

Thirty Years of Interdisciplinary Research at the Site of Pistiros

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ABSTRACT

The Thracian land was a very attractive place for the ancient Greeks and their economic expansion. At the end of the 5th century BC, the Greek inland *emporion*, known as Pistiros, was founded on the upper Maritsa River in inner Thrace, today south-central Bulgaria. More than twenty-five years of successful international cooperation of archaeology with environmental sciences has revealed the existence of a very important commercial centre with connections in the Thracian and the Aegean regions. The study summarizes the current state of research on the urbanized settlement and the river port. The environmental investigation, including the combined archaeobotanical and chemical analyses of organic residues in ceramics assessed here, as well as geomorphological research, contribute to a better understanding of the socio-economic development of this unique archaeological site in Thrace.

KEYWORDS

Thrace; Bulgaria; *emporion*; anthracology; archaeobotany; geomorphology; geophysics; osteology; residue analysis.

INTRODUCTION

The Institute of Classical Archaeology of Charles University in Prague has been systematically involved in the archaeological research of the site at Adjijiska Vodenitsa in Bulgaria, located between the towns of Vetren and Septemvri, where the remains of an ancient settlement identified as the Greek *emporion* Pistiros were discovered. The archaeological work on the territory of Pistiros began in 1988. The first phase of the international project was led by the Polish archaeologist and specialist in Thracian history Mieczysław Domaradzki accompanied by scholars from different countries including Great Britain, Bulgaria, the Czech Republic and France. At the present time, the project director is Aleksey Gotzev from the National Institute of Archaeology with Museum at the Bulgarian Academy of Sciences.

The archaeological site of Pistiros was interpreted by its excavators as a trading post. The beginnings of the *emporion* are rather unclear, perhaps this suitable and perspective place served as a meeting point or unfortified market place for Greek merchants and Thracian clients already in the end of the 6th century BC or in the first half of the 5th century BC (BOUZEK 2013, 5; BOUZEK – DOMARADZKA 2013, 28). Based on the first phase of the fortification system, it is assumed that the permanent settlement was founded in this location in the third quarter of the 5th century BC, according to the so-called Vetren inscription, by citizens of the Greek *poleis* Thassos, Maroneia, Apollonia and Pistiros (Thasian *peraiā*) (BOUZEK *et al.* 2013, 12). The Greek colonists usually established their colonies with an economic character along the sea coast, however, in the Northern Aegean region they penetrated deeper into the interior of the Balkan Peninsula, along the Maritsa River which flows into the Aegean Sea near Ainos (the current Turkish town of Enez). According to literary and epigraphic sources, primarily the Vetren

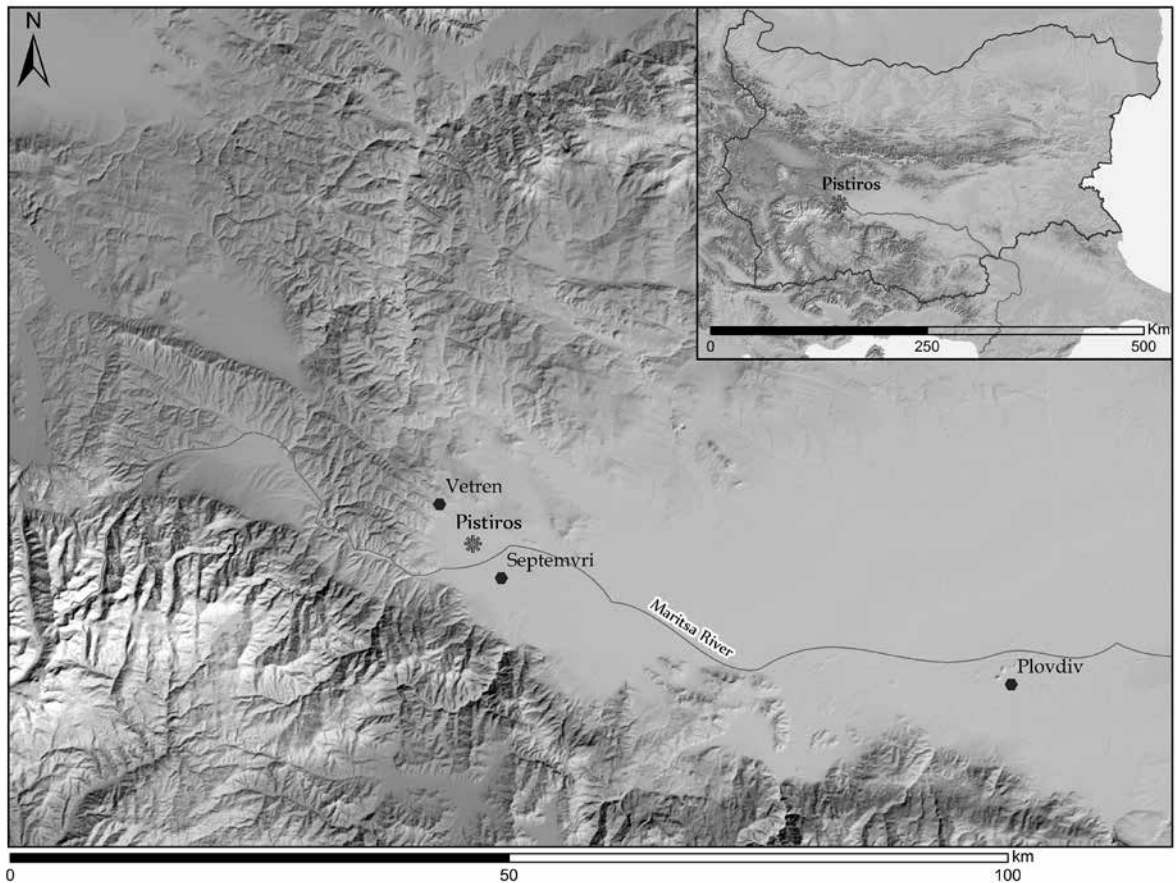


Fig. 1: Location of the Pistiros site (Adjiyska Vodenitsa) on a map of Bulgaria.

inscription, Pistiros is considered to have played the role of a very important centre in the commercial network of the Thracian and North Aegean regions (ARCHIBALD 2001; TIVERIOS 2008). Though the *emporion* was of Greek foundation, its existence and development was also supported by Thracian rulers of the Odrysian Kingdom. The text on the granite block includes, among other things, references to the rights of the Greek merchants and rules of trading in this area in general (BOUZEK – DOMARADZKA 2010; DEMETRIOU 2010, 2013, 175; GRANINGER 2012).

Within the next ca. 150 years, the *emporion* was flourishing, although having suffered from several destructions. The first destruction is dated to the 370s BC, it was probably caused by a conflict between the Odrysian king Kotys I and the other Thracian tribes or by the attack of the Triballoi against Maroneia. At the beginning of the following phase, the fortification was restored. ‘The Golden Age’ lasted, despite the conquest of Thrace by the Macedonian king Philip II (ca. 345 BC), until around 310 BC (BOUZEK *et al.* 2007, 11; BOUZEK 2013). The declining economic importance of the *emporion* and its iterative destructions at the end of the 4th century BC were associated with the wars of the Diadochoi, especially with Lysimachus ruling Thrace. The fortification was definitely destroyed in 279 BC during the Celtic invasion of South Eastern Europe. Archaeological evidence of destructions after the fire have been confirmed by the results of the archaeomagnetic measurements (KOVACHEVA – GIGOV 1996; KOVACHEVA *et al.* 2002; BOUZEK *et al.* 2013, 12).¹

¹ Also thermoluminescence dating of archaeological artifacts was applied but data have not yet been published.

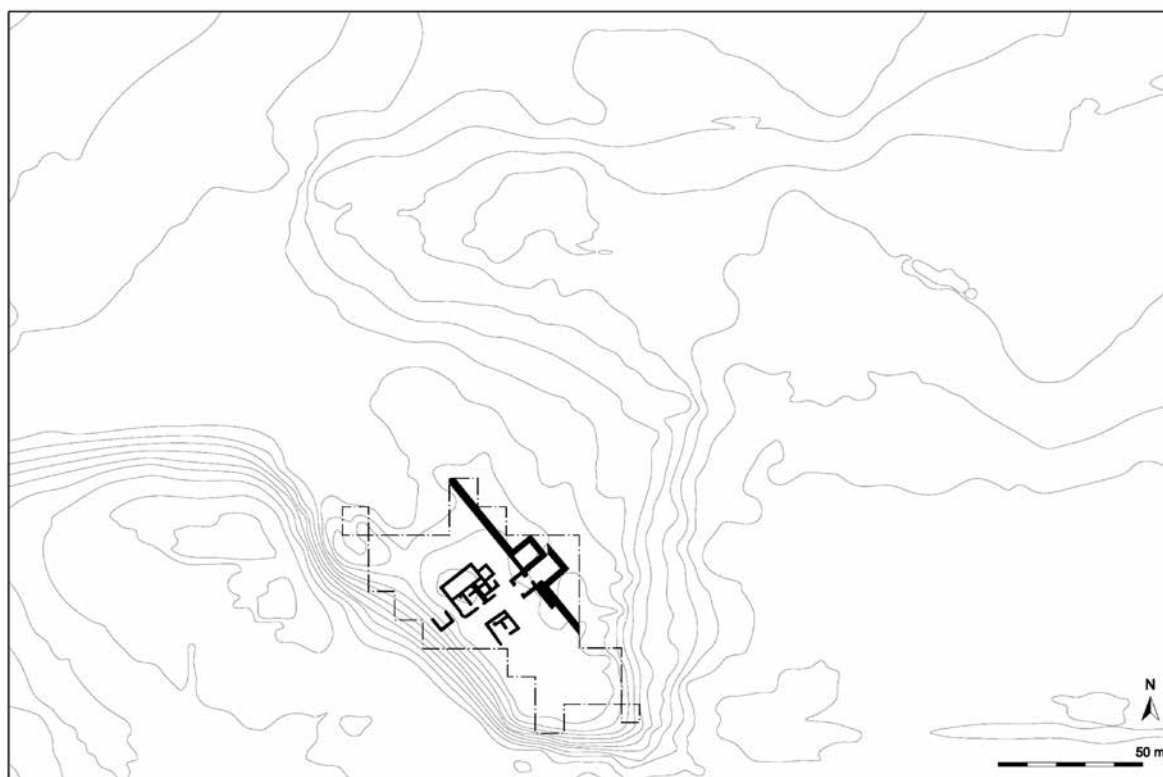


Fig. 2. Topographical plan of the archaeological site at Pistiros. After BOUZEK *et al.* 2007, digitized by J. Souček in 2017.

After the events, post-urban traces of metalworking (iron slag) were detected on the site but the absence of solid architecture or Greek imports suggest that it was only a small village without commercial utilization (BOUZEK 2007, 2013).

The area under investigation is situated on the left bank of the Maritsa River (**Fig. 1**). The landscape of the broad river valley is characterized predominantly by plains and sloping hill-sides enclosed by two mountain systems; the Rila Mountains, which is a part of the Rhodope Massif – the highest Bulgarian uplands (around 2900 m.a.s.l.), and the western part of the mountain range Sredna Gora (around 1600 m.a.s.l.; see BALTAKOV *et al.* 2002; KENDEROVA *et al.* 2007, 272). The *emporion* was positioned on a low hill, ca. 2 m above the surrounding terrain. An important geomorphological aspect is the alluvial fan in which the whole area is situated (**Fig. 2**). The river has always been a dominant force modifying the landscape. In the case of Pistiros, a large area of the settlement has been lost as a result of gradual streambank erosion (BOUZEK *et al.* 2010, 17–18). Due to this prominent location, geomorphological, geophysical and sedimentological studies exploring the fluvial history of the Maritsa and its influence on the existence of the *emporion* have become a significant stage of this project.

GEOMORPHOLOGICAL AND GEOPHYSICAL SURVEY

The site is placed on the highest river terrace of the area, formed by an enormous mass of natural and anthropogenic diluvial sediments (BALTAKOV *et al.* 1996, 181; CHIVERRELL – ARCHIBALD 2009, 293). The fluvial geomorphology at Adjiyska Vodenitsa has become the primary subject of the British project cooperating with the Franco-Bulgarian team. The research was

directed by G. Baltakov and R. Kenderova (Sofia University St. Kliment Ohridski in Bulgaria). Since 1999 V. Chankowski and E. Fouache (Sorbonne-Paris University, France) and the British team with R. C. Chiverrell and Z. Archibald (University of Liverpool) have participated in research on the fluvial system nearby Pistoros (CHANKOWSKI *et al.* 2001; KENDEROVA *et al.* 2007; CHIVERRELL – ARCHIBALD 2009; ARCHIBALD 2010).

Geophysical prospecting in the study area accompanied the archaeological excavation during the campaigns in 1988–1989 and 1998–1999. The geophysics team was led by Susan Ovenden (University of Bradford). Archaeological indications on the surface had suggested a walled settlement. Geophysical exploration using the Schlumberger electrode array as well as magnetic measurements has aimed to determine the dimension of stone structures under the surface. In the first phase, geophysical data localized anomalous factors in the investigated profiles clearly interpreted as a thick stone accumulation. It was successfully identified with the fortification walls of the *emporion* and ruins of small-size buildings and other construction in the cultural layer as a result of the destruction. The other measurements were focused on the southern part of the eastern fortification. In these profiles, placed on the river terrace, geophysical surveys were disadvantaged by flooded terrain. In spite of the difficult terrain situation, the methods used at the site have provided very interesting data concerning the local relief, probable settlement extension, remains of buildings, and last, but not least, more information about the street grid (KATEVSKI 1996; 2002; ARCHIBALD 2002).

The geophysical survey methods combined with archaeological evidence and radiocarbon dating (CHIVERRELL – ARCHIBALD 2009, 299) have attested the continuous river landscape development during the last 2500 years. Palaeohydrological studies have investigated the fluvial history, primarily observing the behaviour of the main stream and its channels and changes during the first millennium BC (CHIVERRELL – ARCHIBALD 2009, 290). The remote sensing techniques supported by sub-surface electrical resistance measurements and a gradiometry survey on the river terraces (ARCHIBALD 2010, 242) have successfully found out that the alluvial plain was composed of multiple paleochannels perceptible beneath the surface. The abandoned river canals have dried as a consequence of the intensive use of the river water for the irrigation system (BALTA KOV *et al.* 1996, 184; BOUZEK *et al.* 2010). Numerous traces of a sophisticated drainage system, consisting of a main drain, several small drains and wells, were already found during the first seasons of excavation (CHANKOWSKI *et al.* 2001; BOUZEK *et al.* 2010).

The river valley is very vulnerable to flooding. Though the settlement and its presumed harbour was placed primarily on the higher and more stable left (north) riverbank (BOUZEK *et al.* 2010; BALTA KOVA *et al.* 2013), the lowlands around the river were flooded during periodic overflows. At the time of the *emporion* existence, during around 150 years, the site was completely flooded six to seven times (BOUZEK *et al.* 2010, 17). Systematic investigation of sediment records including quartz analysis and geochemical testing have also revealed the presence of fluvial material containing gravel, fine sand, clay and well-smoothed pebbles in some archaeological contexts at the site (KENDEROVA – FITOVA 2002). Besides this, archaeological material dating to the Classical and Early Hellenistic period was buried below the floodplain alluvium layers. Sections of fluvial terraces on the right (south) riverbank have been examined as well. The alluvial deposits contained predominantly silty clay, gravel units and rocky particles derived from the surrounding uplands, the Sredna Gora and the Rila-Rhodopes (KENDEROVA *et al.* 2007, 273; CHIVERRELL – ARCHIBALD 2009, 294).

Several studies have focused on exploring the stratigraphy of the river terraces. Two radiocarbon dates were obtained from charcoal samples preserved in the Holocene overbank deposits accumulated in the southern riverbank. The first date 2405±35 BP (750–395 BC) was derived from the higher level, the second one, 985±35 BP (AD 990–1155) from the lower terrace.

It is assumed that these dates represent a temporal delimitation of the geomorphological processes from the most recent phase of alluviation (the higher terrace) to the abandonment of the palaeochannel (the lower terrace) (CHIVERRELL – ARCHIBALD 2009, 294; ARCHIBALD 2010, 241).

ARCHAEOBOTANICAL AND ANTHRACOLOGICAL REMAINS

The archaeobotanical remains reflect many features of the relationship between humans and the environment. At the site of Pistiros, samples for archaeobotanical analyses were obtained from different types of cultural contexts: a fireplace, the context identified as a domestic clay altar² and several archaeological structures from central sectors of the settlement (pits, ritual complex, baked clay floor, fallen roof construction). Plant macro-remains have been examined by Tzvetana Popova (National Institute of Archaeology with Museum, the Bulgarian Academy of Sciences) since 1996 in an effort to reconstruct the paleoenvironmental conditions of the whole territory (POPOVA 1996; 2002; 2013).

The results of the samples taken from soil within the altar and the vicinity revealed rich well-preserved material, carbonized grains and seeds (**Tab. 1**). The most dominant cereals were varieties of wheat- mild/compact, einkorn and emmer (*Triticum aestivum/compactum* L., *T. monococcum* L., *T. dicoccum* Schrank). Also, barley (*Hordeum vulgare* var. *nudum* L.) and millet (*Panicum miliaceum* L.) had a significant role in nutrition. Rye (*Secale cereale* L.) and oat (*Avena* sp.), more typical for Roman times, were found only in small quantities in samples. Legumes are represented mainly by bitter vetch (*Vicia ervilia* Willd.) and lentils (*Lens culinaris* Medik.). Inside the altar, several remains of grape pips (*Vitis vinifera*) and three fragments of plum stones (*Prunus* sp.) were recorded (POPOVA 2013, 258). The other collections of archaeobotanical samples contained very similar taxa, together with cereals and legumes, numerous weed species have been documented.

Wild growing weed species of the alluvial and meadow landscape have been studied as well. The results clearly prove not only wet conditions and a highwater level but also the presence of extended arable land adjacent to Adjiyska Vodenitsa, since most of the weed remains are closely associated with wheat fields. Seeds of these species (e.g. *Agrostema githago*, *Rumex Acetosella* L., *Gallium apparine* etc.) were commonly included in the harvested wheat crop (POPOVA 2013, 259). The most spread weed taxon is *Chenopodium album* L. followed by *Polygonum lapatifolium* L. and *Polygonum persicaria* L. In respect of the abundant occurrence of these plants in cultural contexts, for example the clay altar at the site, it is possible that some kinds of leaves, roots and seeds were used as complementary food (POPOVA 2013, 259).

Analysis of the charcoal wood has detected the most widespread representatives of the forest landscape close by the *emporion*. The river valley was surrounded by dense deciduous or mixed forests. Oak (*Q. cerris*, *Q. frainetto*, *Q. pedunculifolia*, *Q. petraea*, *Q. robur*) was present in all layers on and off the site, followed by hornbeam (*Carpinus*). Traces of alder (*Alnus* sp.), poplar (*Populus* sp.), willow (*Salix* sp.), elm (*Ulmus* sp.), maple (*Acer* sp.) plane-tree (*Platanus* sp.) and ash (*Fraxinus* sp.) were typical wood species growing along the stream (POPOVA 2013, 261; PARVONIČOVÁ 2016). As the charcoal samples were severely damaged due to high temperature, most of the fragments could not be accurately identified (POPOVA 2002).

2 The clay altar was discovered in 1993 and then thoroughly preserved under the direction of Emilia Ivanova. Besides a graphic reconstruction, several samples were taken from soil layers below the altar surface and were subjected to soil analysis (X-ray structural and differential thermal analysis) and archaeobotanical analysis (IVANOVA 1996; 2002).

Species	Soil no. 2	Soil no. 3	Soil no. 4	Soil no. 5	Soil no. 6	Walled altar space	Altar wall
<i>Triticum monococcum</i> (eincorn)			1	1		1	2
<i>Triticum dicoccum</i> (emmer)	2	2					
<i>Triticum aest./comp.</i> (mild/compact wheat)		4	4	3	4	12	
<i>Hordeum vulgare</i> (barley)		2	2	1	2	2	1
<i>Secale cereale</i> (rye)		1					
<i>Panicum miliaceum</i> (common millet)		3				1	8
<i>Vicia ervilia</i> (bitter vetch)		1					
<i>Lens culinaris</i> (lentils)		1				2	
<i>Vitis vitifera</i> (grapes)	1					2	
<i>Polygonum aviculare</i> (knotgrass)	2					2	
<i>Chenopodium album</i> (fat hen)	11						
TOTAL	16	14	7	5	6	22	11

Tab. 1: Composition of the discovered plant remains from and around the clay altar at Pistiros (after POPOVA 2002).

Remains of oak wood were also found at the site by means of construction material. The Pistiros fortification discovered at the end of 1994 was studied by J. Bouzek, M. Domaradzki and V. Kolarova (KOLAROVA 1996; BOUZEK *et al.* 2013). The first phase of the fortification wall was constructed in the third quarter of the 5th century BC. The charcoal fragments were preserved near the entrance gate. Based on the iron clasp of the door pivots directly connected with wooden parts (charcoal fragments), it was identified as traces of a double door at the gate. The charcoal samples examined by Emanuel Opravil (**Tab. 2**) confirmed the exploitation of the local wood resources: oak (*Quercus robur*), elm (*Ulmus laevis*) and beech (*Fagus cf. orientalis*) (BOUZEK 1996a, 46). The last unpublished analyses by E. Opravil confirmed that oak was the most common wood used for the framework of constructions and willow and thin branches of shrubs for the wattle-and-daub interior walls structure.³

³ Personal communication of J. Bouzek with E. Opravil while he was working on the additional samples delivered to him shortly before his death (2005).

Sample 1	Fragments
<i>Ulmus typ laevis</i> (elm)	25
<i>Quercus typ robur</i> (summer oak)	11
<i>Fagus cf. orientalis</i> (beech)	6
+ small fragments of each of the mentioned species	
Sample 2	Fragments
<i>Quercus</i> sp. (oak)	19
<i>Ulmus</i> sp. (elm)	12

Tab. 2: Charcoal fragments discovered near the gate at Pistiros (after BOUZEK 1996a).

CHEMICAL ANALYSIS OF ORGANIC RESIDUES IN CERAMICS

The application of modern chemical techniques has allowed for the obtaining of the detailed data from organic residues absorbed in the porous surface of pottery vessels found at the site. A number of ceramic fragments were submitted for several chemical analyses using Gas Chromatography and Mass Spectrometry, carried out by C. Heron and S. Rye and later E. C. Stout and C. W. Beck (The Chemistry Department of Vassar College in New York). For this survey, the potsherds (cooking pots, transport amphorae) and the hearth of the clay altar, or more precisely the base of the altar, have been selected (HERON – RYE 1996; STOUT *et al.* 2003).

In conjunction with the identification and classification of a wide composition of absorbed residues, it has been possible to reconstruct for what purpose the examined pottery served. The chemical analyses have revealed an appreciable presence of animal and vegetable fats and a small concentration of plant leaf waxes or beeswax, possibly as the remains of a sealant and impregnation of containers which were used to protect their organic content. It is assumed that the vessels were used for food preparation and secondarily for storage of food products and liquids. Usually, basic commodities including wine, oil (most likely olive oil), or fish products (e.g. fish sauces) were stored. Some original plant and animal species from which the fatty acids were derived have been precisely determined.

The abundant traces of the *Pinus halepensis* resin also known as Aleppo Pine found in the transport amphorae and in the hearth altar at Pistiros indicate a possible substance for conservation technique as well as/or the presence of Greek resinated wine (retsina) (HERON – RYE 1996). *P. halepensis* did not grow naturally in the Bulgaria and it had to be carried to this area from Greece or the Aegean islands. Originally, the resin was used as an important preservation material. Together with pitch, pine resin made transport amphorae sealed and impermeable and as a curing agent it eliminated potential risks of changing the colour and taste of the wine inside the containers during transport. This type of resin has also been intentionally added to wine to give a unique flavour (POPOVA 2013, 262).⁴

The studied ceramic fragments were very rich in organic compounds of various aromatic plants added to resinated or flavoured wine. It was primarily rue (*Ruta graveolens*) and other herbs such as thyme (*Clinopodium*), oregano (*Origanum*) and mint (*Mentha* sp.) (STOUT *et al.* 2003, 86). A large concentration of the plant *Cistus incanus*, called pink rock rose, used for the preparation of oil and perfumes was also detected in the hearth altar as well as in transport

4 A project analyzing the remains of resin in trade amphorae had already started in Prague in the 1960s (BOUZEK – KORDAČ 1963). C. W. Beck continued with analyses of the samples of the Central European pine resin selected for him by V. Cílek.

amphorae. The resin extracted from its leaves is known as labdanum. The mixture of oil with the pink rock rose was flavored with many fragrant plants including jasmine (*Jasminum*), sage (*Salvia*) or conifers of the families *Pinaceae* and *Cupressaceae* which were absorbed in the analyzed samples as well. In addition, in the altar area the Greek herb *Herniaria* (*Herniaria incana* Lam.) was found. This medical plant, which usually grows plentifully in rocky places, was exploited as a herbal remedy for hernias (POPOVA 2013, 262; PARVONIČOVÁ 2016). All of these determined ingredients identified within the clay altar together with the findings of the plant macro-remains analysis support the hypothesis that the clay altar could have served for domestic worship. It is interpreted as a place where offerings were put in the form of food and drink (STOUT *et al.* 2003, 87).⁵

DISCUSSION

Monitoring the current environment near Pistiros clearly indicates that the Maritsa River can be quite insidious. As was previously mentioned, the runoff channel located in the transition area between mountain ranges has ensured a regular water supply from rainfall and snow melting (KENDEROVA *et al.* 2007, 272). The period of maximum precipitation occurs during spring. An increase in the river level usually takes about five months (from February when snow melts in the surrounding mountains). From May onwards, there is a visible water drop of more than 10 %, and primarily in summer, the flow level is very low with numerous sediment islands (SARAFOV 2007; ROELEVINK *et al.* 2010). In recent years, in 2007 and 2008, the high-water level broke the riverbanks near Septemvri when heavy rainfall caused extensive overflow of up to 3 m over the old bridge. This allowed studying the new sedimentological outcrop. The main aim was to define the factors involved in the geomorphological processes and to prove whether similar floods affected Pistiros in the past. The mixed assemblage of alluvial gravel and clay has been identified in all parts of the excavated area and it is consistent with alluvial material which is considered to be the remnants of floods. On the basis of the long-term geomorphological research at the site, deposits characteristics have referred to approximately six or seven big floods during the existence of the *emporion* (BOUZEK *et al.* 2010, 17; BALTAKOVA *et al.* 2013).

An assessment of the periodic inundation events raises questions whether or not it was worthwhile building the trade centre in such a dangerous alluvial fan surface threatening the economic prosperity. One of the other explanations of the present silt and sand at the archaeological contexts could be the using of alluvial deposits as readily available building material for town reconstruction (CHIVERRELL – ARCHIBALD 2009, 296; ARCHIBALD 2010, 242). It is also presumed that the drainage system in the city helped to control these frequent overflows (BOUZEK *et al.* 2010). Sediment archives of the seasonal fluvial regime indicate that the river stream was rather little and slow in summer months, whereas in winter and after snow melting the water level rose considerably.

With regard to the distance between the settlement and the main river channel, it is clear that the inhabitants of Pistiros had to adapt their living to this dynamic and strongly seasonal system, thus it is likely that merchant ships using navigable rivers were dependent on the timing of these changes. The Maritsa River was navigable for smaller flat-bottomed river boats

5 According to personal communication with J. Bouzek, C. W. Beck determined a number of diet and toilet (and also scents) ingredients. The local cuisine was roughly the same as still is used by the present-time Bulgarians.

but regarding increasing irrigation requirements its drainage basin gradually diminished. Considering river traffic on the Maritsa during modern times (till ca. the 19th century), it can be supposed that in Antiquity during the navigable season (period of wider catchment area and higher water level), these smaller boats could sail approximately to the Pazardzhik region. Pistiros was probably the last harbor on the Hebros (BOUZEK 1996b; BOUZEK *et al.* 2010; DE BOER 2010; ROELEVINK *et al.* 2010).

The fluvial system in central Bulgaria corresponds to the well-known climate changes during the first millennium BC. The palynological and plant macro-remains studies across the valley region have shown a comparably excessive rise of the water level with the expansion of marshlands and peat lands observed in the Pistiros area especially during the 5th to 3rd century BC (CHIVERRELL – ARCHIBALD 2009, 298; KENDEROVA *et al.* 2007, 277). Spruce (*Picea excelsa*) dominated in the higher altitudes but the lower zones of mountains were covered by oak and hornbeam forests (up to 800 m.a.s.l.) and beech trees. The occurrence of hydrophilic trees like alder, poplar, willow, plane tree and ash tree around the area serves as further evidence of a humid climate. Archaeobotanical records have revealed significant change in vegetation especially after the 5th century BC. Above all, the decline in mixed oak forests is evident in the majority of the Thracian territory and it is supposed to be related to the extension of agricultural land for the purpose of arable cultivation and the grazing of domestic animals (POPOVA – MARINOVA 2007; CHAPMAN *et al.* 2009; ARCHIBALD 2010, 241; POPOVA 2013). It is likely that more intensive anthropogenic activities in general coincided with, among other things, more frequent trading contacts with the Mediterranean.

The comprehensive overview of macro-botanical remains illustrate a picture of food habits influenced by social and economic aspects, it also demonstrates agricultural, social and ritual practices in the region of the Maritsa River during the Classical period. Cereals and pulses were the basic types of crop plants growing in the local fields. Wheat, barley and millet became the prevailing staple cereal crops. Fruits such as cultivated types of grapes and plums were also popular.

In connection with the study of the diet and ritual practices at Pistiros, several archaeozoological analyses have been conducted as well. The vast majority of well-preserved osteological remains belong to domestic cattle, pigs and sheep/goats. Fragments determined as animal bones and teeth of domestic fowl (*Gallus gallus*), geese (domestic or wild), dogs and horses were also quite common. Additionally, besides domestic animals a very limited record of wild species has been documented. Based on morphological criteria, a large number of faunal materials were identified as big birds (crane, stork), hare (*Lepus*), or deer (*Cervus elaphus*) remains. Regarding animal bone size measuring and taphonomic modifications of skeletal remains, it has been supposed that some of the enumerated animal species were significant dietary components. The study of cut marks on bones indicates direct evidence of butchery activities at the site (STALLIBRASS 2007, 266–267; STALLIBRASS 2013).

The local people exploited the landscape for agriculture and for obtaining valuable trade items. Despite the frequent overflows, happening ca. every 20 years, the *emporion* flourished in view of its strategic position (TANEVA 2005; BOUZEK – DOMARADZKA 2013; GOTZEV 2013). Primarily, it was an important river port connected by routes crossing the Rhodope Mts. to the west, the Stara Planina to the north, towards another Thracian tribe of Triballoi, the North Aegean Sea to the south as well as the Black Sea to the east (DEMETRIOU 2010; ARCHIBALD 2013). Rich woods, iron and copper mines together with granite stone quarries in the surrounding area provided an abundance of material for local and regional trade in metal and timber (mainly oak wood) (KATINČAROVA-BOGDANOVA 1996; CHANKOWSKI *et al.* 2001).

Furthermore, the set of exotic (crop) plants recovered at the *emporion* can help us understand what organic products were imported to Thrace, or more precisely to Pistiros. A large amount of transport amphorae document regular commercial contacts with the production centres in the Greek territory. Studies of amphorae sherds discovered at Pistiros have regarded mainly identification of provenance by means of amphorae stamps and morphological characteristics (rims and toes). The majority of transport amphorae originate from Thasos, a smaller amount from Peparethos, Mende, Ainos, Lesbos, Chios, Cnidus and Heraclea Pontica (BOUZEK *et al.* 2007; TUŠLOVÁ *et al.* 2010, 206–208; TEODOSSIEV 2011; TUŠLOVÁ – WEISSOVÁ 2013). On the basis of the above presented results of archaeobotanical and chemical analyses, it can be assumed that transport amphorae usually contained wine, preserved fish and vegetable oil, most probably olive oil. The trace amount of pine resin identified in some examined sherds evidence that these containers transported or stored resinated wine, but it is not always possible to determine without any doubt whether it is the Greek wine retsina or pine tar residues (STOUT *et al.* 2003; POPOVA 2013).

CONCLUSION

The interdisciplinary approach leads to holistic research and, in general, to a better understanding of the inland *emporion* Pistiros. The selected geoarchaeological methods give new different perspectives on the historical development of the whole area with the aim to clarify the role of this trade centre in the North Aegean and Black Sea economic network as well as the interaction with the dynamic fluvial system. In connection with the integration of the *emporion* into the landscape and as a part of a wider spatial context, it is possible to assess the long development of the urbanized settlements in the heart of Ancient Thrace together with changes in anthropogenic activities in dependence on increasing pressure on the environment and agriculture production. The establishment of the Greek trade centre in this territory relatively far from the seashore had a visibly positive response from the local inhabitants. Studies of material culture as well as various environmental surveys at the site of Adjiyska Vodenitsa have proved intensive land use for agriculture – crop cultivation and husbandry. Furthermore, the active commerce of Pistiros was affected by strong relations between the settlement and the surrounding environment, especially with the adjacent river stream allowing a connection with the Aegean region. Traders were aware of the navigable conditions of the river and, despite the flood tendencies, they were able to fully exploit its potential (BOUZEK 1996b, 221; DE BOER 2010, 181).

The proper function of the trading post was to create a well-accessible crossing point where merchants of different origin came to trade. The local inhabitants developed and maintained deep connections with the Greek coastal colonies and the Aegean islands until the destruction of the settlements around 279 BC (BOUZEK *et al.* 2013). Extensive and long-term investigation of the site from a broad perspective of history, archaeology, geomorphology, ecology and the like has brought many significant results and invaluable information proving that the existence and prosperity of the Greek *emporion* was closely tied to both political events and the behaviour of the environment, or more precisely, the river.

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REFERENCES

- ARCHIBALD, Z.H. 2000–2001: The Odrysian river port near Vetren, Bulgaria, and the Pistiros Inscription. *Talanta* 32-33, 253–276.
- ARCHIBALD, Z.H. 2002: A River Port and Emporion in Central Bulgaria. An Interim Report on the Project at Vetren. *The Annual of the British School at Athens* 97, 309–351.
- ARCHIBALD, Z.H. 2010: The impact of post-depositional changes in the fluvial system around Pistiros. In: BOUZEK – DOMARADZKA – ARCHIBALD (eds.) 2010, 241–245.
- ARCHIBALD, Z.H. 2013: *Ancient economies of the Northern Aegean. Fifth to first centuries BC*. Oxford.
- BALTAKOV *et al.* 1996 = Baltakov, G. – Kenderova, R. – Fitova, E.: Geomorphological and palaeogeographical environmental condition of the emporion (3rd–2nd century BC). In: BOUZEK – DOMARADZKI – ARCHIBALD (eds.) 1996, 181–186.
- BALTAKOV *et al.* 2002 = Baltakov, G. – Kenderova, R. – Fitova, E.: Composing a geomorphological map of the Pistiros region for archaeological purposes. In: BOUZEK – DOMARADZKA – ARCHIBALD (eds.) 2002, 303–306.
- BALTAKOVA *et al.* 2013 = Baltakova, A. – Kenderova, R. – Fitova, E. – Baltakov, G.: Geomorphological environment of emporion Pistiros area. In: BOUZEK – DOMARADZKA – GOTZEV – ARCHIBALD (eds.) 2013, 264–271.
- DE BOER, J.G. 2010: River trade in Eastern and Central Thrace from the Bronze Age till the Hellenistic period. *Eirene* 46, 176–189.
- BOUZEK, J. – DOMARADZKI, M. – ARCHIBALD, Z.H. (eds.) 1996: *Pistiros I. Excavations and Studies*. Praha.
- BOUZEK, J. – DOMARADZKA, L. – ARCHIBALD, Z.H. (eds.) 2002: *Pistiros II. Excavations and Studies*. Praha.
- BOUZEK, J. – DOMARADZKA, L. – ARCHIBALD, Z.H. (eds.) 2007: *Pistiros III. Excavations and Studies*. Praha.
- BOUZEK, J. – DOMARADZKA, L. – ARCHIBALD, Z.H. (eds.) 2010: *Pistiros IV. Excavations and Studies*. Praha.
- BOUZEK, J. – DOMARADZKA, L. – GOTZEV, A. – ARCHIBALD, Z.H. (eds.) 2013: *Pistiros V. Excavations and Studies*. Praha.
- BOUZEK, J. – KORDAČ, F. 1963: Examination of amphora fragments from an early Medieval ship-wreck from the Black Sea. *Folia Philologica* 86/2, 256–258.
- BOUZEK, J. 1996a: The position of the Pistiros fortification in the development of the ancient poliorcetics and stonecutting techniques. In: BOUZEK – DOMARADZKI – ARCHIBALD (eds.) 1996, 43–46.
- BOUZEK, J. 1996b: Pistiros as a river harbor. Sea and river transport in Antiquity and its cost. In: BOUZEK – DOMARADZKI – ARCHIBALD (eds.) 1996, 221–222.
- BOUZEK *et al.* 2007 = Bouzek, J. – Rückl, Š. – Titz, P. – Tsotzev, C.: Trade amphorae. In: BOUZEK – DOMARADZKA – ARCHIBALD (eds.) 2007, 133–190.
- BOUZEK *et al.* 2010 = Bouzek, J. – Gotzev, A. – Domaradzka, L. – Katinčarova, D. – Lazov, G. – Musil, J. – Taneva, V. – Archibald, Z.: The water management system of Pistiros. In: BOUZEK – DOMARADZKA – ARCHIBALD (eds.) 2010, 17–23.
- BOUZEK, J. – DOMARADZKA, L. 2010: What was the proper function of the fortified settlement at Adžijska Vodenica? Why to call it Emporion Pistiros. In: BOUZEK – DOMARADZKA – ARCHIBALD (eds.) 2010, 235–240.
- BOUZEK, J. 2013: The outline of the chronology of Pistiros. *Studia Hercynia* XVII/1, 5–7.

- BOUZEK *et al.* 2013 = Bouzek, J. – Domaradzka, L. – Domaradzki, M. (+) – Taneva, V. – Weissová, B.: Fortification and urban planning of the emporion Pistiros (Adžijska Vodenica) reconsidered. *Studia Hercynia* XVII/1, 12–19.
- BOUZEK, J. – DOMARADZKA, L. 2013: Emporion Pistiros between greater powers: 450–278 B.C. An attempt to sketch its history. *Studia Hercynia* XVII/1, 28–35.
- CHANKOWSKI *et al.* 2001 = Chankowski, V. – Augusta-Boularot, S. – Baltakov, G. – Bogdanova, D. – Chankowski, A. – Fadin, L. – Fouache, E. – Georguieva, G. – Gotzev, A. – Nehrizov, G.: Pistiros (Bulgarie). *Bulletin de correspondance hellénique* 125/2, 731–736.
- CHAPMAN *et al.* 2009 = Chapman, J. – Magyari, E. – Gaydarska, B.: Contrasting subsistence strategies in the Early Iron Age? New results from the Alföld Plain, Hungary, and the Thracian Plain, Bulgaria. *Oxford Journal of Archaeology* 28/2, 155–187.
- CHIVERRELL, R.C. – ARCHIBALD, Z.H. 2009: Human activity and landscape change at Adžijska Vodenitsa, central Bulgaria. *Géomorphologie* 4, 287–302.
- DEMETRIOU, D. 2010: Pistiros and a North Aegean trade network. *L'antiquité classique* 79, 77–93.
- DEMETRIOU, D. 2013: *Negotiating identity in the Ancient Mediterranean. The Archaic and Classical Greek multi-ethnic emporia*. Cambridge.
- GRANINGER, D. 2012: Documentary contexts for the Pistiros inscription. *Electrum* 19, 99–110.
- GOTZEV, A. 2013: Archaeological research in emporion Pistiros 2006–2010. Interim report. In: BOUZEK – DOMARADZKA – GOTZEV – ARCHIBALD (eds.) 2013, 7–22.
- HERON, C. – RYE, S. 1996: Analysis of absorbed lipids in amphora sherds. In: BOUZEK – DOMARADZKI – ARCHIBALD (eds.) 1996, 197–202.
- IVANOVA, E. 1996: Conservation of a clay altar from emporion Pistiros. In: BOUZEK – DOMARADZKI – ARCHIBALD (eds.) 1996, 167–172.
- IVANOVA, E. 2002: Conservation of archaeological finds from Pistiros. In: BOUZEK – DOMARADZKA – ARCHIBALD (eds.) 2002, 283–288.
- KATEVSKI, I. 1996: The position of geophysical prospecting in the study of “emporion Pistiros”. In: BOUZEK – DOMARADZKI – ARCHIBALD (eds.) 1996, 175–180.
- KATEVSKI, I. 2002: New data from the geophysical surveys on emporion Pistiros. In: BOUZEK – DOMARADZKA – ARCHIBALD (eds.) 2002, 299–302.
- KATINČAROVA-BOGDANOVA, D. 1996: Traces of metallurgical activity in the emporion. In: BOUZEK – DOMARADZKI – ARCHIBALD (eds.) 1996, 103–109.
- KENDEROVA, R. – FITOVA, E. 2002: Development of the left banks of the Maritsa River of the territory of Pistiros. In: BOUZEK – DOMARADZKA – ARCHIBALD (eds.) 2002, 321–327.
- KENDEROVA *et al.* 2007 = Kenderova, R. – Baltakov, G. – Fitova, E.: Palaeohydrological evolution of the Maritsa plain in the area of the ancient emporion Pistiros during the last 2500 years. In: BOUZEK – DOMARADZKA – ARCHIBALD (eds.) 2007, 272–279.
- KOLAROVA, V. 1996: Study on the section of the emporion's fortification, as discovered by the end of 1994. In: BOUZEK – DOMARADZKI – ARCHIBALD (eds.) 1996, 35–42.
- KOVACHEVA, M. – GIGOV, V. 1996: Emporion Pistiros and archaeomagnetic studies. In: BOUZEK – DOMARADZKI – ARCHIBALD (eds.) 1996, 187–196.
- KOVACHEVA *et al.* 2002 = Kovacheva, M. – Jordanova, N. – Gigov, V.: Supplementary archaeomagnetic investigations on structures of burnt clay from emporion Pistiros. In: BOUZEK – DOMARADZKA – ARCHIBALD (eds.) 2002, 307–318.
- PARVONIČOVÁ, L. 2016: *Environmental changes and human land-use interactions in Ancient Thrace during the Iron Age: The impact of Greek colonization*. Master thesis, defended at the Institute of Classical Archaeology, Charles University in Prague.
- POPOVA, T. 1996: The archaeobotanic samples from the clay altar. In: BOUZEK – DOMARADZKI – ARCHIBALD (eds.) 1996, 173–174.

- POPOVA, T. 2002: Studies of carbonized vegetation remains from Pistiros. In: BOUZEK – DOMARADZKA – ARCHIBALD (eds.) 2002, 289–297.
- POPOVA, T. 2013: Palaeobotanic analysis in the region of the town of Septemvri-Pistiros and its neighbourhood. In: BOUZEK – DOMARADZKA – GOTZEV – ARCHIBALD (eds.) 2013, 255–263.
- POPOVA, T. – MARINOVA, E. 2007: Palaeoethnobotanical data in South-Western region of Bulgaria. In: Todorova, H. – Stefanovich, M. – Ivanov, G. (eds.): *The Struma/Strymon River Valley in Prehistory*. Proceedings of the International Symposium: Strymon Praehistoricus, 27/09–01/10 2004. Sofia, 499–508.
- ROELEVINK *et al.* 2010 = Roelevink, A. – Udo, J. – Koshinchanov, G. – Balabanova, S.: Flood forecasting system for the Maritsa and Tundzha Rivers. In: *Proceedings of the 4th International Conference on Water Observation and Information System for Decision Support* (BALWOIS), 25–29 May 2010. Ohrid, 1–14.
- SARAFOV, A. 2007: Contemporary environment in the ancient emporion Pistiros in Thrace. In: BOUZEK – DOMARADZKA – ARCHIBALD (eds.) 2007, 280–282.
- STALLIBRASS, S. 2007: Research questions and some preliminary results for the animal bones from excavations at Adjiyska Vodenitsa, Vetren, Bulgaria. In: BOUZEK – DOMARADZKA – ARCHIBALD (eds.) 2007, 264–271.
- STALLIBRASS, S. 2013: Animal bone deposition at Adjiyska Vodenitsa, Vetren: can it highlight different areas of past human activity in and around the town? In: BOUZEK – DOMARADZKA – GOTZEV – ARCHIBALD (eds.) 2013, 272–287.
- STOUT *et al.* 2003 = Stout, E.C. – Beck, C.W. – Naliboff, L.C. – Phillips, A.J.: Organic residues in pottery from the Greek settlement of Pistiros, Bulgaria. *Studia Hercynia* VII, 81–114.
- TANEVA, V. 2005: The trade contacts of Pistiros during the second half of the 4th c. B.C. In: Bouzek, J. – Domaradzka, L. (eds.): *The culture of Thracians and their neighbours*. Proceedings of the International Symposium in memory of prof. M. Domaradzki with a Round table 'Archaeological map of Bulgaria'. BAR International Series 1350. Oxford, 27–34.
- TEODOSSIEV, N. 2011: Ancient Thrace during the first millennium BC. In: Tsetskhladze, G.R. (ed.): *The Black Sea, Greece, Anatolia and Europe in the 1st millennium BC*. Leuven, 1–60.
- TIVERIOS, M. 2008: Greek colonization of the Northern Aegean. In: Tsetskhladze, G.R. (ed.): *Greek colonisation. An account of Greek colonies and other settlement overseas 193/2*. Leiden, 1–154.
- TUŠLOVÁ *et al.* 2010 = Tušlová, P. – Kučová, S. – Weissová, B.: Greek and Black Sea transport amphorae in emporion Pistiros, quantified analyses of material excavated until 2009. In: BOUZEK – DOMARADZKA – ARCHIBALD (eds.) 2010, 205–220.
- TUŠLOVÁ, P. – WEISSOVÁ, B. 2013: New Finds and Observations on Transport Amphorae from Pistiros. In: BOUZEK – DOMARADZKA – GOTZEV – ARCHIBALD (eds.) 2013, 161–165.

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