86	20.95
	Sec. ?	8.09	
Pinus		18.65	
cf *Rosaceae*		0.97	
Indeterminate		1.70	

Table 4a. Wood charcoals obtained from 2008 excavation in Yenibademli

Sample Code	Excavation Date	Total Quantity [gr]		Genus
YBD08-Kov51	05.08.2008	26.03	22.19	*Quercus (*section *Ilex)*
			3.84	cf *Arbutus*
YBD08-Kov203a	12.08.2008	2.47		*Pinus*
YBD08-Kov203b	12.08.2008	12.99		*Pinus*
YBD08-Kov241	13.08.2008	62.11		*Pinus*
YBD08-Kov243	13.08.2008	80.40		*Pinus*
YBD08-Kov256	13.08.2008	136.90		*Quercus (*section *Quercus)*

Table 4b. The mean values of the results from 2008

Genus		[%]	
Quercus	Sec.*Quercus*	42.66	49.57
	Sec. *Ilex*	6.91	
Pinus		49.23	
cf *Arbutus*		1.20	

Table 5a. Wood charcoals obtained from 2007 excavation in Yenibademli

Sample Code	Excavation Date	Total Quantity [gr]	Genus
YBD07-Kov193	11.08.2007	12.95	*Quercus* (section ?)

Table 5b. The mean values of the results from 2007

Genus	[%]
Quercus (section ?)	100

Table 6. Mean percentage of wood charcoals identified between 2007 and 2012

Genus			Quantity [%]	
Quercus	Deciduous Oak	sec.*Quercus*	47.34	68.82
		sec.?	19.86	
	Evergreen Oak	sec. *Ilex*	1.62	
Pinus			15.88	
Phillyrea			13.51	
Arbutus			0.63	
Ulmus			0.35	
Rosaceae			0.23	
Indeterminate			0.58	

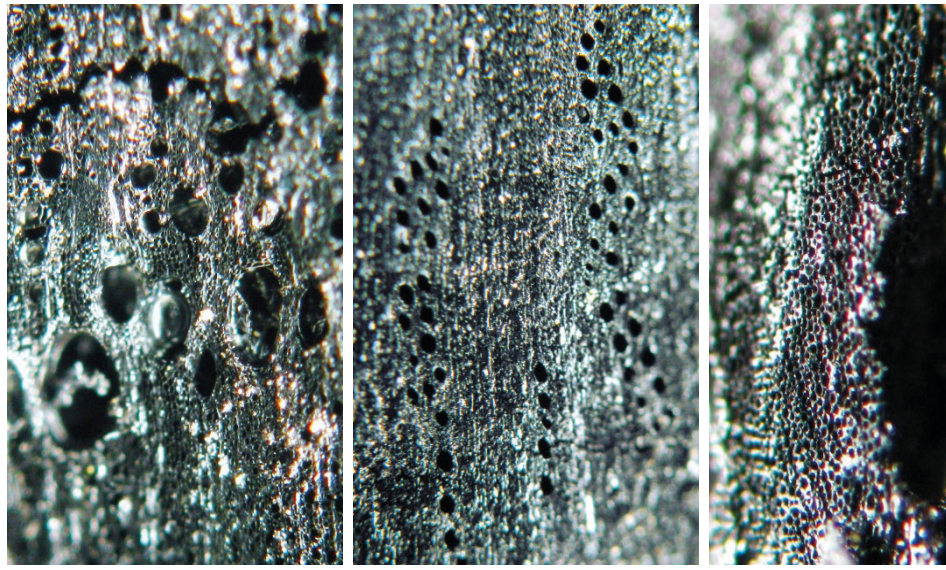

Fig. 3. From left to right; Decidious *Quercus*, Evergreen *Quercus* and Multiseriate ray of *Quercus*

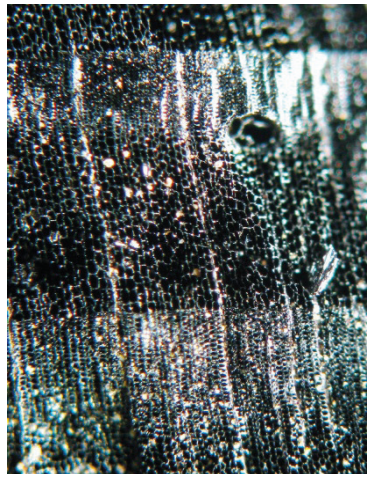

Fig. 4. *Pinus*, transverse section

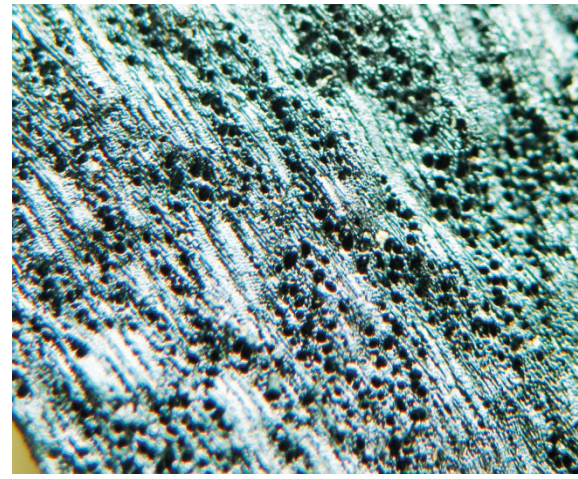

Fig. 5. *Phillyrea,* transverse section

Within section *Quercus* (10), section *Cerris* (5) and section *Ilex* (3), 18 different oak species in total are native to Turkey [Yaltırık 1984]. It is known that both sect. *Quercus* and sect. *Cerris* have ring-porous wood, but they have some differences in the size, frequency and distribution of latewood vessels [Akkemik, Yaman 2012]. Evergreen oaks (sect. *Ilex*) have diffuse-porous wood. In spite of the limited spectrum of taxa within the wood charcoal assemblage in the Early Bronze Age site at Yenibademli (table 6), the anthracological results suggested

mainly two types of vegetation: woodland and maquis. *Quercus* and *Pinus* as the most common two genera in the spectrum of taxa may be related to the oak and pine stands at Gökçeada (Imbros) in the Early Bronze Age. Moreover, evergreen *Quercus* (sec. *Ilex*), and the genus *Phillyrea*, which was third in the spectrum, suggested that maquis and open vegetation were also present in the Early Bronze Age on Gökçeada. The current *Phillyrea* species on the island is *Phillyrea latifolia* L., which is a Mediterranean element growing mostly in dry places in maquis, *Pinus brutia* Ten. forests or deciduous oak forests, and in mixed deciduous scrub forests [Yaltırık 1978]. As a member of maquis vegetation, both Holm oak (*Quercus ilex* L.) and Kermes oak (*Quercus coccifera* L.) are present in the current Gökçeada flora [Hedge, Yaltırık 1982], one of which is identified within the wood charcoal assemblage. However, *Quercus ilex* and *Quercus coccifera* cannot be distinguished on the basis of wood anatomy [Akkemik, Yaman 2012]. Due to the fact that the latter is a dominant member of maquis and phrygana [Hedge, Yaltırık 1982], the evergreen oak species within the charcoal assemblage was probably *Quercus coccifera*.

Gökçeada is part of the eastern Mediterranean climate zone. Mean annual precipitation (P) is 758.7 mm, while the maximum average temperature of the hottest month (M) is 28.4°C, and the minimum average temperature of the coldest month (m) is 4.1°C. According to Emberger's bioclimatic system, Gökçeada has a humid Mediterranean bio-climate (the Pluviometric Quotient is 104.7) with a temperate winter (m: 4.1°C) [Akman 2011]. Evergreen sclerophyllous vegetation is characteristic of the Mediterranean region, of which the dominating species is *Quercus coccifera,* as mentioned above. However, suffrutescent, chamaephytes, geophytes, and therophytes also occur in the region [Riehl, Marinova 2008]. In the present study, the limited number of genera belonging to shrubs, maquis and open vegetation, and the absence of certain genera belonging to alluvial and riverine vegetation, except for *Ulmus*, may have been as a result of the following: 1) the frequency of the occurrence of oak and pine within the flora in the Early Bronze Age at Yenibademli was higher than that of all other woody plants; 2) the settlers at the Early Bronze Age site of Yenibademli preferred to use oak and pine wood for timber consumption and firewood due to the superior features of the two genera; 3) oak (its leaf and acorn) may also have been used for animal husbandry due to the superior nutritional features [Uhri 2011]. It is known that the socio-economic life in this settlement was based on hunting, livestock, farming, and craft, and partially on trade [Hüryılmaz 2007]. It may be assumed that for fuel-wood and timber consumption, the settlers at Yenibademli in the Early Bronze Age utilized the woodland and maquis sources closest to the settlement mentioned above. In addition, except for one sample which was 60 cm away from fireplace, all the wood charcoal assemblages were found at the site in three different houses characterized by flat roofs. Due to the archaeological evidence that these houses were burnt, most of the wood charcoals may be assumed to be the fragments of the burnt wooden beams of the fallen roofs.

Among the archaeological findings at the site, there were stone axes used for woodworking and bones belonging to fallow deer, one of the animals in need of the forest ecosystem [Huş 1974], which also suggests the presence of woodland on Early Bronze Age Gökçeada (figs. 6 and 7). At Yenibademli, on Gökçeada, fallow deer (*Dama dama*) was the only game animal identified, and its bone ratio, among the other animal bones, was approx. 10% [Gündem 2010]. On the basis of the results of the wood charcoal analyses, and of supplementary evidence such as deer and other animal bones [Hüryılmaz 2006; Gündem 2010], it is assumed that there were conifer (*Pinus*) and hardwood (*Quercus* – deciduous) forests (and/or mixed forests) in the Early Bronze Age at Yenibademli. However, this was a forest with gaps, a habitat allowing the deer to survive. In addition, maquis and open vegetation were also present on the stony slopes and rocky places of Gökçeada, which is dominated by *Phillyrea*. As for plant agriculture on the plains of Early Bronze Age Yenibademli, evidence comes from the crop plants found at the site [Oybak Dönmez 2005]. As for the actual stands on Gökçeada (pure and/or mixed stands), while oak woodlands are present in mostly the central parts of the island, pine forests are common in the western parts [OGM 2014]. The current oak species are *Quercus pubescens* Willd., *Quercus ilex* [Hedge, Yaltırık 1982], *Quercus coccifera* [Seçmen 1977], *Quercus infectoria* Oliv., *Quercus ithaburensis* subsp. *macrolepis* (Kotschy) Hedge & Yalt. [OGM 2014], while the current pine species is *Pinus brutia*. *P. brutia* is one of the eastern Mediterranean elements, and is a dominant forest tree with a straight trunk up to 25 m [Coode, Cullen 1965]. According to the General Directorate of Forestry in Turkey, the total forest area on Gökçeada is 6120.1 ha (productive forest 3088.1 ha, degraded forest 3032 ha). The area covered by *Pinus brutia* is 1190.64 ha, while maquis covers 474.77 ha and oak covers 2621.73 ha [OGM 2014].

Fig. 6. Deer Bones*
(* From excavation archive)

Fig. 7. Stone Axes*

Yenibademli, which was an overseas satellite of Troy, was known as a contemporary of Troy I–II [Hüryılmaz 2007]. The most abundant taxa in the woody flora of Troy I–II were *Pinus* (cf *brutia*) and *Quercus* (deciduous) [Riehl, Marinova 2008], and for Early Bronze Age Troy, Riehl and Marinova [2008] suggest the presence of pine forest and oak woodland as well as maquis. Due to the fact that an archaeological site like Troy comprised multi-period settlements, the authors were able to evaluate the time-dependent change in the vegetation of Troy. However, it is not possible to discuss whether and how a change is present in the forests and woodlands of Early Bronze Age Yenibademli due to the uni-period settlement character of the site. If anthracological data were obtained from Uğurlu, a Neolithic settlement on Gökçeda [Erdoğu 2013], the time-dependent change in the vegetation on the island could be evaluated more comprehensively in future.

Conclusions

Identification of the wood charcoals showed that 68.82% of the wood charcoals belonged to the genus *Quercus*, 15.88% to *Pinus*, 13.51% to *Phillyrea*, 0.63% to *Arbutus*, 0.35% to *Ulmus*, and 0.23% to the Rosaceae family. The dominant tree genus was oak (*Quercus*), 67.2% of which was deciduous oak, and the remaining 1.62% was evergreen oak. The anthracological results suggested mainly two types of vegetation: woodland and maquis. The *Quercus* and *Pinus,* as the two most common genera in the spectrum of taxa, may be related to the oak and pine stands on Gökçeada (Imbros) in the Early Bronze Age. Moreover, the evergreen *Quercus*, and the genus *Phillyrea,* which was third in the spectrum, suggested that maquis and open vegetation were also present in the Early Bronze Age on Gökçeada.

To explain whether and how a change is present in the forests and woodlands of Early Bronze Age Yenibademli is not possible due to the uni-period settlement character of the site. Once charcoals are identified at Uğurlu, a Neolithic settlement on the same island, the time-dependent change in the vegetation on Gökçeada (Imbros) can be evaluated comprehensively.

References

Akkemik Ü., Yaman B. [2012]: Wood Anatomy of Eastern Mediterranean Species. Kessel Publishing House, Remagen-Oberwinter

Akman Y. [2011]: İklim ve Biyoiklim: Biyoiklim Metodları ve Türkiye İklimi (Climate and bio-climate: climate methods and climate of Turkey). Palme Yayıncılık, Ankara

Asouti E., Hather J. [2001]: Charcoal analysis and the reconstruction of ancient woodland vegetation in the Konya basin, south-central Anatolia, Turkey: results from the Neolithic site of Çatalhöyük east. Vegetation History and Archaeobotany 10: 23–32

Barnett C. [2008]: Environmental wood charcoal. Additional specialist report. Suburban life in Roman Durnovaria by M. Trevarthen, Wessex Archaeology

Benkova V.E., Schweingruber F.H. [2004]: Anatomy of Russian woods. An atlas for the identification of trees, shrubs, dwarf shrubs and woody lianas from Russia. Haupt Verlag, Bern, Stuttgart, Wien

Coode M.J.E., Cullen J. [1965]: *Pinus.* In: Davis PH (ed.), Flora of Turkey and the East Aegean Islands, Vol. I, Edinburgh University Press, Edinburgh: 72–75

Dominguez-Rodrigo M., Serrallonga J., Juan-Tresserras J., Alcala L., Luque L. [2001]: Woodworking activities by early humans: a plant residue analysis on both Acheulian stone tools from Peninj (Tanzania). Journal of Human Evolution 40: 289–299

Erdoğu B. [2013]: Uğurlu, a Neolithic Settlement on the Aegean Island of Gökçeada. In: Özdoğan M, Başgelen N, Kuniholm P (eds.), Neolithic in Turkey. Archaeology and Art Publications, İstanbul: 1–33

Goren-Inbar, N., Alperson N., Kislev M.E., Simchoni O., Melamed Y., Ben-Nun A., Werker E. [2004]: Evidence of Hominin Control of Fire at Gesher Benot Ya`aqov, Israel. Science 304: 725–727

Gündem C.Y. [2010]: Animal Based Economy in Troia and the Troias during the Maritime Troy Culture (c.3000-2200 BC.) and a General Summary for West Anatolia. PhD Dissertation in Tubingen University: 195 [unpublished]

Hedge I., Yaltırık F. [1982]: *Quercus* L. In: Davis P H (ed), Flora of Turkey and the East Aegean Islands, Vol.7. Edinburgh University Press, Edinburgh: 659–683

Heinz C., Figueiral I., Terral J.F., Claustre F. [2004]: Holocene vegetation changes in the northwestern Mediterranean: new palaeoecological data from charcoal analysis and quantitative eco-anatomy. The Holocene 14: 631–637

Huş S. [1974]: Av Hayvanları ve Avcılık (Game animals and hunting). Istanbul University Press, Istanbul

Hüryılmaz H. [2002]: Yenibademli Mound: an Early Bronze Age Settlement on the west of the Dardanelles, in Gökçeada (Imbros) district. Hacettepe University, Journal of Faculty of Letters 19/1: 27–44 (in Turkish)

Hüryılmaz H. [2006]: Mixed feeding–economy of Gökçeada–Yenibademli inhabitants in the Early Bronze Age. In: Avuç B (ed), Studies in Honour of Hayat Erkanal: Cultural Reflection, Homer Press, Istanbul (in Turkish): 430–439

Hüryılmaz H. [2007]: Gökçeada-Yenibademli Höyük: Social Life in a 5000 Years Settlement. Manas Üniv. Sosyal Bilimler Dergisi 9: 85–100

Jankowska A., Kozakiewicz P. [2013]: The Identification of Charcoal from Archaeological Finds in Risan (Montenegro). Drewno 56 [190]: 77–83. DOI: 10.12841/wood.1644--3985.031.06

Lev-Yadun S. [2007]: Wood remains from archaeological excavations: A review with a Near Eastern perspective. Israel Journal of Earth Science 56: 139–162

Martinoli D. [2009]: Reconstruction of Local Woodland Vegetation and Use of Firewood at Two Epipalaeolithic Cave Sites in Southwest Anatolia (Turkey). In A. Fairbairn & Ehud Weiss (eds). From Foragers to Farmers. Papers in Honour of Gordon C. Hillman. Oxbow Books, Oxford: 161–170

Oybak Dönmez E. [2005]: Early Bronze Age Crop Plants from Yenibademli Höyük (Gökçeada). Western Turkey. Environmental Archaeology 10: 39–49

Prior J., Gasson P. [1993]: Anatomical changes on charring six African hardwoods. IAWA Journal 14: 77–86

Riehl S., Marinova E. [2008]: Mid-Holocene vegetation change in the Troad (W Anatolia): Manmade and natural? Vegetation History and Archaeobotany 17: 297–312

Schoch W., Heller I., Schweingruber F.H., Kienast F. [2004]: Wood anatomy of central European Species. www.woodanatomy.ch [accessed 01.02.2014]

Seçmen Ö. [1977]: The Flora and Vegetation Analysis of Gökçeada and Bozcaada Islands. Tübitak, Tbag-211, Ankara

Tennessen D., Blanchette R.B., Windes T.C. [2002]: Differentiating aspen and cottonwood in prehistoric wood from Chacoan great house ruins. Journal of Archaeological Science 29: 521–527

Uhri A. [2011]: Boğaz Derdi – Arkeolojik, Arkeobotanik, Tarihsel ve Etimolojik Veriler Işığında Tarım ve Beslenmenin Kültür Tarihi. Ege Yayınları, İstanbul: 446

Werker E. [2006]: 780,000-year-old wood from Gesher Benot Ya'aqov, Israel. Israel Journal of Plant Sciences 54: 291–300

Yaltırık F. [1978]: Taxonomic Revision of the Indigenous Taxa within the Family Oleaceae in Turkey. Faculty of Forestry, Istanbul University (publication no: 2404/250), Çelikcilt Matbaası, İstanbul

Yaltırık F. [1984]: Türkiye Meşeleri Teşhis Kılavuzu (Diagnostic Manual of Turkish oaks). Yenilik Press, İstanbul

Yaman B. [2011]: Anatomy of Archaeological Wood Charcoals from Yenibademli Mound (Imbros), Western Turkey. Mediterranean Archaeology and Archaeometry 11: 33–39

Acknowledgements

We would like to thank Mustafa Yaman from Middle East Technical University for editing the English text. We also would like to thank Turkish Republic Ministry of Culture and Tourism and Hacettepe University for financial support.