

CHAPTER 41 PALEOETHNOBOTANICAL STUDY OF EARLY BRONZE II IN THE UPPER STRYAMA VALLEY

DUBENE – SAROVKA IIB

ELENA MARINOVA

Introduction

The Early Bronze Age site of Dubene-Sarovka gives the opportunity to study the development and changes in the agricultural economy during the later fourth and the first half of the third millennium BC in Southeast Europe. During this period some fluctuations in the climate are recorded (Popova & Bozilova 1997; Nikolova 1999a; Kenderova 2000) that has increased the significance of the study of the local vegetation and agriculture in the Upper Stryama valley. The location of Dubene-Sarovka site in the northwestern part of Thrace (Karlovo Hollow), i.e. in the middle of the Balkans allows observing the connections between Southwest Bulgaria and Thrace on the one hand, and between Thrace and North Bulgaria, on the other hand.

This study constitutes the first archaeobotanical analysis of the Dubene-Sarovka site. The objectives of the communication are as follows:

- To publish the recorded cultivated, gathered and other used plants (for medical purposes, dyeing, materials for building etc.) in the area of the Upper Stryama basin. Furthermore
- To publish data on the wild vegetation
- Comparing Dubene-Sarovka with the other sites from Early Bronze Age, which have been studied archaeobotanically.

Geographical and archaeological setting

Dubene-Sarovka is situated about 10 km to the south of the town of Karlovo. The site is located between the mountain chains of the Balkan Mountains and the Sredna Gora Mountains. The microclimate of this valley (protected from the north-east winds) is very favourable for cultivation of some Mediterranean crop plants, which usually grow only in the southernmost parts of Bulgaria. Together with Kazanluk valley, Karlovo Sub Mountain Hollow is the only place in Bulgaria where oil roses are cultivated and one of the very few in the world. The climate is continental with Mediterranean influence, the precipitation per year is about 680 mm, the mean year tempera-

ture is 21.4 °C (Georgiev 1994). The potential natural vegetation consists of oak forests, which nowadays are strong degraded or replaced by agricultural areas.

In the surrounding region there is evidence of human occupation since the Neolithic period (Nikolova 2000). According to the recent archaeological studies, the occupation at Dubene-Sarovka began in the Late Chalcolithic (Nikolova & Zaharieva 1994; Nikolova 2000) and after a chronological break (Final Copper Age), it continued again in the Early Bronze Age. The Early Bronze layers are divided into three stages (Nikolova 1999b). The archaeobotanical material presented in this communication comes from the second stage (Dubene-Sarovka IIB, Early Bronze II - Table 1).

Methods and materials

During the summer of 1996 about 30 samples were collected by flotation at the site of Dubene-Sarovka. Many of them come from houses - their floors, ovens etc.; and about 5 samples originate from a storage building found near Apses House No.1. The soil volume of each sample was about 10-20 l and manual flotation with sieves of 0,5 mm and 0,16 mm was applied. Because of the dry preservation conditions in the area the obtained plant material is only carbonized. Except for the samples from the storage the concentration of the charred plant remains is about 7 determinable units per liter flotation soil.

The material was analyzed under binocular with magnification up to 40x (see Beijerinck 1976, DobrohotoV 1959, Jacomet et al. 1989). The reference collections of Sofia University "St. Kliment Ohridsky", Bulgaria and Lower Saxony Institute for Coastal Historical Studies, Germany were used to confirm the plant determinations.

Results

In almost all of the samples hulled wheat, emmer (*Triticum dicoccum*, Figs. 1 & 2) and einkorn (*T. monococcum*), are found. Considering the storage and the other samples it seems the

Sample №	Quadrant	Depth [m]	Context	Volume [l]
Dab96/1	F-16	0,95-1,00	building, occupation layer IIb	12
Dab96/2	F-15	0,95-1,00	building, oven	10
Dab96/3	I-15/16	0,75-0,80	western part of building	10
Dab96/4	I-19	0,75-0,80	building, floor	10
Dab96/5	E-14	0,85-0,94	occupation layer I	10
Dab96/6	E-16	0,65-0,70	occupation layer I	12
Dab96/8	G-14	0,76-0,98		10
Dab96/10	F-17	0,95-1,00		10
Dab96/13	O-13	1,60-1,65	building, oven	12
Dab96/14	P-13	1,39-1,45		20
Dab96/16	F-16	1,00-1,05	building, in vessel	5
Dab96/18	M-14	1,10-1,16	building, floor	20
Dab96/20	L-19	0,85-0,90		10
Dab96/21	F-19	0,90-1,00		10
Dab96/23	E-19	0,90-1,00	occupation layer II	12
Dab96/26	E-16	1,08-1,14	building, floor	10
Dab96/27	M-15	1,06-1,12	building with vessels	8
Dab96/28	E-14	0,65-0,70		8
Dab96/29	P-13	0,90-1,07	building, floor	20
Dab96/30	F-16	1,02-1,09	building	10
Dab96/31	I-15/16	0,75-0,80	western part of building	20

Table 1. The archaeological context of the studied archaeobotanical samples.

emmer prevailed in the studied levels of Dubene-Sarovka (Table 2).

Near the Apses building No. 1 from IIB2 phase a big quantity of well-preserved cereal crops in carbonized state were documented. The studied storage samples (Table 2) presume cultivation of emmer and hulled barley (*Hordeum vulgare* L. var. *vulgare*). Among the emmer storage there were small quantities of einkorn (*T. monococcum* L.) and spelt wheat (*T. spelta* L. Figs. 3 & 4), which obviously grew together with the emmer. Usually in this period the emmer and einkorn were sown together (Popova & Pavlova 1994) as well as in the prehistoric period as whole (Lisitsina & Filipovich 1980).

One comparison of the grains and spikelets forks of emmer and spelt is presented in Figures 1 to 4. The spikelet bases of spelt (Figure 4) are a sure proof for this kind of wheat. The spelt found in Dubene is a crop plant, which occurs in small quantities in Southeastern Europe since the Bronze Age according to some authors (Kroll 1983). In Bulgaria the spelt wheat was documented in the Bronze Age layers at the sites of Yunatsite, Dyadovo and Nova Zagora (Popova 1995).

The most numerous and frequent weeds in the wheat storage are the typical winter crops: field brome (*Bromus arvensis*), downy brome (*Bromus tectorum*) and black bindweed (*Polygonum convolvulus*). Other probable weeds, which occur in the 5 storage samples are nipplewort (*Lapsana communis*), rough meadow-grass (*Poa pratensis/trivialis*), bedstraw (*Galium* sp.), bristle-grass (*Setaria verticillata/viridis*) etc. The last plant species was found in Ezerovo, Varna Lake (Tschakalova & Bozilova 1984) as a storage bundle of whole plants – maybe collected and used as food or fodder.

The pulses are present in small quantities in a few of the samples. Only the lentil (*Lens culinaris*) was found in about the 50% of the samples. At Yunatsite tell (Arnaudov 1941,

Popova & Pavlova 1994) the grass pea (*Lathyrus sativus*) is widely recorded, whereas it was not available in the studied from Dubene samples. This together with the small quantities of found pulses could be explained with the preservation condition and the limited number of studied samples.

Flax was found in five samples. Because of the high oil content, the flax seeds are rarely preserved in carbonized state and usually are not so often presented in the archaeobotanical record. In one of the samples good determinable seeds of cultivated flax (*Linum usitatissimum*) are present in form of seeds baked together. In some of the samples there are also very badly preserved flax capsules. The last are significantly smaller than is typical for *L. usitatissimum*.

Rather frequent in the studied archaeological contexts is the cornelian cherry (*Cornus mas*). Its stones as well as this of the plums (*Prunus* sp.) are preserved only in fragmentized state. The oak acorns very common in the Bronze Age of Bulgaria, are available in the samples of Dubene-Sarovka with some cupula fragments.

Conclusions

The studied material gives a general frame of Early Bronze Age agriculture and vegetation use at Dubene-Sarovka, which shows the typical tendencies observed in Bulgaria and in the Balkans during Early Bronze II. Accordingly, the archaeobotanical study of the site Dubene-Sarovka revealed a wide scale of used plants. The main crop was the hulled wheat, dominated by emmer. The hulled barley was in the second place after the wheat. The weeds found in the storage are typical for winter crops. Of the pulses the most important seems to be the lentil. The rear preserved in the sites with dry conditions oil/fiber crop – flax – was recorded in big quantities in a building

		Sample Number											
		1	2	3	4	5	6	8	10	11	14	16	
Cultivated plants													
Einkorn	Triticum monococum	131	16	34	6	2	9	-	6	8	7	162	
Emmer	T. dicocum	1786	327	51	3	6	11	-	6	2	21	258	
Spelt	T. spelta	46	8	-	-	-	+	-	-	-	-	-	
Nacked wheat	T. cf. aestivum s. l.	3	-	-	-	1	-	-	-	-	-	-	
Barley	Hordeum vulgare	36	-	9	7	-	35	27	1	1	-	4	
Lentils	Lens culinaris	-	3	-	1	-	2	-	-	-	-	2	
Bitter wetch	Vicia ervilia	-	-	-	-	-	-	-	1	-	-	-	
Pea	Pisum sativum	-	-	-	-	-	-	-	-	-	-	-	
Cultivated flax	Linum usitatissimum	1	-	-	1	-	-	-	-	-	-	-	
Flax	Linum sp.	-	-	2	-	-	-	1	-	-	-	-	
Collected plants													
Cornelian cherry	Cornus mas	-	-	-	-	-	-	-	-	-	-	1	
Plums	Prunus sp.	-	2	-	-	-	-	-	1	-	-	-	
Oak	Quercus sp.	-	1	-	-	-	-	-	-	-	-	-	
Dwarf elder	Sambucus ebulus	-	-	-	-	-	-	-	4	-	-	-	
Weeds and other wild plants													
Brome grass	Bromus arvensis	17	-	-	-	-	1	-	-	-	-	-	
Drooping brome	Br. cf. tectorum	8	-	-	-	-	-	-	-	-	-	-	
Brome grass	Bromus sp.	44	4	-	-	-	7	-	-	-	2	-	
False cleavers	Galium cf. spurium	-	-	-	-	-	-	-	-	-	-	-	
Bedstraw	Galium sp.	-	-	-	-	-	-	-	-	-	-	-	
Nipplewort	Lapsana communis	-	-	-	-	-	-	-	-	-	-	-	
Field gromwll	Lithospermum arvense	-	1	-	-	-	-	-	-	-	1	-	
Medow grass	Poa sp.	-	2	-	-	-	-	-	2	-	-	-	
Rough medow grass	Poa pratensis/trivialis	4	-	-	-	-	-	-	-	-	-	-	
Knotgrass	Polygonum aviculare	1	-	-	-	-	-	-	-	-	-	-	
Black bindweed	P. convolvulus	7	4	-	-	-	-	-	-	-	-	6	
bindweed	Polygonum sp.	-	10	-	-	-	-	-	-	-	-	-	
Tormentil	Potentilla sp.	-	1	-	-	-	-	-	-	-	-	-	
Sorrel	Rumex sp.	1	-	-	-	-	-	-	-	-	-	-	
Bristle-grass	Setaria verticillata/viridis	4	-	-	2	-	-	-	-	-	-	1	
Dover	Trifolium sp.	-	2	-	-	-	-	-	-	-	-	-	
Smooth tare	Vicia cf. tetrasperma	-	-	-	1	-	1	-	-	-	-	-	
Daisy family	Asteraceae	-	-	-	-	-	-	-	-	-	-	-	

Table 2a. The plant taxa identified in the Dubene-Sarovka IIB, Early Bronze Age II.

		Sample Number	18	21	22	23	26	27	28	29	30	31
Cultivated plants												
Einkorn	Triticum monococum	7	6	69	10	60	27	12	18	9	5	
Emmer	Tr. dicocum	4	4	21	4	21	56	16	5	7	9	
Spelt	Tr. spelta	-	-	-	-	-	+	-	-	+	-	
Nacked wheat	Tr. cf. aestivum s. l.	-	-	-	-	-	-	-	-	1	-	
Barley	Hordeum vulgare	-	-	18	-	-	1	2	6	2168	31	
Lentils	Lens culinaris	-	1	2	-	-	1	-	-	3	7	
Bitter wetch	Vicia ervilia	-	-	-	3	-	-	-	2	-	-	
Pea	Pisum sativum	-	-	1	-	-	-	-	1	-	-	
	Linum usitatissimum	-	-	-	-	-	-	-	-	-	+	
	Linum usitatissimum	-	-	-	-	-	-	-	-	-	+	
Collected plants												
Cornelian cherry	Cornus mas	3	-	1	1	-	1	-	-	-	-	
Plums	Prunus sp.	1	-	-	-	-	-	-	-	-	+	
Oak	Quercus sp.	-	-	-	-	-	-	-	-	+	-	
Dwarf elder	Sambucus ebulus	-	1	-	2	-	-	-	-	-	-	
Weeds and other wild plants												
Brome grass	Bromus arvensis	-	-	-	3	-	-	-	-	39	-	
Drooping brome	Br. cf. tectorum	-	-	-	-	-	-	-	-	-	-	
Brome grass	Bromus sp.	-	-	12	-	-	18	-	-	171	-	
False cleavers	Galium cf. spurium	-	-	-	-	-	-	-	-	-	-	
Bedstraw	Galium sp.	1	-	-	-	-	1	-	-	-	-	
Nipplewort	Lapsana communis	-	-	-	-	-	1	-	-	-	-	
Field gromwll	Lithospermum arvense	-	-	-	-	-	-	-	-	-	-	
Medow grass	Poa sp.	-	-	-	-	-	-	-	-	-	-	
Rough medow grass	Poa pratensis/trivialis	-	-	-	-	-	6	-	-	9	-	
Knotgrass	Polygonum aviculare	-	-	-	-	-	-	-	-	-	-	
Black bindweed	P. convolvulus	1	-	-	-	-	-	-	-	-	-	
bindweed	Polygonum sp.	-	-	-	-	-	-	-	-	-	-	
Tormentil	Potentilla sp.	-	-	-	-	-	-	-	-	-	-	
Sorrel	Rumex sp.	-	-	-	-	-	-	-	-	-	-	
Bristle-grass	Setaria verticillata/viridis	-	-	3	-	1	-	-	-	-	-	
Dover	Trifolium sp.	-	-	-	-	-	-	-	-	-	-	
Smooth tare	Vicia cf. tetrasperma	-	-	-	-	-	-	-	-	-	-	
Daisy family	Asteraceae	-	-	-	-	-	6	-	-	-	-	

Table 2b. The plant taxa identified in the Dubene-Sarovka IIB, Early Bronze Age II (Continued).

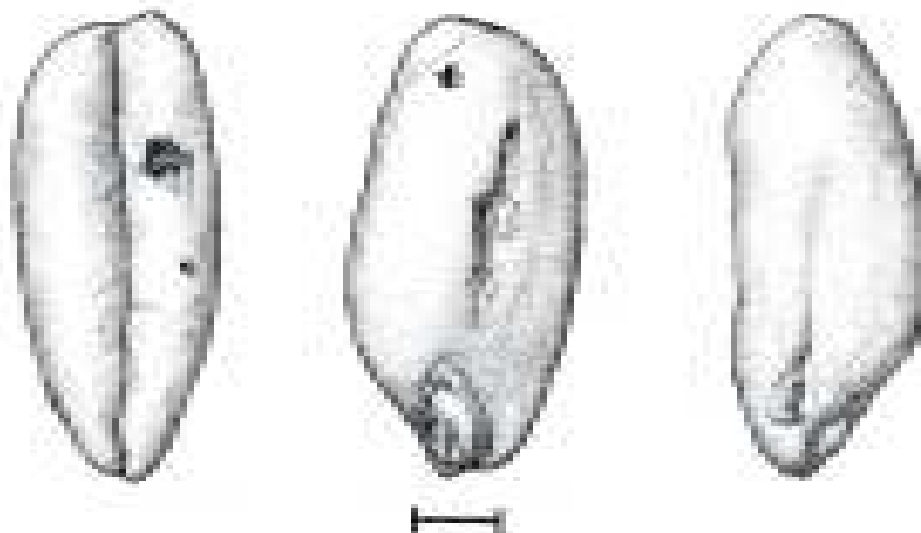


Table 2a. The plant taxa identified in the Dubene-Sarovka IIB, Early Bronze Age II.



Figure 2. Emmer wheat (*Triticum dicoccum*). Spikelet fork. Dubene-Sarovka: Sample 96/16.

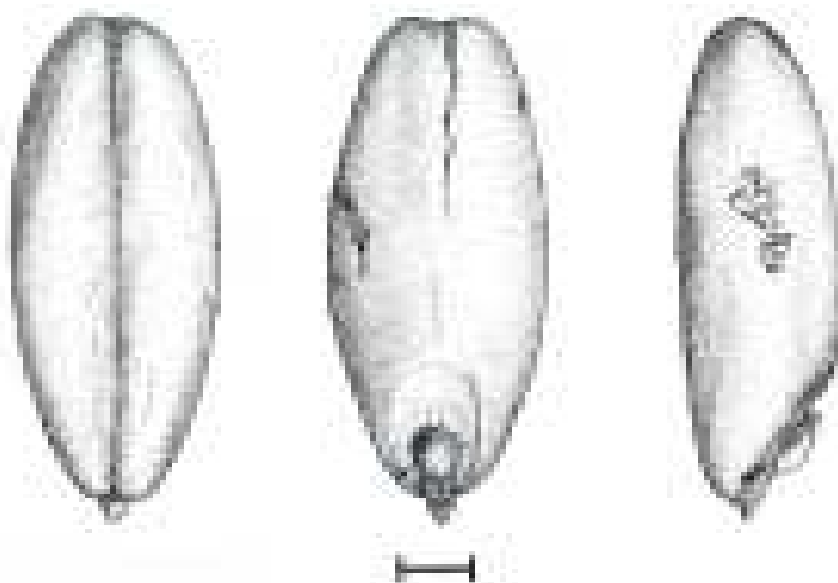


Figure 3. Spelt wheat (*Triticum spelta*). Grain. Dubene-Sarovka: Sample 96/16.

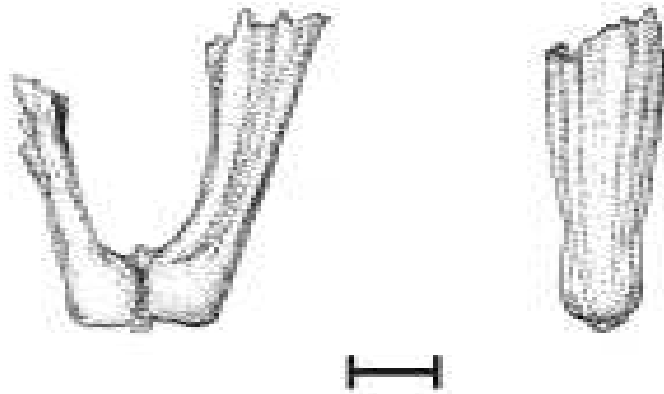


Figure 4. Spelt wheat (*Triticum spelta*). Spikelet. Dubene-Sarovka: Sample 96/16.

from layer IIB. The most important for the period collected plant cornelian cherry is well presented in the site.

The further investigation of the different levels at Dubene-Sarovka would represent a diachronic view on the Late Copper and Early Bronze Age paleobotany in the region of the Upper Stryama valley.

REFERENCES

- Arnaudov, N. 1941 Vurhu novootkritite predistoricheski ostanki v Juzhna Bulgaria. *Annuaire de l'Université de Sofia, Faculté Physico-mathématique* 36, 3 (Sciences Naturelles) 1940/1941, 17-29.
- Beijerinck W. 1976 *Zadenatlas der nederlandsche flora*. Amsterdam. Backhuys & Meesters.
- Dobrohotov M. 1959 *Semena sorni'h rastenij*. Moskva.
- Georgiev M. 1994 *Fizicheska geografiya na Bulgarija*. Sofia. Universitetsko izdatelstvo „Sv. Kliment Ohridski“.
- Jacomet S., Brombacher C. & Dick M. 1989 *Archäobotanik am Zürichsee. Ackerbau, Sammelwirtschaft und Umwelt von neolithischen und bronzzeitlichen Seeufersiedlungen im Raum Zürich*. Orell Füssli. Zürich (Zürcher Denkmalpflege, Monographien 7).
- Kenderova R. 2000 Geomorphological Investigations of the Dubene-Sarovka Area and the Sanctuary near the Village of Dositeevo. In: Nikolova L. (ed.), *Technology, Style and Society. Contributions to the Innovations between the Alps and the Black Sea in Prehistory*. BAR International Series 854. Oxford. BAR, 375-385.
- Kroll H. 1983 Kastanas. Ausgrabungen in einem Siedlungshügel der Bronze- und Eisenzeit Makedoniens 1975-1979. Die Pflanzenfunde. *Prähistorische Archäologie in Südosteuropa* 2. Berlin. Volker Spiess.
- Nikolova L. 1999a *The Balkans in Later Prehistory. Periodization, Chronology and Cultural Development in the Final Copper and Early Bronze Age (Fourth and Third Millennia BC)*. BAR International Series No. 791. Oxford, 1999.
- Nikolova L. 1999b *Yunatsite culture: Periodization, Chronology and Synchronization*. Sofia. Prehistory Foundation and Agatho Publishers (*Reports of Prehistoric Research Project 2-3*, 33-97).
- Nikolova L. 2000 Towards the Neolithic and Copper Age Development in the Balkans (Data from the Stryama Valley). In: Nikolova L. (ed.), *Technology, Style and Society. Contributions to the Innovations between the Alps and the Black Sea in Prehistory*. BAR. Oxford. BAR International Series 854, 65-92.
- Nikolova, L. & Zaharieva T. 1994 Selishte ot Karanovo VI pri Dubene, Karlovsiko. In: Maritza-Iztok – Arheologicheski prouchvanijaq 2, 63-71.
- Popova, Tz. 1995 Plant remains from Bulgarian Prehistory (7000-2000 BC). In: Bailey D. & Panajotov, I. (eds.), *Prehistoric Bulgaria*. Wiskonsin. Madison, 193-207 (Monographs in World Archaeology 22, I).
- Popova, C. & Bozilova E. 1997 Palaeoecological and Palaeoethnobotanical Data for the Bronze Age in Bulgaria. In: Stefanovich M., Todorova H. & Hauptmann H. (eds.), *In the Steps of James Harvey Gaul*. Vol 1. *James Harvey Gaul in memoriam*. Sofia. James Harvey Gaul Foundation, 391-397.
- Popova Tz. & Pavlova P. 1994 Paleoethnobotanical study of the Yunatsite, Bronze Age Settlement, Pazardzik Distict. *Annuaire de l'universite de Sofia "St. Kliment Ohridski", Faculte de Biologie, Livre 2- Botanique* 84, 71 -101.
- Tschakalova, E. & Bozilova E. 1984 Rastitelni ostanki ot rannobronzovata epoha. *Annuaire de l'universite de Sofia "St. Kliment Ohridski", Faculte de Biologie, Livre 2- Botanique* 74, 18 -27.