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LIVING TOGETHER OR APART? UNRAVELLING THE DEVELOPMENT, INTERNAL ORGANIZATION AND SOCIAL STRUCTURE OF A COMPLEX BRONZE AGE TELL SETTLEMENT AT TOBOLIU, WESTERN ROMANIA

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ABSTRACT

In this paper we present a new research project dedicated to the interdisciplinary investigation of the complex Bronze Age site in Toboliu (Bihor County, Romania). Using a multidisciplinary approach, the project aims to reveal the interplay of factors that contributed to the development and subsequent decline of this site. To this end, the planned investigations feature both archaeological fieldwork and comprehensive scientific analyses; the main disciplines involved here are geoarchaeology, archaeozoology, archaeobotany and molecular archaeology. Hence, this project contains two closely integrated parts (archaeology and natural sciences), which in cooperation will hopefully provide a broad spectrum of new information about a Bronze Age tell in terms of the chronological and spatial development of the entire site structure, as well as subsistence practices and social and economic developments.

Keywords: Middle Bronze Age; Multidisciplinarity; Tell settlement; Landscape archeology

Introduction

The site of Toboliu (Bihor County, Romania) (fig. 1) is representative of the tell settlements that developed in the Carpathian Basin during a period encompassing the late Early Bronze Age (EBA) and the Middle Bronze Age (MBA) (c. 2300/2200–1500/1450 BC) according to the chronological system used in the region (Fischl *et al.* 2015a; Gogâltan 2015). As postulated ‘central places’ (see, for example, Kristiansen, Larsson 2005, 161–167; Gogâltan 2010, 37–40; Metzner-Nebelsick 2013, 332–336), these artificial mounds, which are still visible today in the flat landscape of the Hungarian Plain, have traditionally attracted much archaeological attention¹. However, recent

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¹ For a research history on the Bronze Age tell settlements in the Carpathian Basin see Kovács 1988 and Gogâltan 2005.

research carried out in the region² has brought significant new insights into the structure of these sites by revealing settlement activity beyond the mounds themselves and thus proving that tells were part of complex settlement systems. At least in some cases, it was established that these systems consisted of several parts (tells, enclosures and associated outer settlements) whose relations vis-à-vis each other in social, chronological and functional terms remain to be determined.



Fig. 1. Toboliu–Dâmbu Zănăcanului. Aerial view of the tell and the surrounding outer settlement.

Recent investigations at the Bronze Age tell of Toboliu have also confirmed the existence of a complex settlement system (fig. 1). Through a series of non-invasive fieldwork methods (surface surveys, aerial photography and magnetometer survey), it was established that the central mound was enclosed by two concentric ditches, beyond which extended a substantial outer settlement (Fazecaş, Lie 2018; Lie *et al.* 2019, 356–357). As a result of systematic excavations undertaken on the mound between 2014 and 2017, we know that its evolution can be dated between the 19th and 16th centuries BC (Lie *et al.* 2019, 363), being thus largely parallel to the evolution of the MBA according to the regional chronology (see above). The last phase identified on the tell can be tentatively ascribed to the beginning of the Late Bronze Age (LBA) (Gogâltan *et al.* 2020, 87; Găvan *et al.* 2021, 64–65). On the other hand, the surface survey conducted on the outer settlement (Fazecaş, Lie 2018) has revealed material that can be mostly dated to the MBA, possibly even the

² Reference is being made here to research projects conducted in the Žitava Valley (Bátora *et al.* 2012; Müller-Scheeßelet *et al.* 2016), the Benta Valley (Sørensen, Vicze 2013; Earle *et al.* 2014; Klehm, Nyíri 2016), the Hernád Valley (Fischl *et al.* 2015b), the Titel Plateau (Falkenstein 1998; Falkenstein *et al.* 2016), the Körös Valley (Duffy 2014; Duffy *et al.* 2019), the Kakucs area (Jaeger, Kulcsár 2013; Jaeger *et al.* 2018), the Borsod Region (Fischl *et al.* 2012; Kienlin *et al.* 2018; Kienlin 2020), the Ier Valley (Marta *et al.* 2010; Molnár, Nagy 2013; Kienlin *et al.* 2017; Kienlin, Găvan 2021) and in the Lower Mureş Basin and the Crişul Repede catchment system (Gogâltan *et al.* 2014; Gogâltan *et al.* 2020; Kienlin, Găvan 2021).

early LBA, suggesting that the outer settlement was at least partly contemporary with the occupation on the central mound. Hence, this site offers a unique opportunity to uncover in detail how a Bronze Age tell together with its surrounding settlement developed through time. This is one of the main goals of our new interdisciplinary project funded by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation)³.



Fig. 2. Geophysical survey on the outer settlement at Toboliu in spring 2019.

This project also aims to contribute to a better understanding of the social and economic underpinnings of tell-building communities in the Carpathian Basin. Tells are often considered political and economic centres in control of craft production and long-distance trade and exchange (see above), while their surrounding open settlements are thought of as being subordinate in social, political and economic terms (Reményi 2012, 277–282; Metzner-Nebelsick 2013, 332–336). It is often assumed that they were providing the economic base of tell sites, with their economy being focused on agricultural production (Artursson 2010, 102; Fischl, Reményi 2013, 729). This reconstruction however is a purely theoretical one, and has not yet been tested through archaeological investigations targeted at off-tell households. In fact, there is very little data available regarding the economy and function of these sites⁴. Furthermore, despite the progress obtained by recent investigations, information on the structure and chronological evolution of occupation outside Bronze Age tells remains an open question. Settlement activity in the immediate vicinity of the mounds has mostly been established by means of coring, magnetometric prospection and/or surface finds. However, due to the absence of radiocarbon dates, the precise chronological relations of the outer settlement with the mound and its enclosure(s), as well as their dynamics relative to each other through time, remain largely unknown. Therefore, through excavations of the outer settlement and with the help of multidisciplinary analyses planned within this project (consisting of geoarchaeological, archaeobotanical, archaeozoological, and molecular archaeological investigations), we have the opportunity to test the abovementioned assumptions, to establish the chronological relation between the different settlement parts, and to formulate new models based on a strong empirical foundation.

³ Project numbers 436594565 (<https://gepris.dfg.de/gepris/projekt/436594565>); 436834905 (<https://gepris.dfg.de/gepris/projekt/436834905?language=de>). See also <https://ufg.phil-fak.uni-koeln.de/forschung/forschungsprojekte/toboliu-project>

⁴ Some preliminary data concerning the animal economy has been published for the outer settlement of the tell from Pecica (Nicodemus 2018).



Fig. 3. Geophysical survey on the outer settlement at Toboliu in spring 2018.

Preliminary work

Although the site has been known since the beginning of the 20th century and several excavation campaigns have been conducted during the second half of the previous century, there was very little information available in the published literature⁵. In this context, archaeological research was resumed in Toboliu in 2014. These new investigations consisted of excavations, surface surveys, magnetometer measurements, test drillings, aerial photography and the creation of a digital elevation model (Lie *et al.* 2018; Lie *et al.* 2019; Gogâltan *et al.* 2020, 80, 84–91). The non-invasive investigations revealed the existence of an outer settlement surrounding the central mound in Toboliu. Based on the surface survey conducted in spring 2015, the size of this outer settlement has been estimated to c. 84 ha (Fazecaş, Lie 2018). In order to gain a better understanding of its structure and layout, magnetometer survey was also conducted here between 2016 and 2019 (fig. 2–3). Over the course of four campaigns an area of c. 75 ha was covered. As for the results of the magnetometry, there are multiple anomalies visible in the outer settlement, which can most likely be interpreted as pit anomalies and the remains of (occasionally burnt) house structures. Moreover, there is a good match between the results of the surface survey and those of the magnetometer survey, both showing that the outer settlement extended up to c. 650 m north, c. 600 m west and c. 400 m east of the tell (fig. 4).

⁵ For a complete research history see Fazecaş 2014; Lie *et al.* 2019, 352–353.



Fig. 4. Toboliu–Dâmbu Zănăcanului. Results of the geophysical measurements and of the surface survey.

Excavations have also been conducted on the tell between 2014 and 2017, revealing a 4 m thick stratigraphic sequence in its centre (fig. 5). The preliminary results of these investigations have already been published (Lie *et al.* 2019) and will not be repeated here. Samples for multidisciplinary analyses have been collected from trench 1 located in the centre of the mound (Lie *et al.* 2019, 360–363, fig. 3). The profiles of this trench were characterised geoarchaeologically and 20 monoliths for thin section analyses were sampled from three different profiles (fig. 6). The sampling encompassed different floor sequences, some with wooden planks. Samples from destruction levels were also taken in order to receive further details about other architectural constructions such as burnt or unburnt collapsed walls, possible remnants of roofs and other inventory elements, as well as information about the fire regime (e.g. Goldberg, Macphail 2006; Macphail, Crowther 2007; Friesemet *al.* 2017; Röpke, Dietl 2017). The collected samples will later serve as a basis for comparative investigations using geochemical and spectrometric analyses such as geochemistry, FTIR (Fourier transform infrared spectroscopy), XRF (X-ray fluorescence spectroscopy), and Raman spectroscopy.



Fig. 5. Toboliu–Dâmbu Zănăcanului. Western Profile of trench 1.

Samples for macro-remain analyses were also taken from trench 1 in 2017. These samples, with a total volume of 52.55 l sediment, come from 15 different contexts such as floors, domestic waste and destruction levels. A total of over 6.700 (mostly) charred plant remains were found; a few were preserved in mineralised form. The density of the samples varies from 2 to 11.004 remains per litre (n/l), while the mean value is 816 n/l; several samples have a high density, well above 100 n/l. The preservation of the plant remains is generally good. A total of 60 taxa could be determined, nine of which were cultivated plants; the latter also have the highest proportion of the spectrum, almost 95% (fig. 7). Numerous cereal residues were detected – both from storage and from further processing within the tell settlement. *Triticum timopheevii*, formerly known as ‘new’ glume wheat (Czajkowska *et al.* 2020), a now lost(?) wheat species⁶ known from Neolithic and Bronze Age Europe with a focus on the south-eastern regions (e.g. Jones *et al.* 2000; Kenéz *et al.* 2014; Toulemonde *et al.* 2015), could be identified in one sample.

⁶ Depending on its relationship to *Triticum timopheevii* subsp. *Timopheevii* (or *Triticum timopheevii* (Zhuk.)) cultivated until the twentieth century – and thought to be endemic – in western Georgia (Mosulishvili *et al.* 2017; Czajkowska *et al.* 2020).



Fig.6. Collection of samples for thin section analyses from the western profile of trench 1.

As for the faunal assemblage in Toboliu, a large quantity of animal bones was recovered from the tell. The remains originate mainly from the light-grey layers that were typically found on top of house floors, but also from the surrounding pits and other domestic features. The bones are very well preserved and therefore have a strong potential for further investigations (age at death determination by osteohistology and microwear analysis). A first screening of these remains indicates the presence of cattle, pig, sheep, goat and freshwater molluscs. So far, more than 500 faunal remains from the tell have been analysed. Among the typical domesticates of the MBA, cattle is the dominant species, followed by pigs. Sheep, goats, horses and dogs are also represented, though less frequently. Cut and chop marks on some dog and horse bones document an exploitation of the meat possibly for human nutrition. Red deer is also frequent and indicates its importance as game animal.

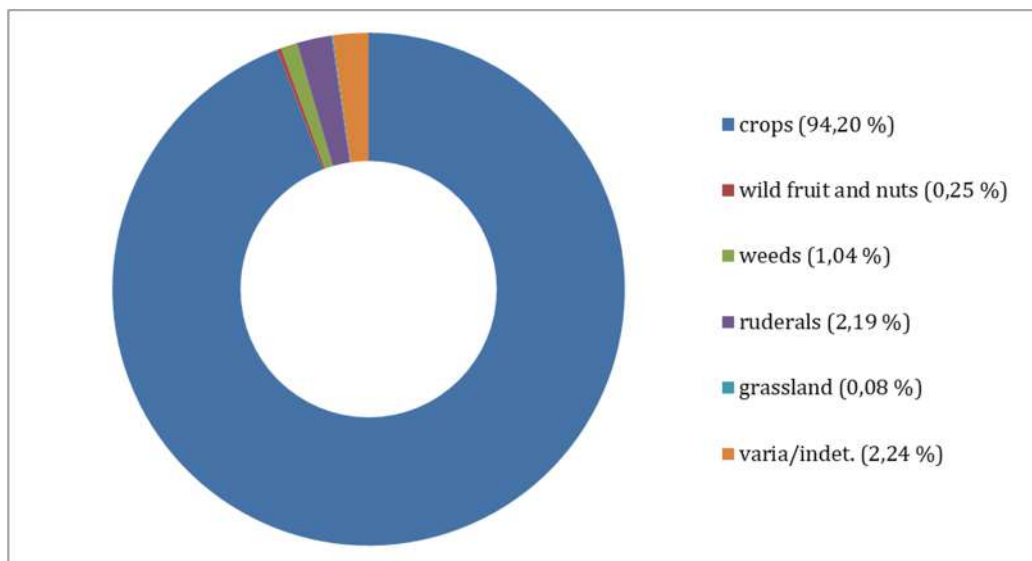


Fig. 7. Composition of the macrobotanical plant spectrum in the tell samples from Toboliu.

Project goals

As mentioned above, the principal aim of the Toboliu project is to determine and understand in detail how a complex Bronze Age tell and its outer settlement were formed and how they developed through time. Such a detailed investigation is so far lacking and will significantly contribute to our knowledge and interpretation of Bronze Age tell communities in the Carpathian Basin. Although the extent and horizontal layout of the site in Toboliu have been determined by means of non-invasive investigations, the precise chronological relation between the different settlement parts (mound, ditches and outer settlement) and their dynamics relative to each other through time are still unknown. Therefore, it is fundamental for this project to establish an accurate relative and absolute chronology for the development of the entire site structure. Another important goal of the project is to ascertain the relation between the different settlement parts in economic, social and functional terms. We plan to compare activity patterns on various parts of the site and establish if potential areas of specialised function are detectable. In order to reveal the subsistence strategies, economy and household practices, we need to conduct a series of micromorphological, geoarchaeological, archaeobotanical and archaeozoological analyses, all of which are vital for obtaining answers for our research questions. Moreover, based on the results of these investigations, it is our goal to reconstruct how the community in Toboliu was organized in social terms. The main aspects under analysis here are comparisons between on-tell and off-tell households in terms of architecture, inventory, diet, economic activities, and availability of particular resources.

Hence, the objectives of our project are threefold: 1) to determine the chronological and spatial evolution of the site structure (absolute and relative chronology); 2) to compare household practices, subsistence strategies and economic activities within and outside the settlement mound; 3) to unravel the social organization at Toboliu. Another important project goal isto reconstruct the prehistoric environmental settings of the site in order to better understand its development within the surrounding landscape.

Planned investigations

Our interdisciplinary project will entail archaeological, geoarchaeological, archaeobotanical, archaeozoological, and molecular archaeological investigations (fig. 8). The following paragraphs are intended to provide a brief overview of the main analyses and methods planned within the Toboliu project.

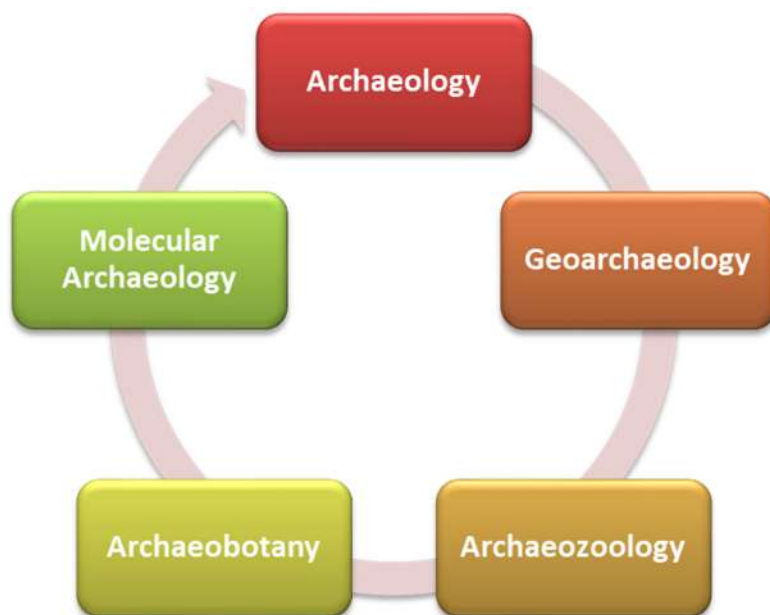


Fig. 8. The main disciplines involved in the Toboliu project.

1. Archaeological investigations

In order to achieve the project's goals, the planned archaeological fieldwork will consist of excavations, targeted coring, metal detector survey, and targeted surface surveys. We plan to excavate three trenches in different parts of the outer settlement targeting representative off-tell households. For the establishment of an absolute chronology, we will collect samples for AMS radiocarbon dating from the excavated areas.

In order to ensure a complete coverage of the site in chronological terms, drillings will also be implemented. The cores will be targeted at representative houses and pits visible in the geomagnetic plan in order to check the stratigraphy of the outer settlement and collect radiocarbon samples. The two enclosures will also be targeted by drillings in order to reconstruct their chronology, the history of their construction and the manner in which they were filled. Both the planned excavations and the core drillings will be based on the magnetometer data available (see above).

The results of the excavations on the mound will provide a secure basis for comparisons with the outer settlement in terms of chronology, architecture, house inventories, economy, and subsistence practices. A precise absolute chronology for the development of the mound is under construction, while the typo-chronological evolution of the pottery encountered here is also in progress. After establishing the pottery's relative chronological development, it will become possible to apply this more refined chronology to the outer settlement as well. For this purpose, we will conduct a more intensive surface survey in targeted areas of the outer settlement in order to collect and plot datable material. This will provide us with a clearer picture of the relative chronological evolution of the entire site. During the planned field walking, attention will also be paid to items indicative of craft production activities as well as artefacts usually regarded as status symbols. The spatial distribution of special finds, which can indicate possible differences in social, economic and functional terms between the different parts of the site, will also be analysed.

Adding to this, a metal detector survey will also provide answers regarding the distribution and patterning of metal artefacts, which are often seen as markers of social status and prestige items. The metal detector work will hopefully provide further information regarding the presence or absence of metal artefacts and/or residues of metal production in the outer settlement. In this way we can determine if metal production activities were restricted to the tell site or not.

2. *Geoarchaeological and molecular investigations*

The geoarchaeological investigations planned within the Toboliu project encompass pedological descriptions along with micromorphological and geochemical analyses of archaeological sediments and soils. The core drilling program will cover selected areas of the outer settlement, specifically targeting identified anomalies, as well as the areas outside of the anomalies. The stratigraphy will be described geoarchaeologically according to IUSS Working Group WRB (2015) and Ad-hoc-Arbeitsgruppe (2005), and samples for geochemical and element analyses (mainly Corg., pH, CaCO₃, phosphate, copper, zinc and lead as well as pedogenic sesquioxides) will be collected from the cores. Geochemical analyses will also be targeted at identifying possible specialist activities. Promising structures rich in faecal components will be sampled for molecular investigations. Further molecular investigations will also aim at reconstructing dietary practices using molecular-level food residue analysis. Compound-specific carbon isotope analysis of fatty acids extracted from potsherds will be employed, scrutinizing the distinct metabolic isotope footprints of adipose (porcine vs. ruminant) and milk fats.

Concerning the two enclosures (ditches), geoarchaeological analyses of the cores will provide a clearer picture on their phases of use and possible reuse. It is possible to find out whether the ditches were filled with water or not, whether they were cleaned, and how they have been infilled (intentionally or naturally).

3. *Archaeobotanical investigations*

Archaeobotanical samples will be collected during excavations in the outer settlement and processed by means of flotation. Further analyses of the archaeobotanical material will be carried out at the Archaeobotanical Laboratory of the Department of Prehistoric Archaeology, University of Cologne. Based on the macro-remain analyses, the importance of cereal cultivation, as well as the main crops, can be detected. Weeds provide additional information about cultivation techniques and the ecological conditions of the arable land. These results could then be reinforced by analysing the micro-remains in the thin section. Especially diagnostic phytoliths (dendritic long cells) usually interpreted as chaff can be used (e.g. Dal Corso *et al.* 2017).

Palynological investigations will be undertaken in the nearby floodplain in order to reconstruct the vegetation and land-use history. For this purpose, drilling in selected places in the surrounding marshland is planned within the project. The samples obtained will be prepared using standard palynological procedures (Fægri, Iversen 1989; Moore *et al.* 1991). *Lycopodium clavatum* spore tablets will be added to estimate microscopic charcoal and pollen concentrations (Stockmarr 1971). Pollen grains will be identified by standard keys (Punt, Clarke 1976–2009; Fægri, Iversen 1989; Moore *et al.* 1991; Reille 1992; 1998) and through the use of the reference collection of the Archaeobotanical Laboratory.

4. *Archaeozoological investigations*

The faunal assemblage recovered from the outer settlement will be analysed with the help of the osteological reference collection of the Archaeozoological Laboratory of the Department of Prehistoric Archaeology, University of Cologne. By comparing the archaeological faunal remains with modern skeletons, a determination of the animal species, skeletal element, portion, and side is possible. In addition, the quantity (as number of specimens and fragments), the weight and the spatial distribution of the animal remains allow conclusions about the economic importance of each species for the inhabitants and will also be recorded in a database programme. Further investigations focusing on the individual's age and sex (Lemppenau 1964; Fock 1966; Silver 1969; Habermehl

1975, 1985; Armitage, Clutton-Brock 1976; Armitage 1982; Grigson 1982a, 1982b; Levine 1982; Zeder 2006) will also be conducted in order to answer questions about animal husbandry strategies and exploitation (e.g. meat vs. secondary products as milk, wool or draught power). Microwear analyses on cheek teeth will yield details about the diet, grazing behaviour and possible feeding of the individual species. Among the classic zooarchaeological methods for age determination, histological methods should also be used as far as possible (e.g. Stallibrass 1982; Dammers 2006). Taphonomic modification (summarised in Lyman 1994), such as cut marks or fire traces and pathology (e.g. Driesch 1975; Telldahl 2005; Bartosiewicz 2008; Stevanović *et al.* 2015) provide information about the carcass treatment after the animal's death and the population's disease status. In case of complete bones or joints, the standardised measurement (Driesch 1976) of the anatomic feature offers an opportunity to reconstruct shape and growth habit of the prehistoric animal (see Driesch, Boessneck 1974).

Outlook

The Toboliu project aims to offer new data regarding a Bronze Age tell in the Carpathian Basin and its surrounding settlement in terms of chronology, establishment and evolution of spatial arrangements, as well as social and economic dynamics. It is our hope that this will contribute to the current understanding of socio-economic structures and developments in a key area of Bronze Age Europe, and help to reassess how well the current ideas match the evidence in the ground. Applying a rigorous empirical and methodological foundation for determining the establishment and development of a Bronze Age tell and its surrounding settlements, rather than relying on theoretical models, will hopefully enable further interpretations regarding the social and economic organization of such sites. The Toboliu project also aims to gain more information about the subsistence strategies and economic activities of the inhabitants of an open settlement surrounding a Bronze Age tell. Due to lack of excavations, the current knowledge on this topic is limited. Furthermore, by comparing the results obtained in the outer settlement to those from the tell, it will become possible to determine whether there are differences in the economic activities practiced on- and off-tell and whether certain areas of the site were devoted to specific activities. The answers to these questions will hopefully help to clarify the relation between the tell and its outer settlement in economic and functional terms.

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