ADAM MICKIEWICZ
UNIVERSITY
POZNAŃ

Treasures of Time

Research of the Faculty of Archaeology
of Adam Mickiewicz University in Poznań

Location of the main research areas.
Numbering, compare the table of Contents.

Adam Mickiewicz University Poznań

Treasures of Time

Research of the Faculty of Archaeology
of Adam Mickiewicz University in Poznań

Editor
Danuta Żurkiewicz, danuta@amu.edu.pl

Editorial Committee
Marcin Ignaczak, Przemysław Makarowicz,
Andrzej Michałowski, Anna Skowronek, Jacek Wierzbicki

English proofreading
Sarah Martini, Grażyna Piątkowska, Asta Rand

Technical Editor and Layout
kreomania Justyna Kozłowska, Hanna Kossak-Nowicień

Cover
Mirosław, Greater Poland Voivodeship, site 37. Part of the burial equipment.
Photo: K. Zisopulu. Cover design: Justyna Kozłowska

Reviewers: Artur Błażejewski, Jacek Górski

Editor's Address
Faculty of Archaeology, Adam Mickiewicz University in Poznań,
Uniwersytetu Poznańskiego 7, 61-614 Poznań, Poland

ISBN 978-83-946591-9-6
DOI: 10.14746/WA.2021.1.978-83-946591-9-6

The Volume is available online at the Adam Mickiewicz University Repository (AMUR):
https://repozytorium.amu.edu.pl/

FACULTY OF ARCHAEOLOGY AMU

Treasures of Time

Research of the Faculty of Archaeology
of Adam Mickiewicz University in Poznań

Contents

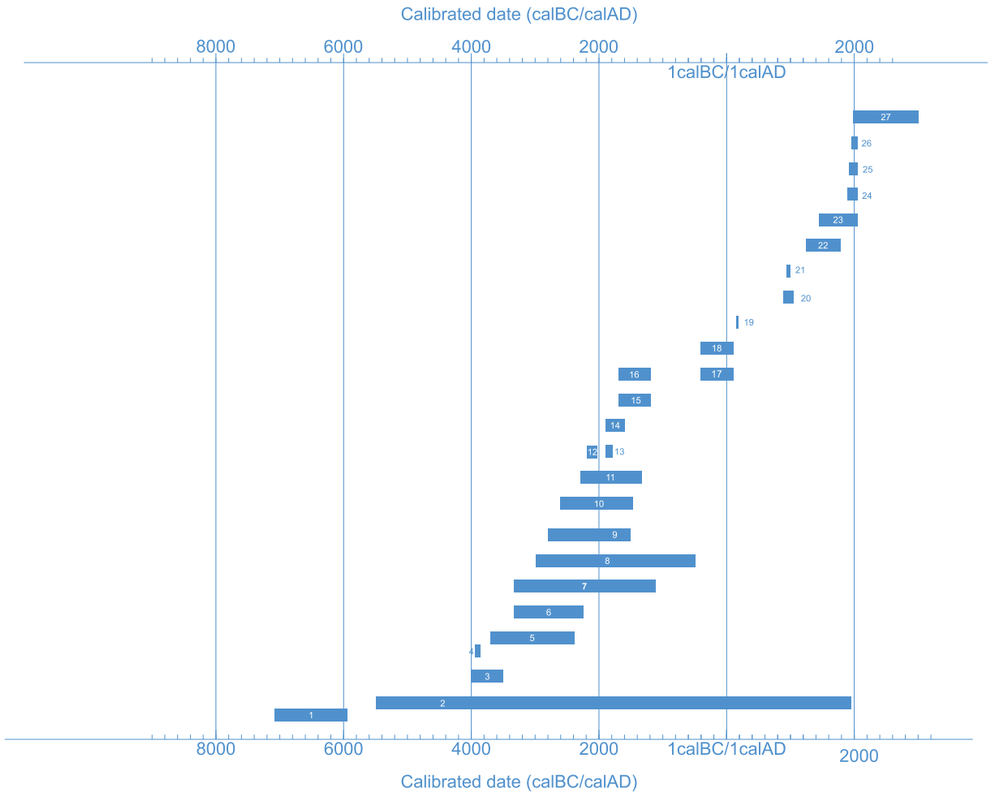
FACULTY OF ARCHAEOLOGY AMU

Treasures of Time: Research of the Faculty of Archaeology of Adam Mickiewicz University in Poznań

Introduction

In 2019, archaeology at the Adam Mickiewicz University in Poznan celebrated its honourable 100th anniversary! The establishment of archaeology at this university was associated with the strong influence of the authority of Prof. Józef Kostrzewski and a succession of eminent scholars, many of whom we today call Masters.

The year 2019 was a real breakthrough. We started the second century of existence within the Alma Mater Posnaniensis with a new structural independence and quality that the academic archaeology of Poznań had not yet known for its one hundred years of existence. This change, the formation of the first Polish Faculty of Archaeology, has opened new chances and possibilities of which we are now taking advantage.



Calibrated date
(calBC/calAD)

Prof. Józef Kostrzewski
(1885-1969)

Currently, the Faculty of Archaeology of Adam Mickiewicz University is formed by a number of teams, each with their own leaders. In the majority of cases, these teams are united by interdisciplinarity, which integrates within selected projects the experience of many so-called 'auxiliary' sciences of archaeology. This trend is paralleled by the development of specialised laboratories armed with the latest equipment in the Faculty of Archaeology.

This publication presents the current scientific interests creatively developed by such teams at the Faculty of Archaeology of Adam Mickiewicz University. The research of these teams covers vast areas in time and space, summing up at least the last 9,000 years of prehistory. The following articles, arranged in chronological order, allow us to explore the prehistory of various areas.

The adventure begins around 7100 BC, in the Neolithic settlement of Çatalhöyük located in Turkey. Then, we move on to the loess uplands near Krakow, where the first farmers from the south of Europe had just arrived (5500 BC). A little later (4000-3500 BC), and a little farther north, in the area of Greater Poland, some of the first megalithic constructions in this part of the world were built. Around the same time, about 800 km to the southeast, a settlement

of the Trypillia culture remains in the phase of development (3950 BC). The end of the Stone Age in Poland was described in the history of Late Neolithic communities on a hill in the center of Kujawy region (3700-2400 BC). Farther east, in the forest-steppe area of Ukraine, significant cultural and social changes resulted in the formation of the Yamnaya culture (3350-2250 BC), beginning the Bronze Age.

Intense elements of this era can be traced in the area of southern Europe in the Greek Anthemous Valley (3350-1150 BC), in Attica (3000-500 BC) on the plains of the Hungarian Lowlands (2600-1450 BC) and to the Upper Dniester Valley, where numerous burial mounds were formed (2800-1500 BC). A similar chronological range is presented in the articles devoted to a unique site in Bruszczewo, Greater Poland (2300-1350 BC), which not only accumulates valuable metal artefacts, but is also the subject of interest of an interdisciplinary team focused on reconstructing its environmental context.

The next text take us far to the east, to the area of Iraqi Kurdistan, where we can appreciate the importance of Mesopotamian influences in shaping the picture of the Early Bronze Age (2200-2150 BC).

Subsequent texts describe the discoveries of Poznań scientists in Syria (1906-1787 BC) and in Greater Poland (1900-1600 BC). These two distant points describe various aspects of life in contemporary communities in the Middle and Early Bronze Age.

The characteristic archaeological materials of the later centuries of the Bronze Age (1800-1200 BC) reveal an intensification of military conflicts and migration processes (1700-1200 BC). The turn of the eras is illustrated in this volume by texts on the interpretation of representations on ancient Greek and Roman sculpture (400 BC-100 AD), as well as the cultural situation in the Polish lands (400 BC-100 AD).

We are introduced to the new era by an article on the funerary customs of communities from the Polish lowlands describing discoveries at the site of Mirosław (160-175 AD). Moments of the formation of elements of Polish statehood are referred to in texts describing towns at Grzybowo (919-1050 AD) and Poznań in the early Middle Ages (950-1000 AD).

Later parts of the Middle Ages are described by sacral monuments located also in the area of the contemporary city of Poznań: the Collegiate Church of St Mary Magdalene (1263-1802 AD) and the still extant Church of the Blessed Virgin Mary on Ostrów Tumski, founded around 1431 AD in the immediate vicinity of the previously described early medieval site of the ‘origin’ of the city of Poznań.

The final texts of the volume do not refer directly to a particular period of prehistory, but present the history of Polish archaeological research on the Iberian Peninsula, the contemporary perception of prehistoric art by the inhabitants of present-day Canada and Siberia, and the development of methodological thought among Poznań archaeologists.

The volume closes with a text describing one of the many perspectives currently faced by the staff of the Faculty of Archaeology of Adam Mickiewicz University in Poznań: the new ArchaeoMicroLab.

We look to the future with great hope that the Staff of the Faculty will provide ideas for many more volumes of Treasures of Time. We trust that this set of articles will present archaeology at the Adam Mickiewicz University in Poznań in its new structure as a Faculty and show its potential. We would thus like to encourage you to get acquainted with our Poznań perspective on archaeological studies, and to reflect on ways of exploring the past.

Andrzej Michałowski

Danuta Żurkiewicz

Location of the main research areas.
Numbering, compare the table of Contents.

Treasures of Time:

Research of the Faculty of Archaeology of Adam Mickiewicz University in Poznań

DOI 10.14746/WA.2021.10.978-83-946591-9-6

Kakucs-Turján: a multi-layered settlement in Central Hungary

Mateusz Jaeger, Robert Staniuk, Sofia Filatova, Gabriella Kulcsár

Abstract

Investigations of the settlement of Kakucs-Turján have applied a multi-disciplinary approach to recognize the everyday reality of communities living in Early and Middle Bronze Age Hungary. Field prospection and preliminary excavations allowed characterization of the overall site parameters, while the subsequent excavation seasons provided evidence of a complex settlement history wherein a major transition from behaviors producing a flat to a multilayered site was identified as a major turning point. Analyses of material culture and botanical remains point to stable lifestyles and subsistence practices across generations of inhabitation of the settlement within which differential access to exotic resources and non-local objects was part of the way of life. This paper provides a state-of-the-art overview summarizing the main findings of the focal points of research at Kakucs-Turján.

Keywords: Hungarian Bronze Age – Tell Settlement – Vatya Culture

Kakucs-Turján and Middle Bronze Age fortified settlements in the Central Danube region

The Kakucs-Turján settlement is located approx. 35 km from present-day Budapest (Figure 1). It was investigated from 2013 and 2017 by an international research team as part of the “Kakucs Archaeological Expedition”. The research was conducted as a collaboration between the Institute of European Culture, Adam Mickiewicz University in Poznań; the Institute of Archaeology of the Hungarian Academy of Sciences in Budapest; and the Institute of Prehistoric and Protohistoric Archaeology, Graduate School “Human Development in Landscapes”, and Johanna-Mestorf Academy at the Christian-Albrechts-Universität zu Kiel. The research was co-financed by Polish, Hungarian and German institutions (Jaeger et al., 2018).

The site was part of a dense network of multi-layered and tell settlements of the so-called Vatya culture. Approximately 45 sites have been identified in the area where this ceramic style was prevalent, most of which were surrounded with fortifications at some stage of their existence (Figure 1). The settlement areas fall between 2 and 3 ha and the surrounding wooden-earthen defenses were typical for the Central European Bronze Age: ramparts, ditches, and palisades (Jaeger, 2016). While settlements were located in various landscapes, evidence of developed agriculture and husbandry points to preferential choices enabling communities to engage in specific economic strategies (Jaeger, 2016). Apart from economic and strategic considerations, which may be approached as purely pragmatic factors, a conspicuous characteristic of Vatya fortified settlements is that their locations often overlapped with places that had previously been inhabited in the Early Bronze Age (EBA).

As for the internal layout of the settlements, one can rely only on a limited number of sites that have been explored over a more extensive area. The buildings were situated at a small distance from one another. In a number of cases, they were constructed in the manner typical of tell settlements, i.e. consistently in the same locations throughout the period of occupation. Spaces adjacent to the houses hosted various production activities (Jaeger, 2016).

A unique feature of some Vatya fortified settlements is the spatial division of their interior. In the case of Kakucs-Turján, archaeological research revealed a complex system of fortifications which split the Middle Bronze Age (MBA) settlement into three sections. Given the available sources, it seems likely that the division was initially functionally-oriented, separating particular activities undertaken by the inhabitants. Consequently, different parts of the site have different stories to tell.

Revealing Kakucs-Turján: non-invasive and geoarchaeological investigations

The investigations of the Kakucs-Turján settlement were initiated by a multi-disciplinary geo-archaeological prospection aimed at characterizing the archaeological record for targeted excavations (Niebieszczański et al., 2018). The geophysical survey revealed a settlement with a tripartite shape (zones A, B and C; Figure 2) that extended over 2.2 ha (Niebieszczański et al., 2019). Investigations of the magnetic images and analysis of material obtained from the coring transects revealed three types of anomalies. The first type were wall-like features that had a rectangular shape and a width of up to 1 m. These anomalies have only been identified in zone A and their arrangement suggests a development of houses around a central feature located in the main part of this zone (Niebieszczański et al., 2018). The second type were ditch-like structures with an elongated shape and a depth and width of ca. 4.5 m to 12 m, respectively. These structures were located both on the exterior of the settlement, surrounding it, as well as on the interior, dividing it into three parts (Niebieszczański et al., 2018). Finally, the third type most likely represented water reservoirs that constituted an element of the ditch, located in the northern section of the site (Niebieszczański et al., 2018). It is possible that the circular reservoirs served as a deliberate measure implemented to achieve hydrological depression, allowing the water from a nearby source to flow into the ditches (Pető et al., 2018). However, a comprehensive reconstruction of how the system worked and what functions it served requires further investigations.

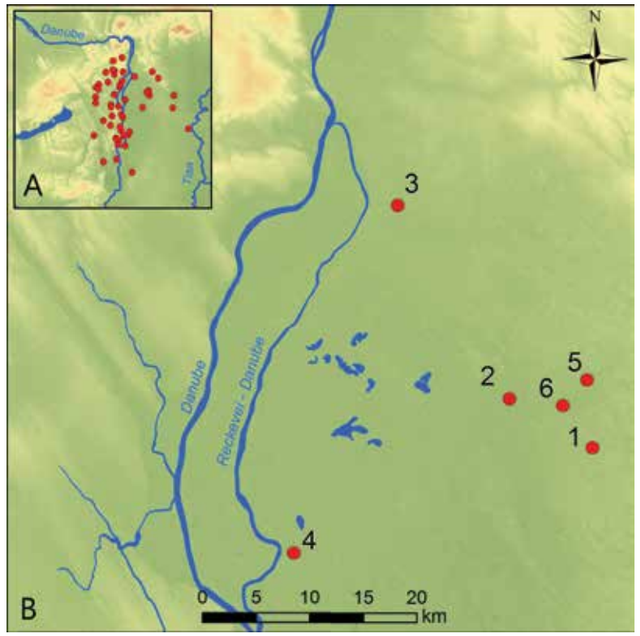


Figure 1. Vatya fortified and multi-layered settlements in Hungary (A) and in the Kakucs microregion (B): 1 – Dabas-Dabasi szőlők, 2 – Dabas-Sári/Bugyi, 3 – Soroksár-Várhegy, 4 – Dömsöd-Leányvár, 5 – Kakucs-Balla-domb, 6 – Kakucs-Turján.

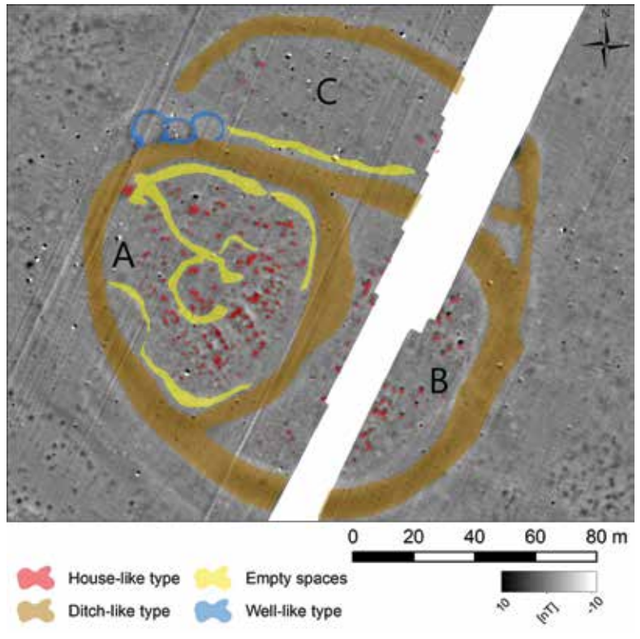


Figure 2. Interpretation of magnetic anomalies at Kakucs-Turján.

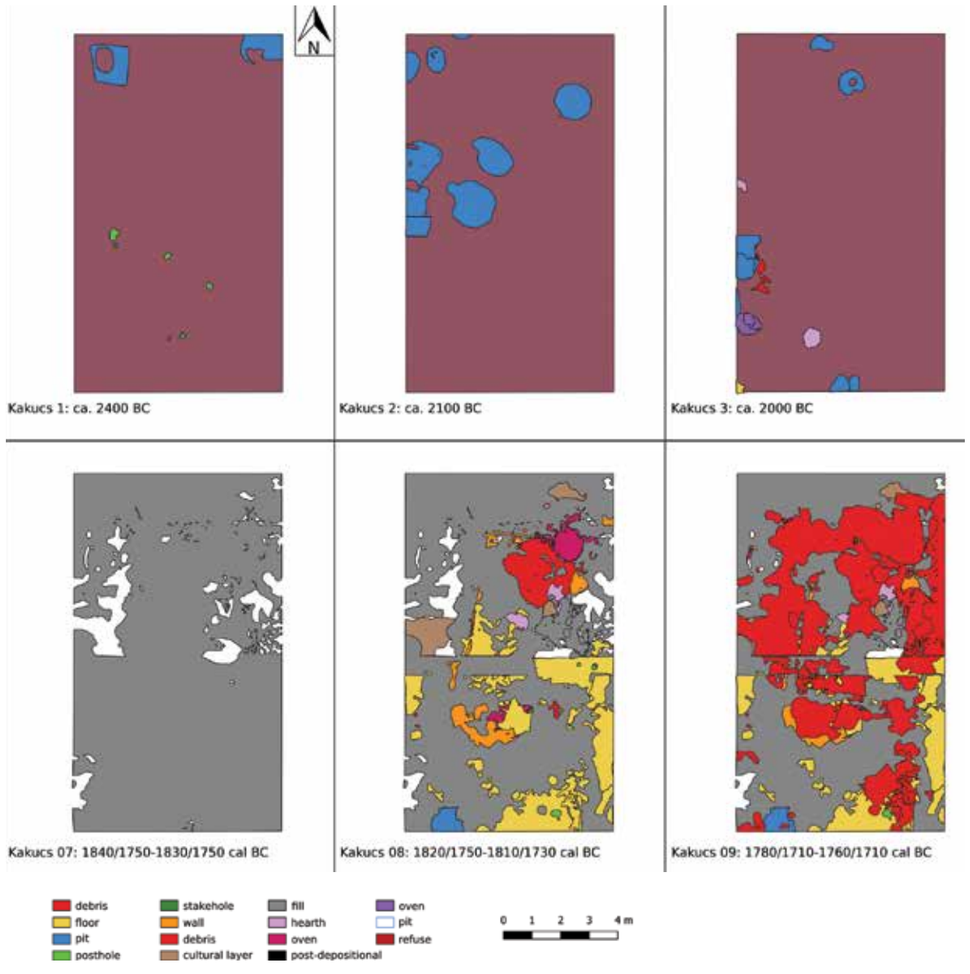


Figure 3. The occupational sequence and distinct habitation phases of Kakucs-Turján.

Excavation results and site history

The multi-layered settlement of Kakucs-Turján emerged as a result of continued, yet changing occupation. The current results indicate that zone A was characterized by the most intensive occupational sequence (Figure 3). While architectural structures were also documented in zone B, the intensity of household remains was significantly lower, suggesting a later re-use of the area for domestic purposes. The findings included house remains, storage pits, hearths, and a destroyed oven. Zone C was largely devoid of Bronze Age finds, which would support the initial interpretation of the area as primarily used for animal grazing.

The formation of the settlement was initiated by the aggregation of relatively mobile societies (Jaeger et al., 2018). This initial stage of habitation, conventionally positioned ca. 2400 BC, was significantly destroyed by the later stages of the settlement, and could only be associated with the remains of a post-based structure accompanied by pits re-purposed for waste disposal (Kakucs 1). The subsequent stage was characterized by intensive digging and the re-purposing of the existing voids by filling them with different quantities of household-related waste (Kakucs 2). The area previously used for waste disposal was re-purposed for production facilities, including a large firing installation; the only directly recognized relic of a household linked to this stage was a piece of a thick floor found in the corner of the trench (Kakucs 3).

Only after these first three stages of flat settlement did characteristic behaviors resulting in the formation of a multi-layered site arise– a relatively uniform fill was distinguished across the entire surface, pointing to the re-deposition of waste as a levelling substance (Kakucs 4). Immediately afterwards a household was established on the previously levelled ground,

corresponding to the outline documented in the earliest settlement stage (Kakucs 5). The house was rectangular and comprised of a thick, ca. 20 cm clay floor and wattle and daub walls. After ca. 30-50 years the house was abandoned and destroyed (Kakucs 6). The missing architectural components such as fragments of wall debris suggest that parts of the structure were removed from their initial position prior to levelling. This time a thick layer of sediment mixed with refuse (animal bones, bone tools, broken ceramics) was distributed across the entire excavated area (Kakucs 7). Like before, a household was established on top of this levelling horizon, similar in orientation to the previous household (Kakucs 8). Despite architectural similarities, it was characterized by a division into two rooms (NW- and SE-oriented). The northern room was accompanied by a large clay oven, which was part of the house wall. After ca. 30 years the house was abandoned and destroyed (Kakucs 9) and the entire area was levelled again with a sediment comprising primarily of refuse (animal bones, bone tools, broken ceramics; Kakucs 10). Another household was erected on top of the levelled surface, the majority of its architectural features were destroyed by modern ploughing, only deep storage pits and some working surfaces were documented (Kakucs 11). The subsequent occupation stage is only hinted at in the ploughing zone, although the density of material culture as well as the distribution of finds suggest that another levelling took place before the final house remains were destroyed in the modern period (ploughing zone).

From a chronological perspective, the settlement existed for ca. 800 years, 400 of which were characterized by a tell-like occupation form. The transition between a flat and tell-like settlement most likely occurred ca. 1950 BC, and is marked by an increasing intensity of occupation. The tell-like occupation form was definitely in existence between ca. 1900-1640 cal BC (Jaeger et al., 2018) (Figure 4), although the destruction of the archaeological record due to ploughing, a relatively common thread in the archaeology of tell settlements in the Carpathian Basin (Bátora et al., 2012), suggests that the settlement was still occupied during the 16th century BC. The chronology of the Kakucs-Turján site was based on the integration of stratigraphic data and radiocarbon dating for Bayesian modelling (Jaeger, Kulcsár, Taylor & Staniuk, 2018 Appendix 1).

Kakucs phases (see fig. 1)	Absolute duration (1 sigma)	Hungarian Bronze Age periods	Hungarian Bronze Age periods cal BC (Fischl et al. 2015)
Kakucs 1	NA	EBA1-2	2600-2200/2100
Kakucs 2	NA	EBA3	2200/2100-2000/1900
Kakucs 3	NA	EBA3/MBA1	2000/1900
Kakucs 4	NA	MBA1	2000/1900-1500/1450
Kakucs 5	NA		
Kakucs 6	1871/1778-1866/1769 BC		
Kakucs 7	1865/1762-1865-1751	MBA2	
Kakucs 8	1863/1746-1862/1742 BC		
Kakucs 9	1861/1736-1862/1728 BC		
Kakucs 10	1860/1696-1859/1692 BC	MBA3	
Kakucs 11	1860/1680-1859/1660 BC		
Kakucs 12	NA	Iron Age - Sarmatian period	NA

Figure 4. Chronology of settlement phases and occupation of Kakucs-Turján.

Ceramic analysis

The analysis of ceramics was aimed at establishing the chronological trends of material culture change – specifically in vessel forms, decorations, and technology – as means of investigating the relationship between architectural sequences and the material culture used. The overall aim was to determine whether the documented sequence was characterized by major qualitative changes, as is often proposed for the EBA and MBA communities in the Carpathian Basin, where increasing hierarchization and specialization, or rise of political structures is to be expected (Earle & Kristiansen, 2010).

The collection of ceramic finds was carried out in relation to the stratigraphic units excavated between 2013 and 2016. A total of 29771 individual sherds from all settlement phases were analyzed, representing approx. 50% of the entire ceramic assemblage. These finds were grouped into three distinct categories: mass finds (n=24165), selected finds (n=3098), and matching sherds (n=2508). The first category comprised of heavily fragmented material without distinguishable form traits; the second comprised of fragments with discernible typological information; the third is a mixed category of fragments which could be matched and used[1] to reconstruct complete vessels. In this final case the number of individual sherds was reduced to a single number representing a reconstructed unit. Overall, the distribution of samples shows that phases 2, 7, 10, and the ploughing zone were characterized by the largest amount of deposited material culture (Figure 5).

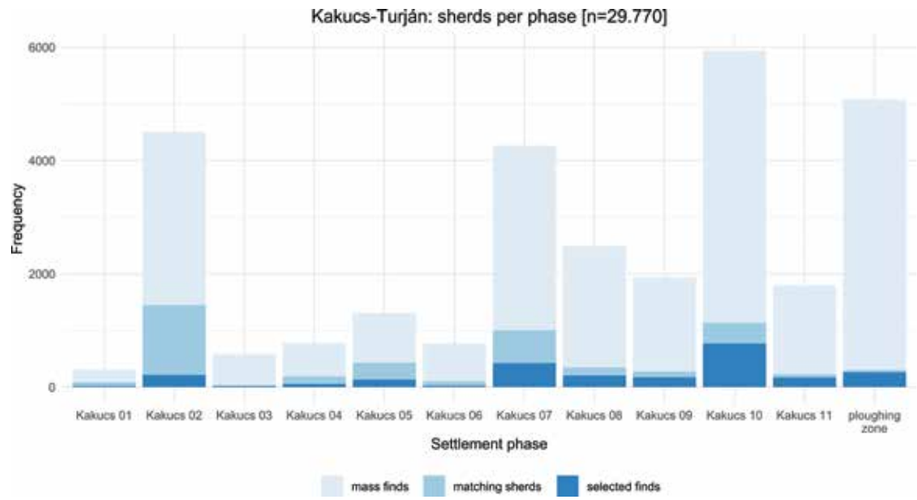


Figure 5. Phase-based distribution of ceramic sherds.

[1] The results of the ceramic analysis of Kakucs-Turján given below were presented in detail in Staniuk, 2020.

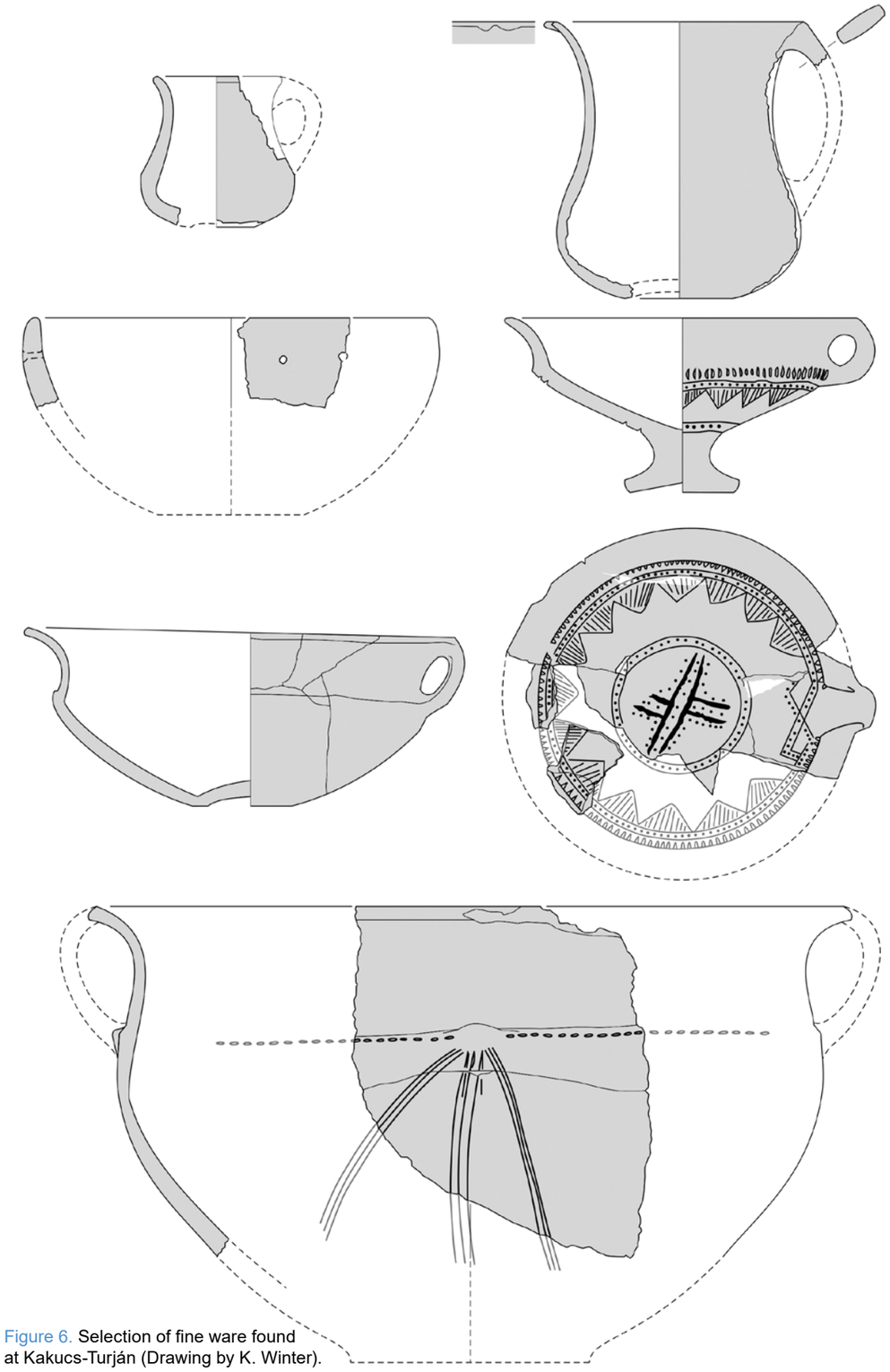


Figure 6. Selection of fine ware found at Kakucs-Turján (Drawing by K. Winter).

Small-scale differences in vessel appearance were investigated using a hierarchical classification system, based on the analysis of metric variables supplemented with increasingly detailed consideration of visual components. The system was based on the definition of functional categories, which could be further characterized in terms of the overall shapes, followed by the description of individual parts. The functional categories comprised of cups, jugs, bowls, wide bowls, pedestalled bowls, vases, pots, and jars (Figure 6). The investigation has shown that while these categories underwent visual changes related to appearance of specific form variations over the course of settlement's history, the differences between non-tell and tell phases of the settlement were related to the disappearance of a single functional type (Figure 7). Instead, the analysis indicated only restricted attempts at modifying the existing functional categories, pointing to the maintenance of a set of practices involving pottery. The distribution of different categories throughout the settlement history was generally similar, which suggests that the main difference between the investigated household and waste disposal phases was the quantity of discarded materials, most likely resulting from the deposition of refuse from numerous adjacent structures.

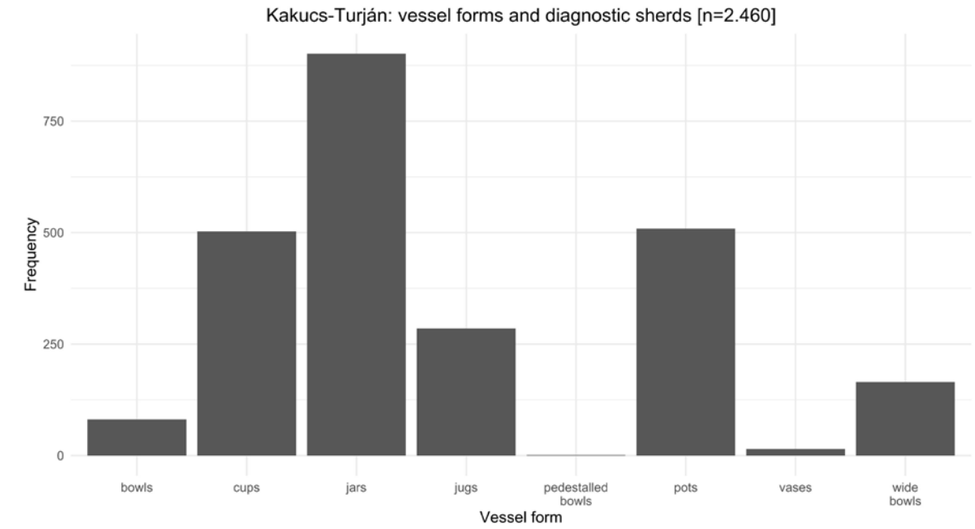
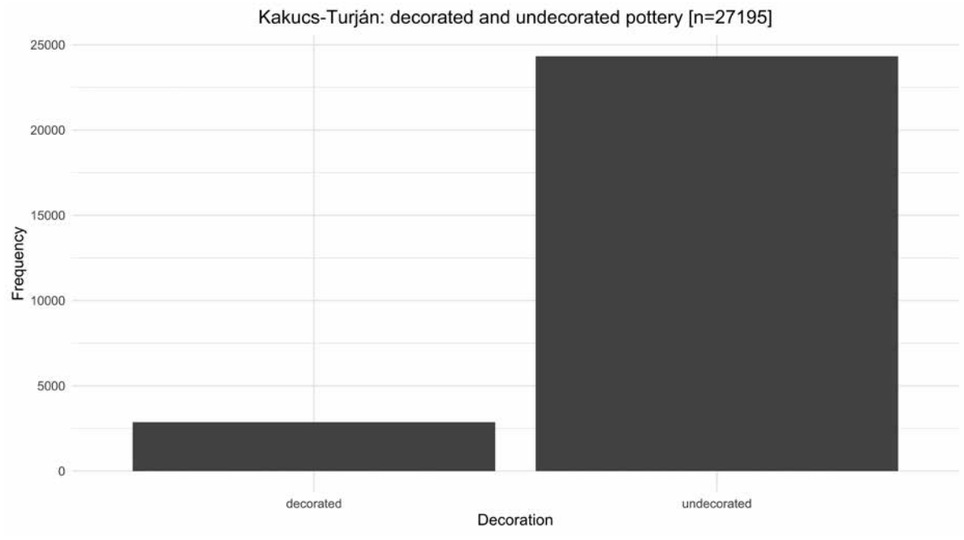


Figure 7. Distribution of vessel forms.

The analysis of pottery decoration was directed towards determining whether the persistence of vessel forms was matched by a similar consistency regarding how their appearance was manipulated. The decorated sherds were documented using a hierarchical classification system in order to recognize the highest resolution of the decoration manufacturing (techniques), to complex combinations involving the positioning of decorations on specific surfaces (systems). The analysis indicated the presence of long- and short-term trajectories in use of decorations which, despite the variability of decorative motifs, did not indicate any major stylistic changes during the history of the settlement (Figure 8). This continuity is most discernible when comparing the presence of decorated and undecorated sherds in each phase, the latter of which represented approx. 90% of the entire ceramic material.



I Figure 8. Decorated and undecorated pottery.

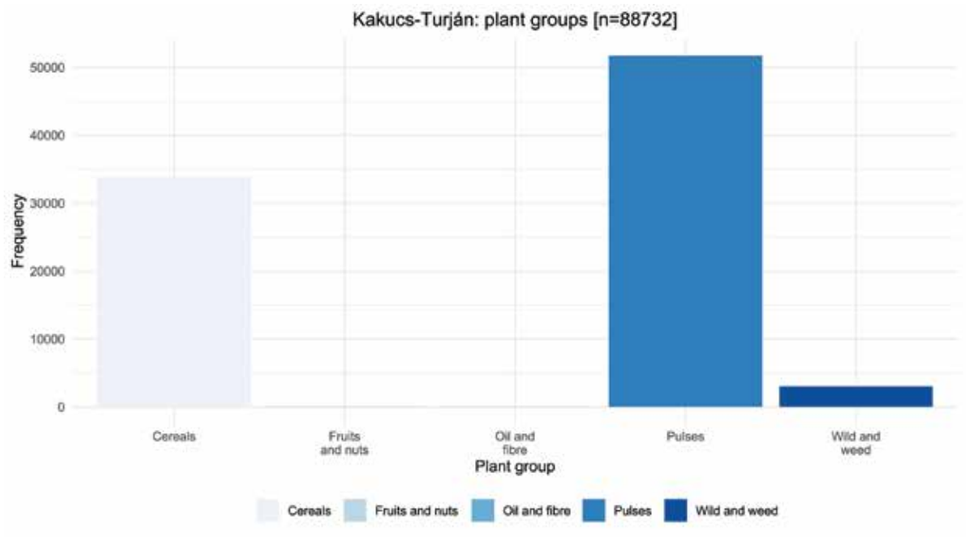
The technological analysis followed the *chaîne operatoire* approach, where the analysis of the subsequent stages involved in vessel production are used as analytical threads to recognize potential changes in how communities produce their pottery (Gosselain, 2018; Rye, 1981). The findings indicated that the changes in settlement's history were generally accompanied by a continuity in technological process relying on tempering pottery with grog, and eventually grog and sand. The firing technique was predominantly bonfire firing and other technological parameters were stable throughout the entire history. Only small-scale changes were visible, such as the appearance of non-tempered ceramics in the final stages of the settlement, a process which required extraction of high-quality clays or development of a rigorous system of clay preparation.

The findings of the ceramic analysis contrast with the proposed top-down models of social development as a result of the emergence of bronze technology (Staniuk et al., 2020). Instead of recognizing increasing hierarchization tied to powerful individuals (Earle & Kristiansen, 2010), the majority of settlement activities are directly tied to households, anthropological units of people involved in shared living, which were effectively responsible for the over-arching similarity of material culture manipulation (Kienlin, 2015). The unavailability of other comprehensively analyzed ceramic datasets raises questions as to whether this phenomenon represents a trajectory unique for the settlement of Kakucs-Turján or is representative of the general trends in the Early and Middle Bronze Age Middle Danube Valley. However, for the time-being, it is considered as a first step towards recognizing the diverse forms of social complexity involved in community life in the Bronze Age Carpathian Basin.

Paleobotanical analysis

The macrobotanical assemblages of seeds and fruits from Kakucs-Turján were systematically collected during excavations of trenches 1-3 in zone A, between 2013 and 2016[2]. 395 amalgamated samples (originally 458 samples) containing 89,614 remains of seeds and fruits were studied from 26 types of archaeological features. Samples were available from all habitation phases, albeit in unequal amounts; for example, habitation phases 1 and 2 were represented by six and seven samples, respectively, while phase 10 was represented by 152 samples. The objectives of the macrobotanical study were (i) to identify the processes that had contributed to the formation and deposition of the assemblages from each habitation phase and (ii) to interpret the remains (diachronically) with respect to the plant economy of the inhabitants.

Using univariate and multivariate statistical analyses, a variety of plant-related activities were distinguished, including daily-routine activities such as crop processing, food preparation, and waste disposal, and rare activities such as storage destruction. The contribution of these activities to the formation of the assemblages of each habitation phase varied depending on the use of the area from which they were collected, which mainly consisted of either occupation of domestic structures or waste disposal. Furthermore, analysis of the spatial distribution of the assemblages revealed that processes of post-depositional disturbance, such as levelling and the digging of pits and postholes, most likely contributed to redeposition and mixing of macrobotanical remains from several habitation phases.



I Figure 9. Distribution of plant groups identified in the samples from Kakucs-Turján.

[2] The results of the macrobotanical analysis of Kakucs-Turján presented here are a concise summary. Complete descriptions of the analysis can be consulted in Filatova, 2020.

Figure 10. Seeds of lentil (*Lens culinaris*) from the fourth habitation phase from Kakucs-Turján.

Domesticated plants were dominant in the macrobotanical dataset of Kakucs-Turján and the remains of wild plants, weeds, fruits, and nuts were only rarely encountered (Figure 9). Finds of pulses were the most numerous, followed by cereals and oil and fibre crops. Lentil (*Lens culinaris*; Figure 10) and einkorn (*Triticum monococcum* ssp. *monococcum*; Figure 11) were identified as the main staple crops throughout the entire habitation of the settlement and were supplemented by four cereal and five pulse species, respectively, including barley (*Hordeum vulgare*), pea (*Pisum sativum*), and emmer (*Triticum turgidum* ssp. *dicoccon*; Table 1). An elaborate diachronic comparison of the crop spectra was hampered by the unequal amount of samples and remains per habitation phase. Despite potential bias, it is suggested that a diversification of the crops cultivated by the inhabitants of the settlement took place during the Middle Bronze Age, as an especially broad variety of pulses has been identified.

Taxon	Plant part	Absolute quantity	Number of samples	Common name
Lens culinaris	Seed	43455	352	Lentil
Triticum monococcum ssp. *monococcum*	Grain	17249	307	Einkorn
Pisum sativum	Seed	7433	186	Pea
Triticum monococcum ssp. *monococcum*	Glume base	4536	85	Einkorn
Hordeum vulgare (undiff)	Grain	2462	239	Barley
Hordeum vulgare (h)	floret	2142	106	Hulled barley
Triticum turgidum ssp. *dicoccon*	Grain	794	136	Emmer
Vicia ervilia	Seed	421	77	Bitter Vetch
Vicia faba	Seed	115	12	Broad bean
Triticum monococcum/dicoccon	Glume base	91	13	Einkorn/emmer
Lathyrus sativus	Seed	49	21	Grass pea
Triticum turgidum ssp. *dicoccon*	Glume base	36	14	Emmer
Triticum monococcum/dicoccon	Grain	28	18	Einkorn/emmer
Hordeum vulgare (n)	Grain	25	14	Naked barley
Linum usitatissimum	Seed	22	6	Flax/linseed
Triticum aestivum/durum	Grain	21	14	Free-threshing wheat
Hordeum vulgare	Rachis fragment	10	2	Barley
Vicia sativa	Seed	6	2	Common vetch
Triticum aestivum ssp. *spelta*	Glume base	3	3	Spelt
Triticum turgidum ssp. *durum*	Rachis fragment	1	1	Hard wheat
Panicum miliaceum	Grain	1	1	Broomcord millet
Cerealia indet	Grain	6416	252	Indeterminate cereals
Leguminosae sativae indet	Seed	228	57	Indeterminate pulses

Table 1. Overview of the crop taxa identified in the samples from Kakucs-Turján expressed as absolute numbers of finds and as the total number of samples in which the taxa have occurred.

The cultivation of a diversity of pulses and cereals might have been part of an agricultural risk-management strategy, wherein mixtures or maslins of crops were cultivated in order to ensure sufficient yields even if one specific crop failed to produce harvest (Martson, 2011). Currently, the analysis of the material suggests that it is likely that the inhabitants of Kakucs-Turján practiced intensive mixed farming, whereby crops were stored as (semi-)clean harvests by individual households.

The unique character of the macrobotanical dataset of Kakucs-Turján is especially apparent from the vast assemblage of pulses, which far outnumber finds of cereals in the dataset. No other assemblages from settlements of the Middle Bronze Age in the Carpathian Basin have been reported with a higher amount of pulses than cereals, and this observation is rare for charred macrobotanical datasets in general (Sarpaki, 1992). In light of the current evidence, the explanation for the striking presence of pulses remains speculative; a multitude of advantages are associated with cultivating pulses, including fixation of nitrogen in the soil, flexible growing conditions, and, although subjectively, their palatability (Butler, Tesfay, D'Andrea & Lyons, 1999; Enneking, Lahlou, Noutfia & Bounejmate, 1995; Palmer, 1998). It is furthermore possible that the prevalence of pulses resulted from exchange with Balkan and/or Aegean communities, where similar diversities of pulses are observed for the Bronze Age (Kroll & Reed, 2016; Marinova & Valamoti, 2014; Stika & Heiss, 2013). Regardless of the

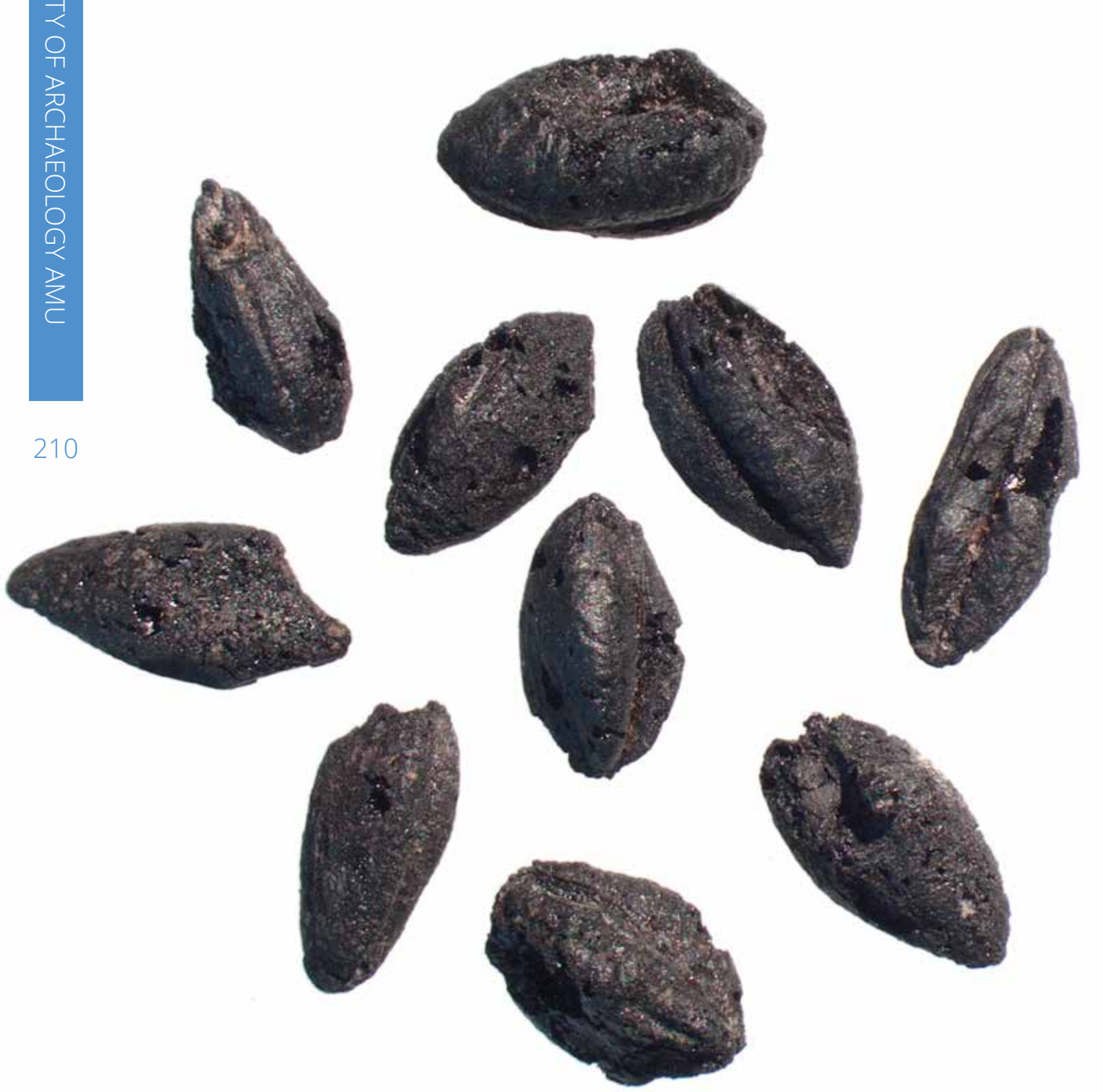


Figure 11. Grains of einkorn (*Triticum monococcum* ssp. *monococcum*) from the third habitation phase of Kakucs-Turján.

explanation, it is clear that the preference for growing pulses distinguished Kakucs-Turján from other (Vatya) communities in the region and it is likely that this practice formed part of the identity of the inhabitants. The prevalence of pulses at Kakucs-Turján further illustrates that agricultural practices of Vatya communities did not follow a uniform pattern and that more research is needed in order to unravel the diversity of Bronze Age foodways in Hungary.

Archaeolozoological analysis

The archaeozoological analysis targeted only remains found in the Middle Bronze Age pits. A total of 30.15 kg animal bones coming from those features were identified (N=3520, NISP=3625) (Biller, 2018). As expected, the proportion of domestic species exceeds that of the wild animals in the given assemblage. Among the domestic species small ruminants (sheep, goat) were the most common, followed by cattle, swine, domestic horse, and dog. Horses were underrepresented in Kakucs-Turján, as generally is the case in MBA assemblages from sites in modern Hungary. Each body region of all the main species (cattle, small ruminants, pigs) was found, which may indicate local processing on-site. In the case of cattle and small ruminants, the importance of secondary utilization (such as draught power, milk, and wool) also seems to have been relevant in addition to primary exploitation for meat.

In the group of wild species, the presence of hare and fox could suggest interest in the utilization of fur. Fishing likely played only a secondary role in food provisioning because of the distance of major bodies of water from the settlement. This assumption seems to be indirectly supported by the relatively higher presence of small mammalian bones than fish bones in the hand-collected assemblage. Tiny remains of small mammals and fish bones have similar taphonomic properties. Therefore, the almost complete lack of fish bones and remains of other aquatic species may indicate their small significance in the local MBA diet.

The basic information concerning animal remains we currently have at our disposal cannot help reconstructions of the natural environment in detail. Nevertheless, the high number of small ruminants' bones that prefer dry-grass pasture and the presence of hare (together with the aforementioned poor representation of aquatic species) point to a relatively dry grassland habitat in the settlement's environment. However, the keeping of cattle requires much more water and richer, long grass pastures in floodplains or lush hillsides. Pigs are more likely to be associated with oak forests and frequently inundated areas (Bartosiewicz, 2006). The presence of remains from large game species suggest forested areas in the proximity of the settlement, but their small numbers indicate a low intensity of hunting.

Kakucs-Turján and the outer world

Archaeological research has produced a series of finds that point to the development of a close relationship of the local MBA community with the outside world.

The central Danube basin is deprived of the natural resources necessary for the development of metallurgy. Nevertheless, both gold and bronze items were discovered within

the remains of MBA buildings. Although they do not constitute proof of local production, they indicate the organizational capacity of the inhabitants who obtained non-local resources (copper, tin, gold, bronze) and used metal objects. In 2013, a gold item (*Lockenring*) was discovered in the western section of trench no. 1, in the layer which constitutes the general "fill" of the trench, near layer KEX13-15: 60034 (part of debris of younger Vatya house; Kakucs 9) (Figure 12). Bronze (or, possibly, copper) finds make up a set of 9 artefacts: namely small, damaged ornaments (3 specimens of unidentified pin types); small tools (awl and chisels); and fragments of damaged objects whose function cannot be established. Most were discovered in layers associated with MBA houses.

Connections of local communities with closer and more distant regions of Europe are also reflected in the ceramics. Next to pottery forms and ornamentation that are typical of the local Vatya style, a fair number of imports were identified (Figure 13). Among those, Encrusted Pottery and Kisapostag vessels are the most numerous group. In addition, some of the discovered vessels can be associated with Hatvan, Füzesabony, and Gyulavarsánd styles,

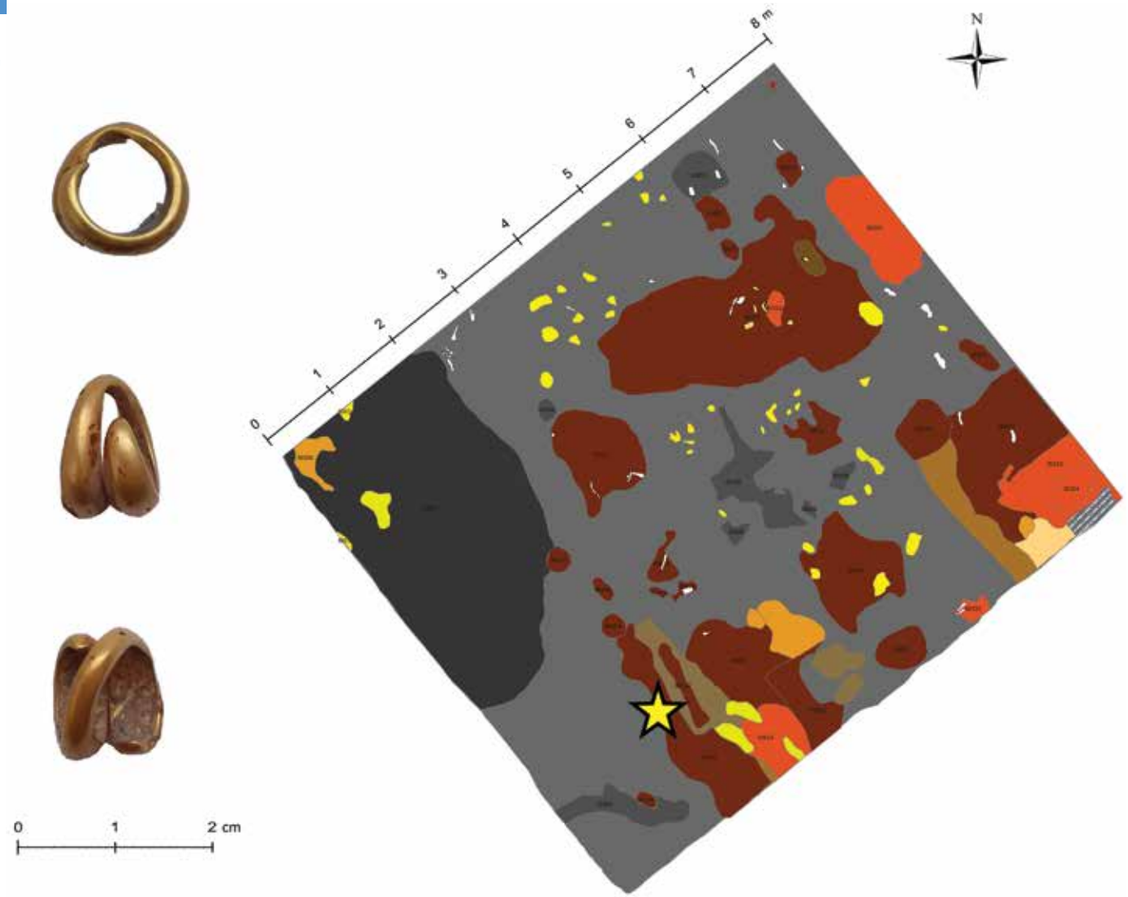


Figure 12. Gold lock-ring from Kakucs-Turján and its location in trench no 1 (marked with yellow star), in layers of the Middle Bronze Age house remains.

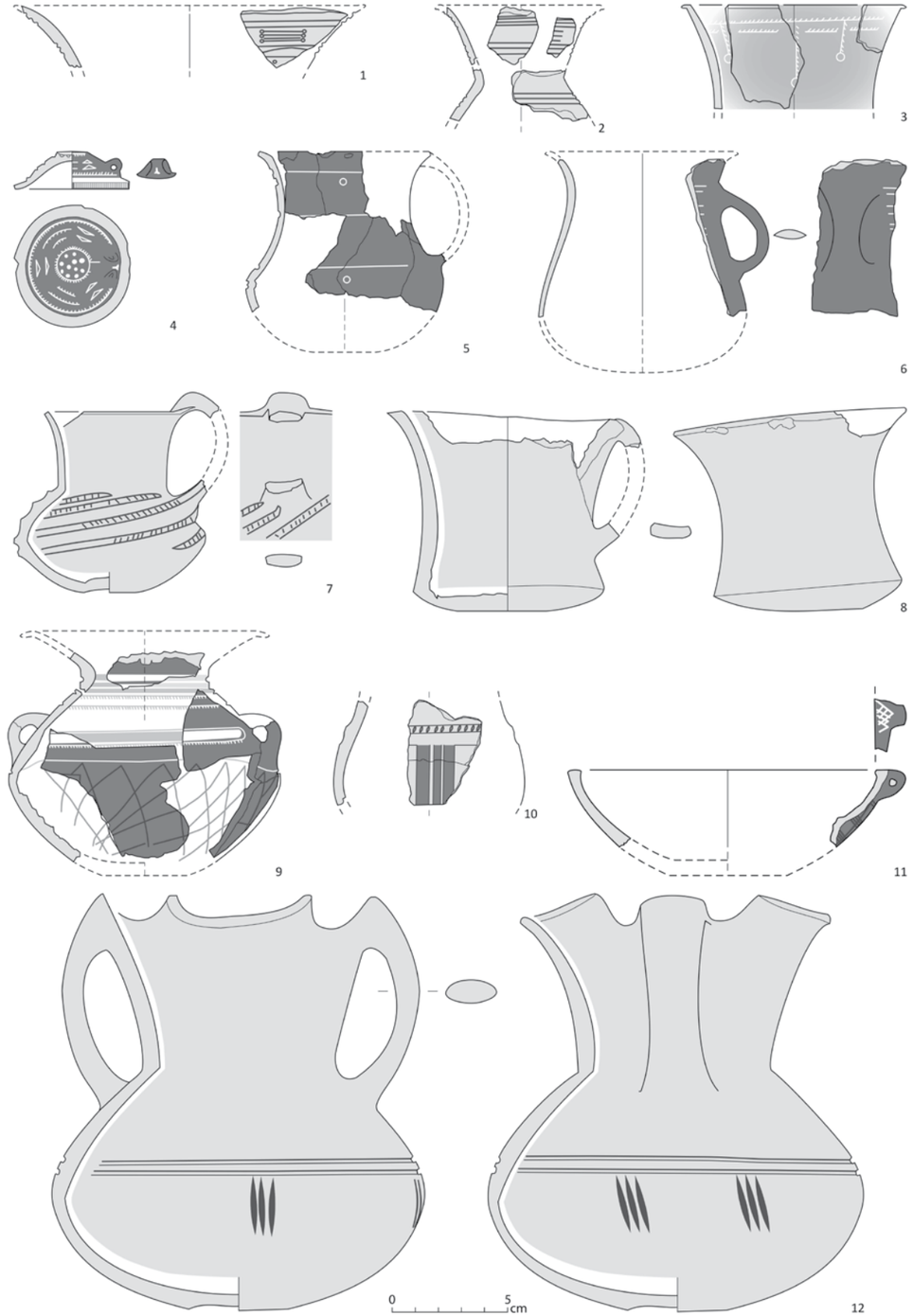


Figure 13. Selection of stylistically non-local ceramics found in zone A of Kakucs-Turján

suggesting a north-eastern direction of interaction, and one vessel displayed traits of the Maros culture, whose principal area of distribution is south of the central Danube basin. Imports aside, there are also artefacts which draw particular attention as local imitations of vessels bearing “foreign” stylistic traits. At present, once could list several pieces attesting to local attempts at emulating non-indigenous styles, for instance imitating the typical Gyulavarsánd ornamentation. Still, the most conspicuous example of such a practice is a vessel imitating a Maďarovce cup (which in turn drew on the classical cup of the Únětice culture) (Figure 13). The imitation cup at Kakucs-Turján was made using a technique resembling local production methods. Most of the vessels described above were found in a single household. This suggests that its inhabitants not only adhered to the local tradition but also had knowledge of, used, and even imitated vessels originating from other cultural-geographic regions.

Very significant finds extending the network of interregional connections of Kakucs-Turján’s inhabitants are fragments of amber beads discovered in the remains of the younger Vatya house. In total, the site yielded five small amber fragments. Two were found in situ. The other three fragments were identified in a laboratory while studying, under a microscope, material gathered by floating soil samples. Based on the stratigraphy and absolute chronology of the context of the discovery of individual fragments, the presence of amber should be associated with the period around 1800-1650 BC. In the light of the performed spectral analysis (FTIR method), all discovered finds are Baltic amber (Jaeger et al., 2020) (Figure 14).

Summary and research perspective

Previous studies of the Kakucs-Turján site have provided basic information on the economic and spatial development of the settlement. The next stages of the research will focus on a more complete recognition of the absolute chronology of the settlement, the individual elements of the fortifications and the relationship between neighboring fortified settlements in the region. Their proximity suggests the existence of a complex political-economic system. In order to fully reconstruct its parameters, it is necessary to obtain detailed information on the chronology of their formation, development, and the history of surrounding them with fortifications. Research focused on these goals will be continued by the existing Polish-Hungarian-German team in the coming years.

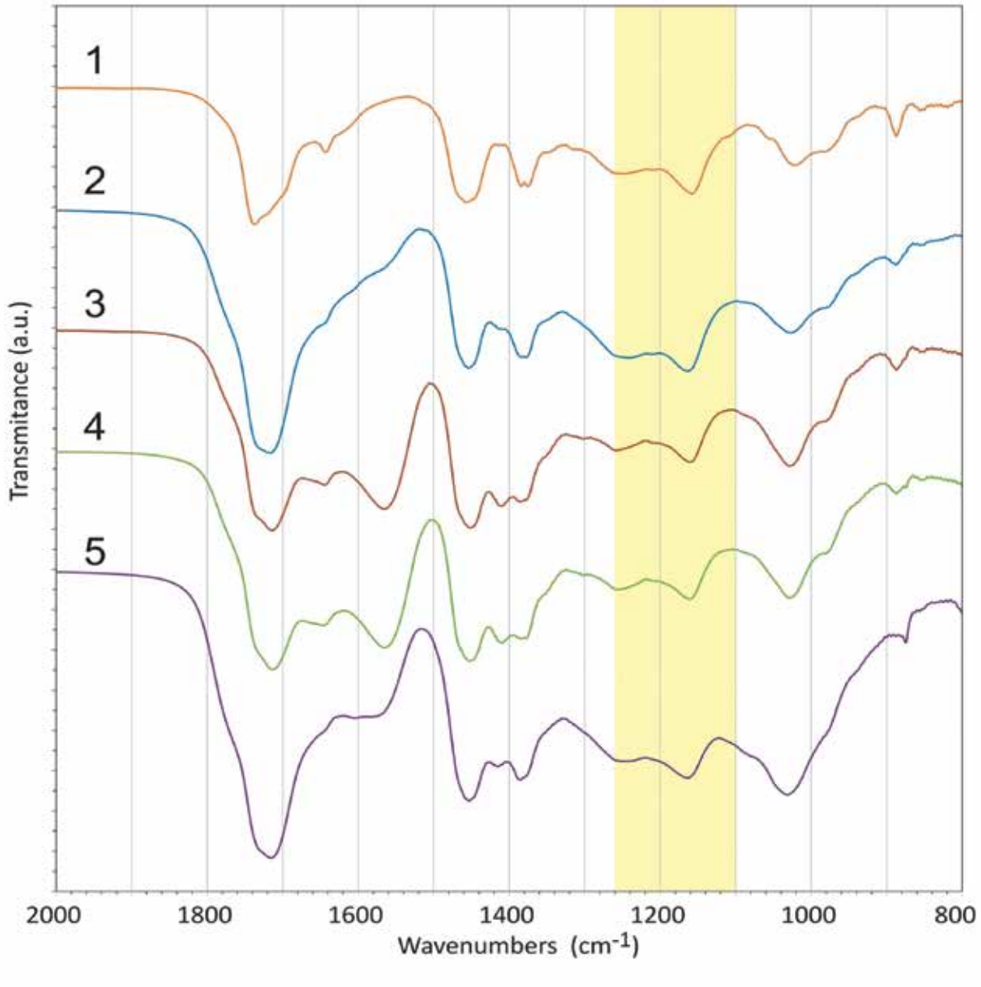


Figure 14. Fragments of amber beads from Kakucs-Turján and FTIR analysis results of all discovered amber finds: 1 – reference sample of succinite; 2 – finds of two lumps in situ; 3 – lump from soil sample 125; 4 – lump from soil sample 102; 5 – lump from soil sample 122.

References

Bartosiewicz, L. (2006). *Régenvolt háziállatok. Bevezetés a régészeti állattanba*. Budapest: L'Harmattan.

Bátora, J., Behrens, A., Gresky, J., Ivanova, M., Rassmann, K., Tóth, P., & Winkelmann, K. (2012). The Rise and Decline of the Early Bronze Age Settlement Fidvár near Vráble, Slovakia. In J. Kneisel, W. Kirleis, M. Dal Corso, N. Taylor, & V. Tiedtke (Eds.), *Collapse or Continuity? Environment and Development of Bronze Age Human Landscapes* (pp. 111-130). Bonn: Dr. Rudolf Habelt GmbH.

Biller, A. Z. (2018). Archaeological results of the pits from Kakucs-Turján. In M. Jaeger, G. Kulcsár, N. Taylor, & R. Staniuk (Eds.), *Kakucs-Turján a Middle Bronze Age multi-layered fortified settlement in Central Hungary* (pp. 159-173). Bonn: Dr. Rudolf Habelt GmbH.

Butler, A., Tesfay, Z., D'Andrea, C., & Lyons, D. (1999). The Ethnobotany of Lathyrus Sativus L. in the Highlands of Ethiopia. In M. van der Veen (Ed.), *The Exploitation of Plant Resources in Ancient Africa* (pp. 123-136). Boston, MA: Springer US. DOI: 10.1007/978-1-4757-6730-8_11.

Earle, T., & Kristiansen, K. (2010). Organizing Bronze Age Societies: The Mediterranean, Central Europe and Scandinavia Compared. In *Organizing Bronze Age Societies: The Mediterranean, Central Europe, and Scandinavia Compared*. New York: Cambridge University Press. DOI: 10.1017/CBO9780511779282.

Enneking, D., Lahlou, A., Noutfia, A., & Bounejmate, M. (1995). A note on Vicia ervilia cultivation utilisation and toxicity in Morocco. *Al Awamia, 89*, 141-148.

Filatova, S. (2020). *Kakucs-Turján-A case study of macrobotanical formation processes and plant economy from the Hungarian Bronze Age*. Bonn: Dr. Rudolf Habelt GmbH.

Gosselain, O. P. (2018). Pottery chaînes opératoires as Historical Documents. In T. Spear (Ed.), *Oxford Research Encyclopedia of African History*. Oxford: Oxford University Press. DOI: 10.1093/acrefore/9780190277734.013.208.

Jaeger, M. (2016). *Bronze Age Fortified Settlements in Central Europe*. Bonn-Poznań: Wydawnictwo Nauka i Innowacje In Kommission bei Dr Rudolf Habelt GmbH.

Jaeger, M., Czebreszuk, J., Piszora, P., & Kulcsár, G. (2020). Small Links in a Long Chain. Amber Finds at a Vatya Culture Fortified Settlement, Kakucs-Turján (Central Hungary). In J. Maran, R. Băjenaru, S.-C. Ailincăi, A.-D. Popescu, & S. Hansen (Eds.), *Objects, Ideas and Travelers. Contacts between the Balkans, the Aegean and Western Anatolia during the Bronze and Early Iron Age. Volume to the memory of Alexandru Vulpe. Proceedings of the Conference in Tulcea*, 10-13 November, 2017 (pp. 43-52). Bonn: Dr. Rudolf Habelt GmbH.

Jaeger, M., Kirleis, W., Kiss, V., Kulcsár, G., Müller, J., Staniuk, R., & Taylor, N. (2018). Kakucs Archaeological Expedition. In M. Jaeger, G. Kulcsár, N. Taylor, & R. Staniuk (Eds.), *Kakucs-Turján a Middle Bronze Age multi-layered fortified settlement in Central Hungary* (pp. 13-21). Bonn: Dr. Rudolf Habelt GmbH.

Jaeger, M., Kulcsár, G., Taylor, N., & Staniuk, R. (2018), (Eds.), *Kakucs-Turján a Middle Bronze Age multi-layered fortified settlement in Central Hungary.* Bonn: Dr. Rudolf Habelt GmbH.

Jaeger, M., Staniuk, R., Müller, J., Kulcsár, G., & Taylor, N. (2018). History of Bronze Age Habitation. In M. Jaeger, G. Kulcsár, N. Taylor, & R. Staniuk (Eds.), *Kakucs-Turján: A Middle Bronze Age multi-layered fortified settlement in Central Hungary* (pp. 97-118). Bonn: Dr. Rudolf Habelt GmbH.

Kienlin, T. L. (2015). *Bronze Age Tell Communities in Context. An Exploration into Culture, Society, and the Study of European Prehistory-Part 1*. Oxford: Archaeopress Archaeology.

Kroll, H., & Reed, K. (2016). *Die Archäobotanik: Feudvar III*. Würzburg: Würzburg University Press.

Marinova, E., & Valamoti, S.-M. (2014). Crop Diversity and Choice in Prehistoric Southeastern Europe: Cultural and Environmental Factors Shaping the Archaeobotanical Record of Northern Greece and Bulgaria. In A. Chevalier, E. Marinova, & L. Peña-Chocarro (Eds.), *Plants and People. Choices and Diversity through time* (pp. 64-74). Oxford & Philadelphia: Oxbow Books.

Martson, J. M. (2011). Archaeological markers of agricultural risk management. *Journal of Anthropological Archaeology, 30* (2), 190-205.

Niebieszczański, J., Jaeger, M., Pető, Á., Hildebrandt-Radke, I., Kulcsár, G., Staniuk, R., … Czebreszuk, J. (2019). Revealing the internal organization of a Middle Bronze Age fortified settlement in Kakucs-Turján through geoarchaeological means: Magnetometric survey and sedimentological verification of a housing structure. *Journal of Archaeological Science: Reports, 25* (February), 409-419. DOI: 10.1016/j.jasrep.2019.04.014.

Niebieszczański, J., Pető, Á., Serlegi, G., Hildebrandt-Radke, I., Galas, J., Sipos, G., … Márkus, G. (2018). Geoarchaeological and non-invasive investigations of the site and its surroundings. In M. Jaeger, G. Kulcsár, N. Taylor, & R. Staniuk (Eds.), *Kakucs-Turján a Middle Bronze Age multi-layered fortified settlement in Central Hungary* (pp. 43-71). Bonn: Dr. Rudolf Habelt GmbH.

Palmer, C. (1998). An Exploration of the Effects of Crop Rotation Regime on Modem Weed Floras. *Environmental Archaeology, 2* (1), 35-48. DOI: 10.1179/env.1997.2.1.35.

Pető, Á., Serlegi, G., Niebieszczański, J., Molnár, M., Jaeger, M., Kulcsár, G., & Taylor, N. (2018). Report on the geoarchaeological survey of Kakucs-Turján site. In M. Jaeger, G. Kulcsár, N. Taylor, & R. Staniuk (Eds.), *Kakucs-Turján a Middle Bronze Age multi-layered fortified settlement in Central Hungary* (pp. 25-40). Bonn: Dr. Rudolf Habelt GmbH.

Rye, O. S. (1981). *Pottery Technology. Principles and Reconstruction*. Washington: Taraxacum.

Sarpaki, A. (1992). The Palaeoethnobotanical Approach. The Mediterranean Triad or Is It a Quartet? In B. Wells (Ed.), *Agriculture in Ancient Greece. Proceedings of the Seventh International Symposium at the Swedish Institute at Athens, 16-17 May, 1990*. (pp. 61–76). Stockholm: Svenska Institutet i Athen.

Staniuk, R. (2020). *Tradition and Practice. Study on Pottery, Chronology and Social Dynamic of the Hungarian Bronze Age*. Bonn: Dr. Rudolf Habelt GmbH.

Staniuk, R., Jaeger, M., Kulcsár, G., Taylor, N., Niebieszczański, J., & Müller, J. (2020). Moving Bottom-up: The Case Study of Kakucs-Turján (Hungary) and Its Implications for Studies of Multi-layered Bronze Age Settlements in the Carpathian Basin. In A. Blanco-González, & T. L. Kienlin (Eds.), *Current Approaches to Tells in the Prehistoric Old World* (pp. 57-72). Oxford and Oakville: Oxbow Books.

Stika, H.-P., & Heiss, A. (2013). Seeds from the Fire. Charred Plant Remains from Kristian Kristiansen´s excavations in Sweden, Denmark, Hungary and Sicily. In S. Bergerbrant, & S. Sabatini (Eds.), *Counterpoint: Essays in Archaeology and Heritage Studies in Honour of Professor Kristian Kristiansen* (BAR International Series 2508) (pp. 77-86). Oxford: Archaeopress. DOI: 10.13140/2.1.2214.4004.

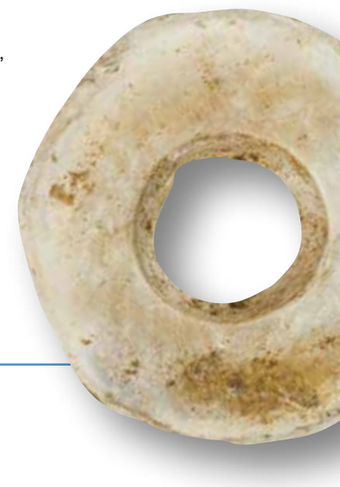
Authors:

Corresponding author: Mateusz Jaeger, Institute of European Culture, Adam Mickiewicz University, Kostrzewskiego 5, 62-200 Gniezno, Poland.
ORCID: 0000-0002-9475-4051, e-mail: jaeger@amu.edu.pl

Robert Staniuk, Institut für Ur- und Frühgeschichte, Christian-Albrechts University in Kiel, Johanna-Mestorf-Straße 2-4, 24118 Kiel, Germany.
ORCID: 0000-0002-9941-1875, e-mail: rstaniuk@gshdl.uni-kiel.de

Sofia Filatova, Institut für Ur- und Frühgeschichte, Christian-Albrechts University in Kiel, Johanna-Mestorf-Straße 2-4, 24118 Kiel, Germany.
ORCID: 0000-0003-2291-3102, e-mail: s.filatova@ufg.uni-kiel.de

Gabriella Kulcsár, ELKH Bölcsészettudományi Kutatóközpont Régészeti Intézet
Institute of Archaeology Research Centre for the Humanities ELRN,
Tóth Kálmán 4, H-1097 Budapest, Hungary.
ORCID: 0000-0002-3295-1156, e-mail: Kulcsar.Gabriella@abtk.hu



FACULTY OF ARCHAEOLOGY AMU

27. Archaeology under a microscope: research at ArchaeoMicroLab of the Faculty of Archaeology Adam Mickiewicz University in Poznań

26. Are we where we wanted to be? Modernist tendencies versus the postmodern reality Some remarks on the methodology of archaeologists at Adam Mickiewicz University in Poznań

25. Rock art as a source of contemporary cultural identity: a Siberian-Canadian Comparative Study

24. Polish archaeological research in the Iberian Peninsula

23. Archaeological research of the Gothic Church of the Blessed Virgin Mary on the island of Ostrów Tumski, Poznań

22. Research on Kolegiacki Square in Poznań (St. Mary Magdalene Parish Collegiate Church)

21. Poznań in the early Middle Ages

20. The stronghold in Grzybowo and its settlement base in the context of in-depth interdisciplinary research

19. Barrows in the Skirts of the Forest. Excavation of a Wielbark culture cemetery at Mirosław 37, Ujście commune, Piła district, Greater Poland Voivodeship

18. Some Remarks on the Problems of Art Research in Archaeology using the Example of Greek and Roman Sculpture

17. About the 'interim' or discovering the depths of the pre-Roman Iron Age

16. Migration and kinship in East-Central Europe in the 1st half of the 2nd millennium BC

15. Aspects of ancient warfare: Multidisciplinary research on war and warriors in Bronze Age Europe

14. Metallurgy in the Early Bronze defensive settlement in Bruszczewo, site 5, Śmigiel commune,Kościan district. One more step on the way to the synthesis

13. From the cradle to the grave

12. From clay you are

11. When archaeology meets environmental sciences: the Bruszczewo site revisited

10. Kakucs-Turján: a multi-layered settlement in Central Hungary

9. The barrow culture of the Upper Dniester Basin in the 3rd and 2nd millennia BC. The Polish-Ukrainian research projects

8. Some Remarks on the Problems of Researching Art in Archaeology using the Examples of Prehistoric Figurines and Attic Geometric Pottery

7. In the Valley of Anthemous … (Northern Greece)

6. Between the East and the West of Europe. The Eneolithic and the Beginning of the Bronze Age in light of studies on bio-cultural borderlands

5. Late Neolithic Hilltop Communities in Central Kujawy

4. Excavations in Kamenets-Podolskiy, Tatarysky: Small-scale insight on large-scale questions

3. Lost and found: The Funnel Beaker culture's 'megalithic tombs' in the cultural and natural landscape of Greater Poland

2. Heritage regained: results of rescue excavations in the Land of Cracow

1. Late Neolithic and post-Neolithic settlements and burial grounds in the TPC Area at Çatalhöyük. The research project of the archaeological team of Adam Mickiewicz University in Poznań

6000 4000 2000 1calBC/1calAD 2000

ISBN 978-83-946591-9-6