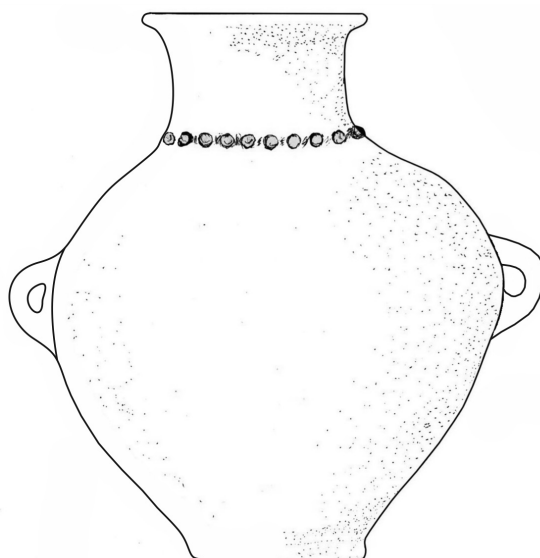


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ArheoPecica Project.

Preliminary results of the 2022 campaign

Victor Sava, Ioan Cristian Cireap, Florin Gogâltan, Dragoş Diaconescu, Alexandru Hegyi, Daniel Preda, Cristian Floca, Adrian Cristian Ardelean, Adriana Sărăşan

Abstract: Recently the Museum of Arad together with its partners started a project focused on the detailed study of the Pecica micro-region. Named ArheoPecica, the project team aims to develop three main research topics. Firstly, it focuses on the identification of new sites, which will then be investigated using a wide range of non-invasive methods. A second objective focuses on the evaluation and investigation of the burial mounds located north-east of Pecica. The third topic aims at publishing sites already investigated on other occasions. This article presents the main results obtained during 2022.

Keywords: Early Eneolithic; Early Bronze Age; Late Bronze Age; Lower Mureş Region; Field Archaeology.

Introduction

Extensive pre-development excavations conducted over the last 20 years in Romania has provided both specialists and those interested in archaeology with new and more rigorous insights into archaeological phenomena. Such an example can be found in Arad County (Western Romania), where since 2009 an increasing number of excavations have been carried out, driven by economic investments. Part of these new investigated sites are already known through partial or monographic studies¹.

One particular case can be illustrated by the archaeological investigations carried out in the south-western part of Arad County, in the surroundings of Pecica (Fig. 1). The studied micro-region is located in the lowland area, being crossed to the south by the Mureş River (Fig. 2). The territory of the town of Pecica spreads over an area of more than 237 km² and includes the villages of Bodrogu Vechi, Sederhat and Turnu (Fig. 3). Some 15 km north of the Mureş riverbed, several paleochannels are visible, whose streams are arranged from east to west. The relatively high plains range between 95 and 125 m altitude. Even though apparently this plain area appears to be homogeneous, different sectors within the micro-region exhibit distinctive features. For example, the eastern part is lower, and here the plain has an altitude ranging from 100 to 110 m. Towards the north-west, stretches the high terrace of the Mureş, the most prominent geographical feature of the whole area. Level difference between the Mureş riverbed and the maximum height of the terrace can reach up to 15 m. Gradually the terrace descends towards the north-east of Pecica.

Over the last decade, 13 sites have been investigated through pre-development excavations. The areas excavated over time at the various sites total about 23.5 ha. These pre-development excavations, while yielding a vast amount of new information, were determined by the requirements of local developers. Therefore, investigation was restricted exclusively to sites located on the Arad-Nadlac motorway section, near Pecica, or in logistic areas close to the motorway. Other archaeological sites to the north of Pecica were not investigated, as they are situated at a considerable distance from areas with economic potential.

Through these investigations, a considerable body of archaeological information has been acquired, both from prehistoric and historic periods. Although some of the most representative sites

¹ For example Gogâltan, Sava 2010; Sava *et al.* 2011; Sava, Andreica 2013; Sava 2014; Sava *et al.* 2015; Gáll 2017; Sava *et al.* 2017; Mărginean 2017; Mihail, Sava 2019; Sava 2019a; Sava 2019b; Sava, Ursuţiu 2020a; Sava, Ursuţiu 2020b; Gáll, Mărginean 2021; Sava, Ursuţiu 2021; Mărginean, Gáll 2022; Mărginean *et al.* 2022a; etc.



Fig. 1. Map of Romania and Arad County, with the administrative territory of Pecica marked in grey (by the authors).

have already been partially published², the large number of new finds requires a sustained effort to be exploited to their full potential.

The overall picture of the Pecica archaeological area illustrates an intensely inhabited micro-region in almost all prehistoric and historical periods. Taking into account the investigated sites until 2022, it can be seen that these sites are clustered in the southern part of the territory of Pecica (Fig. 4), where economic investments have led to pre-development excavations. It is for this reason that the

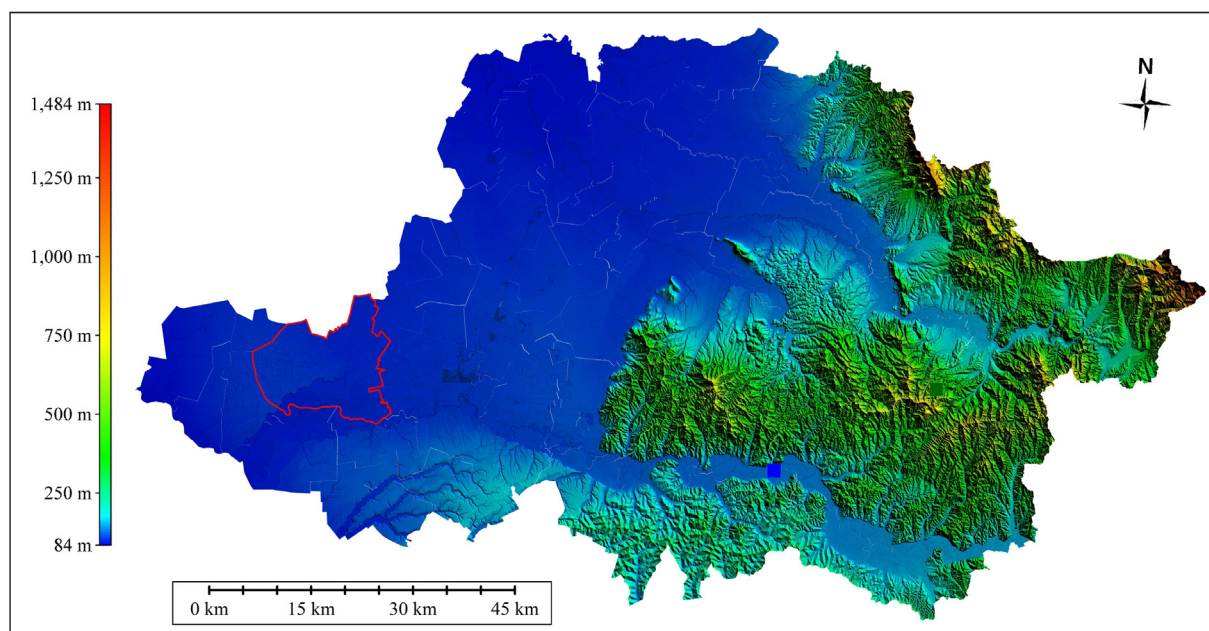


Fig. 2. Digital elevation model of Arad County showing the administrative boundaries of Pecica (red line) (by the authors).

² We are referring in particular to the following sites: PEC001 (Kapcsos 2014; Mărginean 2021), PEC006 (Sava, Andreica 2013; Sava, Ignat 2014), PEC007 (Virag 2013), PEC011 (Mărginean 2017; Sava *et al.* 2017; Sava, Ursuțiu 2020a); PEC012 (Sava, Ursuțiu 2021), PEC018 (Gáll, Mărginean 2021; Mărginean, Gáll 2021).

northern area of the town has not been the subject of sustained archaeological investigations. Therefore, under the auspices of the Museum of Arad, together with other partners, the ArheoPecica project began in 2022, which aims at exploiting the archaeological potential of the whole area, through field surveys, targeted excavations, geophysics and, last but not least, by publishing the excavations already carried out.

The main objective of this article is to provide a preliminary overview of the 2022 campaign results of the ArheoPecica project and to lay the groundwork for future investigations. In addition to an outline of the objectives and methodology of the project, we aim to highlight several key-sites.

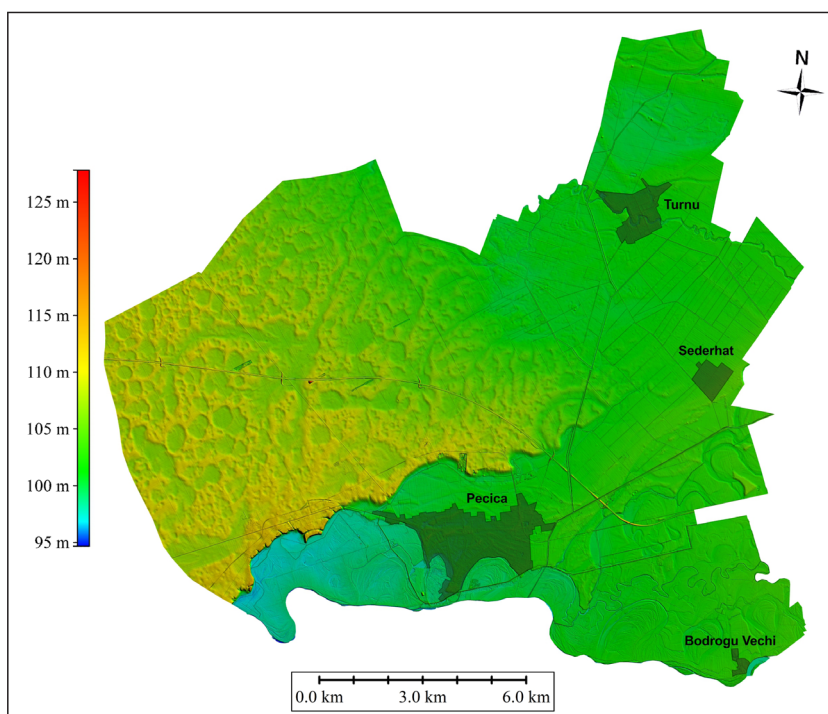


Fig. 3. Digital elevation model of the administrative territory of the town of Pecica, showing the related localities (by the authors).

A brief history of archaeological research in the area of Pecica

The most well-known site in the investigated area is Pecica-Șanțul Mare (PEC019)³. The Middle Bronze Age (MBA) tell and the Dacian settlement here have been the subject of numerous archaeological excavations. The first of these excavations led by László Dömötör during the late 19th and early 20th centuries uncovered numerous artefacts that were spectacular for their time. Márton Roska continues the excavations with a high degree of scientific rigour, ordering the finds according to stratigraphic criteria. During the 1960s the Dacian settlement was excavated, and between 2005 and 2015 archaeological investigation focused on the MBA deposits.

The 1960s and 1970s were a milestone for the archaeology of Arad, a period that coincided with numerous field surveys and small test excavations. Egon Dörner, the head of Arad's archaeological department, coordinated this scientific activity. PEC014-fosta cărămidărie C.A.P. Ogorul⁴, PC019-Șanțul Mare - Rovine- Pruniște⁵ or PEC020 – Șanțul Mic – Între vii- Fostul Sălaș Donat⁶ are among the sites investigated by Dörner.

Since 2011, the most significant period in the history of archaeological research in Pecica began. Numerous pre-development excavations have been carried out regularly since then. However, most of them were located on the Arad-Nădlac motorway section and in the area bordering the motorway (Fig. 4).

Pecica's archaeological monograph was published in 2022, presenting the key archaeological landmarks of the micro-region under analysis⁷. In order to organize the existing dataset, first of all the already known sites were renamed. Each of these sites was given a code derived from the name of the administrative-territorial unit followed by Arabic numerals (e.g. PEC001, PEC002). To avoid

³ See the most recent summary on this site: Sava *et al.* 2022b.

⁴ Sava 2010.

⁵ Crișan 1978.

⁶ Dörner 1970, 460, Fig. 14/4-5.

⁷ Sava *et al.* 2022a.

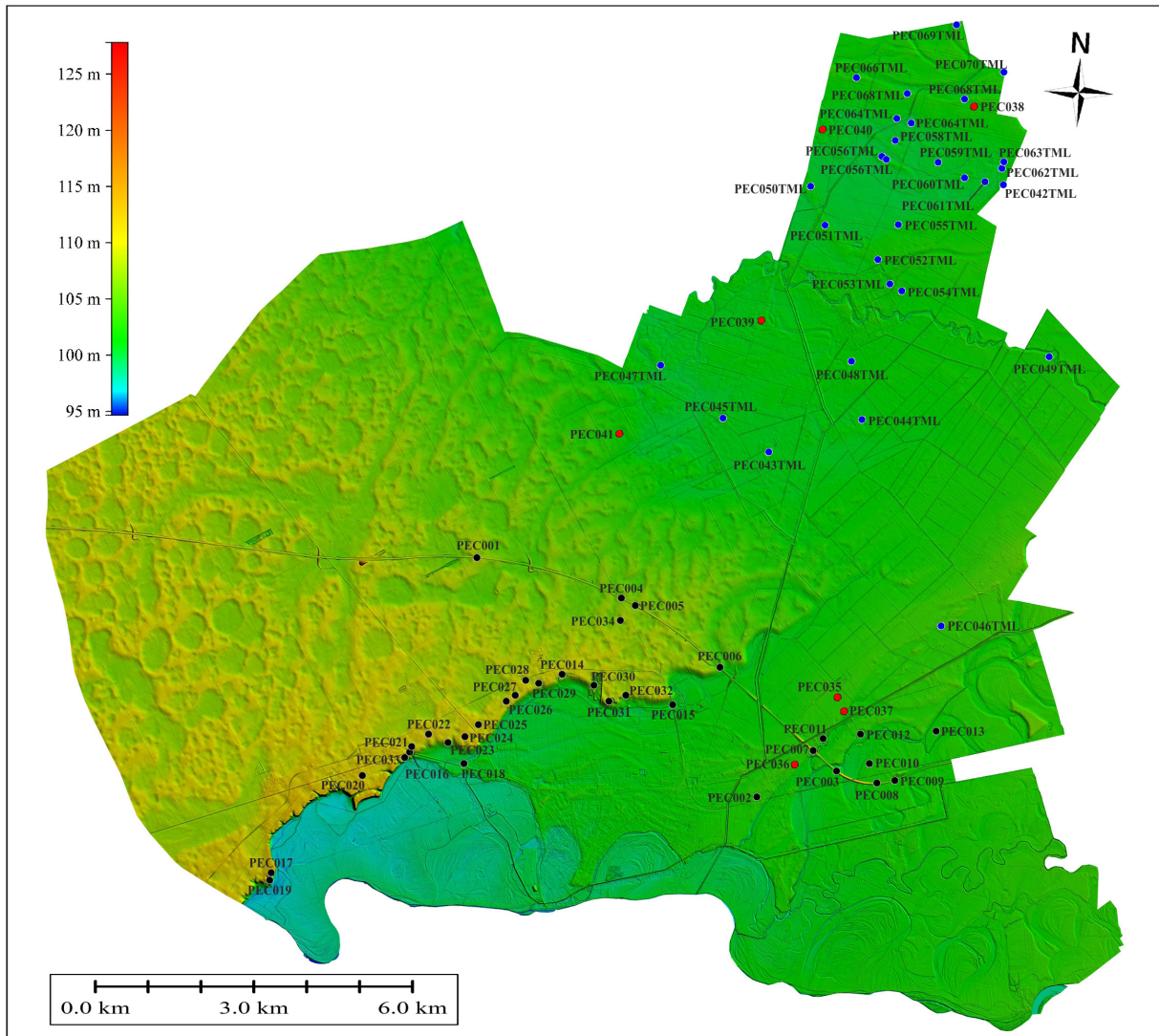


Fig. 4. Digital elevation model of the administrative territory of Pecica, showing the archaeological sites (black circle - sites discovered before the start of the ArheoPecica project; red circle - settlements discovered during 2022; blue circle - tumuli mapped during 2022) (by the authors).

confusion, the new codes were equated with the old toponyms (e.g. PEC020 = Șanțul Mic = Între Vii = Fostul Sălaș Donat).

The ArheoPecica Project

The area of Pecica was chosen for this project for several reasons. First of all, it is one of the largest territorial units of Arad County. The area has been intensively explored over time, both through excavations and systematic field surveys. The complexity of the sites is high, ranging from multi-layered settlements (tell and tell-like settlements), fortified and unfortified settlements, to various burial grounds. Last but not least, the local authorities have provided support for this scientific project.

Goals and objectives

Studying the history of archaeological research undertaken in the territory of Pecica suggests that while numerous excavations have been undertaken, these sites have been published only through partial reports. The exception is the monographic publication of the Dacian settlements at Șanțul Mare⁸. In order to overcome this situation, the ArheoPecica

⁸ Crișan 1978.

project will include a section for study and publish the sites already excavated. Among the sites considered for publication are the Early Eneolithic (EEN) settlements PEC010 (ca. 4250-4000 BC)⁹ and PEC011 (ca. 4220-3960 BC)¹⁰, the EEN burial ground of PEC002 (ca. 4450-4350 BC)¹¹, the Early Bronze Age (EBA) settlement PEC006 (ca. 2600-2300 BC)¹² and the Late Bronze Age (LBA) cemetery within the same site (PEC006=Site 14) (ca. 1600/1500-1000/900 BC)¹³. In addition, Pecica III¹⁴ and IV¹⁵ bronze hoards will be re-evaluated and comprehensively published. Besides the classical approach to archaeological features (description, graphic representation, etc.), further analyses will be carried out, such as ¹⁴C dating, archaeogenetics, physical anthropological studies, archaeozoological studies, or identification of raw material sources.

The systematic field surveys carried out on the entire administrative territory of Pecica are another important objective of the project. Sites already known or newly identified will be further investigated by non-invasive (geophysical, drillings etc.) investigations. A number of the newly identified sites will be excavated in order to identify their scientific potential.

Methodology

The types of investigations described above will be aimed at studying three distinct chronological periods. Firstly, all contemporary sites in the area next to the EEN PEC011 cemetery (4400/4300-4000/3900 BC) will be identified, which, due to its size and rich funerary inventories, offers a unique insight into the social hierarchy of the period. Anthropological, archaeozoological, ¹⁴C data, aDNA, correspondence analysis will provide factual information about the individuals buried in this cemetery. Identifying the sources of the raw materials used to produce the artefacts will allow us to trace the extent of their exchange networks. Of particular importance is the identification of contemporary settlements in the vicinity of this cemetery. The absolute dating of certain EEN contexts in the PEC007, PEC010 and PEC011 settlements will be supplemented by stylistic analysis of the pottery. All of these will make an essential contribution to the detailed chronology of the cemetery and contemporary settlements. On the other hand, where the horizontal stratigraphy allows, certain sites will be surveyed by geophysical measurements and stratigraphic profiles obtained by coring.

A particular focus for us will be to explore the differences between the sizes of some burial grounds. While in the case of PEC002, the cemetery is rather small and the settlement spreads over a relatively restricted area, in the case of the PEC011 cluster of sites the picture is the opposite. By acquiring absolute data on a number of individuals discovered in PEC002 cemetery, we will be able to establish possible connections between two burial grounds located in close proximity.

The second period under consideration is the EBA (ca. 2700/2600-2000/1900 BC), when probably most of the tumuli north of Pecica were constructed. The mapping of these still visible monuments will be accompanied by the digital elevation model, recording the dimensions of each mound and specifying their state of preservation. In order to acquire further data, a number of well-preserved tumuli will be selected for geophysical survey to determine their structure. Tumulus PEC042 has been selected for excavation because it is in danger of permanent destruction. To place these monuments in a wider context, a number

⁹ Sava, Ursuțiu 2020b, 213, Tab. 5, nr. 14 ; Mărginean *et al.* 2022b, 116.

¹⁰ Sava *et al.* 2017; Mihail, Sava 2019; Sava, Ursuțiu 2020a; Sava, Ursuțiu 2020b; Sava *et al.* 2022c.

¹¹ Sava *et al.* 2022d, 76, Fig. 2, 5.

¹² Sava, Mărginean 2022, 95, Fig. 3.

¹³ Sava, Andreica 2013; Sava, Ignat 2014; Sava, Ignat 2016, 185-186; Ignat, Sava 2019, 7, 8, 9, 14-15; Sava, Gogăltan 2019, 224-225; Sava 2020, 263; Sava, Mărginean 2022, 95, 99.

¹⁴ Dörner 1970, 460, Fig. 14/4; Sava *et al.* 2022e, 223-224, Fig. 6.

¹⁵ Petrescu-Dâmbovița 1977, 102, Pl. 176/29-22, 177, 178/1; Sava *et al.* 2022e, 224, Fig. 7-8.

of contemporary, or chronologically close, settlements will also be absolutely dated. These include two Late Eneolithic (LEN) settlements (PEC002 and PEC007) and an EBA settlement (site PEC006).

Archaeological investigations conducted over the last 15 years in the Lower Mureş Region have led to a better understanding of the LBA (ca. 1600/1500-900/800 BC). New excavations in the mega-forts of Sântana-Cetatea Veche¹⁶, Corneşti-Iarcuri¹⁷, Idjoş-Gradişte¹⁸, Csanádpalota-Földvár¹⁹, or in the unfortified settlement of Şagu-Situl A1_1²⁰, enabled the reconstruction of an almost unknown civilization that built the largest fortifications of the European Bronze Age. The discovery near Pecica of three LBA II hoards, and the reports of earthworks, are an invitation to a more detailed assessment of this area. Aiming to provide a more accurate view of this period, the bronze hoards known as Pecica III and IV, discovered within the PEC020 site, will be reassessed. PEC006 cemetery represents another significant archaeological site. This burial ground, used throughout the LBA, will be the topic of a separate publication as part of the ArheoPecica project. The large amount of ¹⁴C data acquired, together with numerous other analyses undertaken (anthropological, archaeozoological, aDNA, strontium isotope, lead isotopes) will provide a more complete insight into the societies of this period and the economic and social relations developed between them. In addition to the re-evaluation of some discoveries and the publication of the excavations undertaken, it is planned to map and document the LBA sites in as much detail as possible. Emphasis will be placed on the study of possible fortification systems, their chronology and character. To this end, large-scale field surveys, geophysical measurements and stratigraphic profiles are planned.

Overview of the archaeological context and the main results achieved to date

A first step was to collect and organize all the available data acquired prior to the start of the project²¹. Detailed data on 34 sites can be found in this overview, along with extensive illustrations and a diachronic presentation of the archaeological data on the evolution of human communities in the area of Pecica.

Following the field surveys conducted during the first year of the project (2022), 7 new settlements and 29 tumuli were added to the number of the already known sites. Altogether these 70 sites provide the premise for a more accurate understanding of the prehistoric and historical realities of the area. In order to illustrate this, we have therefore chosen to summarise data for three key periods: EEN, LEN/EBA and LBA II.

The Early Eneolithic (EEN) (ca. 4600/4500-4000/3900 BC)

During the Early Neolithic (EN) and Middle Neolithic (MN), the area under consideration was settled by a small number of communities. Until the start of the ArheoPecica project, there were no Late Neolithic settlements reported that linked chronologically to the Eneolithic period. West of Turnu, the LEN PEC039 settlement was identified (Fig. 5)²². The settlement is surrounded by an oval ditch, which encloses an area of approx. 20 ha. A second ditch is visible, mainly on the western side, which would enclose an area of about 34 ha. It is possible that there are other inner ditches on the settlement area. It is worth noting that the settlement was crossed from north to south-east by a

¹⁶ See for ex. Gogâltan, Sava 2010; Gogâltan et al. 2019; Sava et al. 2019.

¹⁷ Krause et al. 2019 with older references.

¹⁸ Molloy et al. 2020 with older references.

¹⁹ Szeverenyi et al. 2017 with older references.

²⁰ See for ex. Sava et al. 2011.

²¹ Sava et al. 2022a.

²² E. D. Pădurean refers to this settlement as Turnu-Vest (Pusta Sionda) (Pădurean 2014, 353). In his brief description of the archaeological site, earthen ramparts are mentioned. At the same time Pădurean states that „From the area in question we collected archaeological finds belonging to the Bronze Age, the First Iron Age (Dacian period) (1st century BC-1st century AD)”. In our field survey, carried out in the spring of 2022, no ramparts could be identified, only ditches. Moreover, the only artifacts identified here are to be dated to the Late Neolithic.

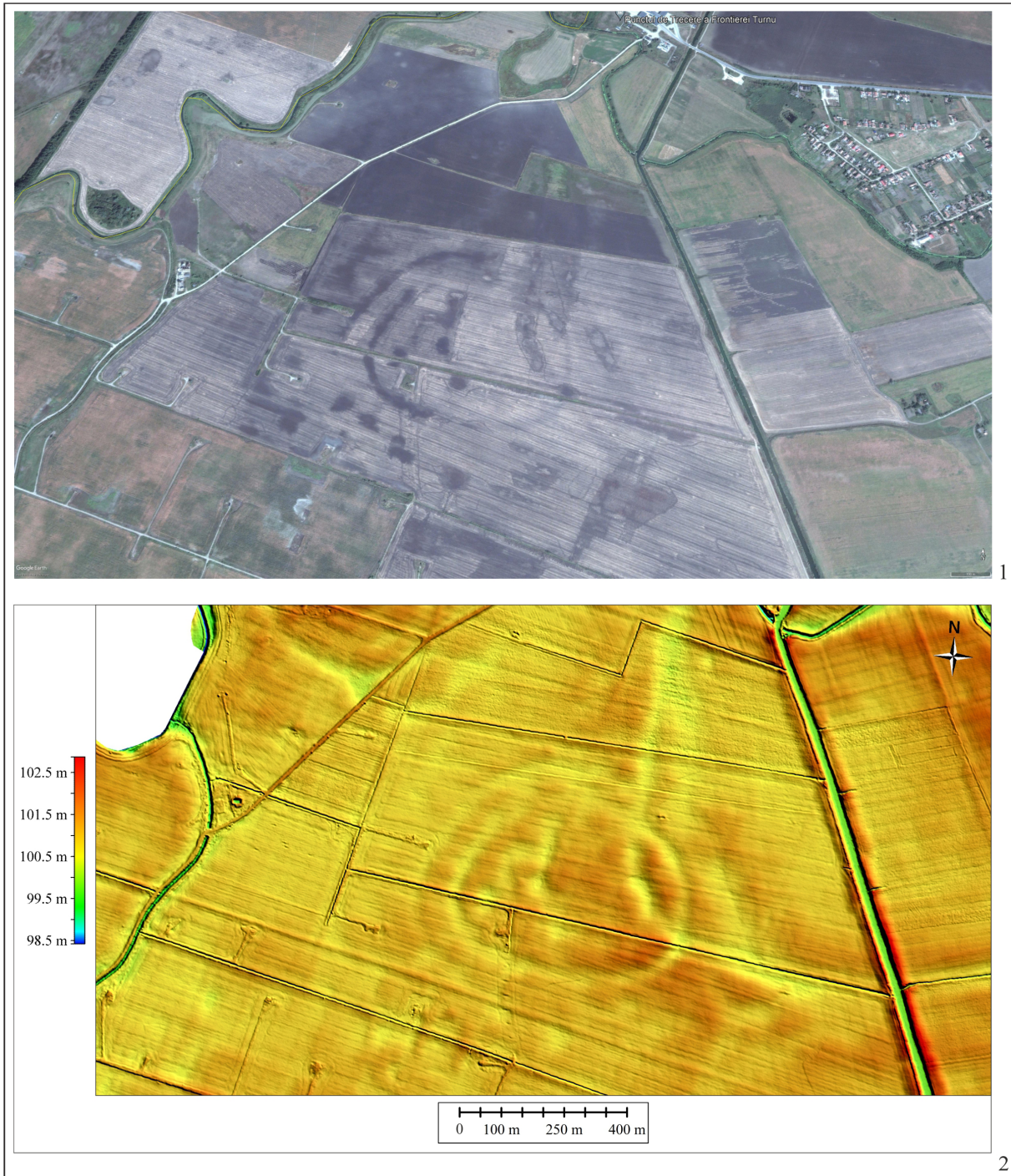


Fig. 5. LN settlement PEC039 = Turnu-Vest (Pusta Sionda);
1. Satellite imagery (source GoogleEarth); 2. Digital elevation model (by the authors).

palaeo-channel. Large amounts of adobe can be seen on the surface, evidence that the settlement was destroyed by a severe fire. Our field survey was undertaken on 21.03.2022; the land was ploughed and without agricultural crops. As a result of the survey, we were able to confirm the existence of ditches also visible in the elevation model. Adobe was found within the perimeter of the site, some of which appeared to have impressions of beams or wattle and daub. Around the ditches, adobe and pottery fragments are visible. Several clusters of adobe, pottery, a few animal bones and lithic items (grinders, polished axes, an obsidian core) are to be found in the inner part of the settlement. Presumably these clusters represent the burnt remains of buildings.

Having been inhabited for almost 500 years, Neolithic tells are gradually being abandoned, making way for a different society. This new period has been called the Eneolithic, Copper Age or

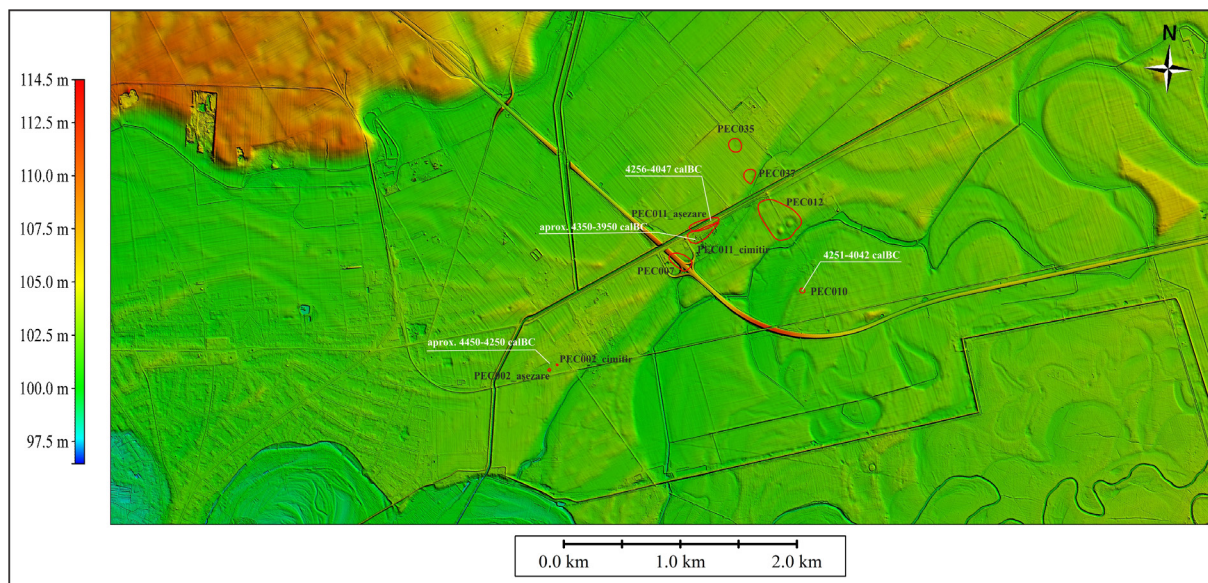


Fig. 6. Digital elevation model of the eastern part of Pecica, indicating the EEN sites (with red line) (by the authors).

Chalcolithic. Many changes with strong social and economic impacts are now documented. Numerous new settlements are founded, large burial grounds develop, metalwork is widely spread, and the shapes and decoration of ceramic vessels change. Perhaps the most significant social transformation, which has been identified on the basis of the funerary inventories, is a pronounced hierarchy within communities.

The chronology of these periods has been significantly improved as a result of extensive excavations and the widespread use of ^{14}C data. Therefore, we argue that these „radical changes” that occurred following the abandonment of the tells actually developed over several centuries, and can rather be defined as gradual transformations of parts of society²³. Even in the case of funerary contexts, a transition towards the new Eneolithic realities can be noted, rather than a sudden break with Neolithic traditions. For example, recent studies have indicated that the diet of the LN and EEN population of the eastern Tisa River area remained the same, as did the management strategies of domestic animals²⁴. On the other hand, the analysis of strontium isotopes stored in human and animal bones indicates that, in contrast to earlier periods, the EEN population, especially that of the Bodrogkeresztúr phase, exhibits increased mobility²⁵.

Considering the low number of Neolithic sites, during the Eneolithic a significant increase was recorded. Several EEN sites (ca. 4600-4000/3900 BC) can be found north of the Forgaci stream valley, east of the present town of Pecica (Fig. 6). Evidence suggests that EN settlements were also established in roughly the same location. Therefore we can assume a similar preference of the communities of the two periods for the same locations near the present Mureş riverbed.

According to the available data the earliest Eneolithic finds in the area are those from the PEC002 burial site, which can be dated between ca. 4440-4350 BC²⁶. At least four burials belong to this period; these graves have been clustered within a perimeter extending to about 200 m² (Fig. 7). Some of the deceased were crouched, with period-specific grave inventories (ceramic vessels, stone axes, animal offerings), others were heavily disturbed by later habitation. A particular category is exemplified by two graves, without inventory, whose deceased were laid in less usual postures, one of which (cx. 101), according to absolute dating, belongs to the MN. Perhaps the most interesting issue related to this grave cluster is the occurrence of a significant number of injuries observed on the human remains, resulting in the death of three individuals (cx. 92, 94, 95). All three belong to adult males ranging in

²³ Raczky et al. 2014; Sava 2015, 303-304.

²⁴ Giblin, Yerkes 2016.

²⁵ Giblin 2009; Giblin et al. 2013; Hoekman-Sites, Giblin 2012.

²⁶ Sava et al. 2019a; Sava et al. 2022d, 76, Fig. 2, 5.

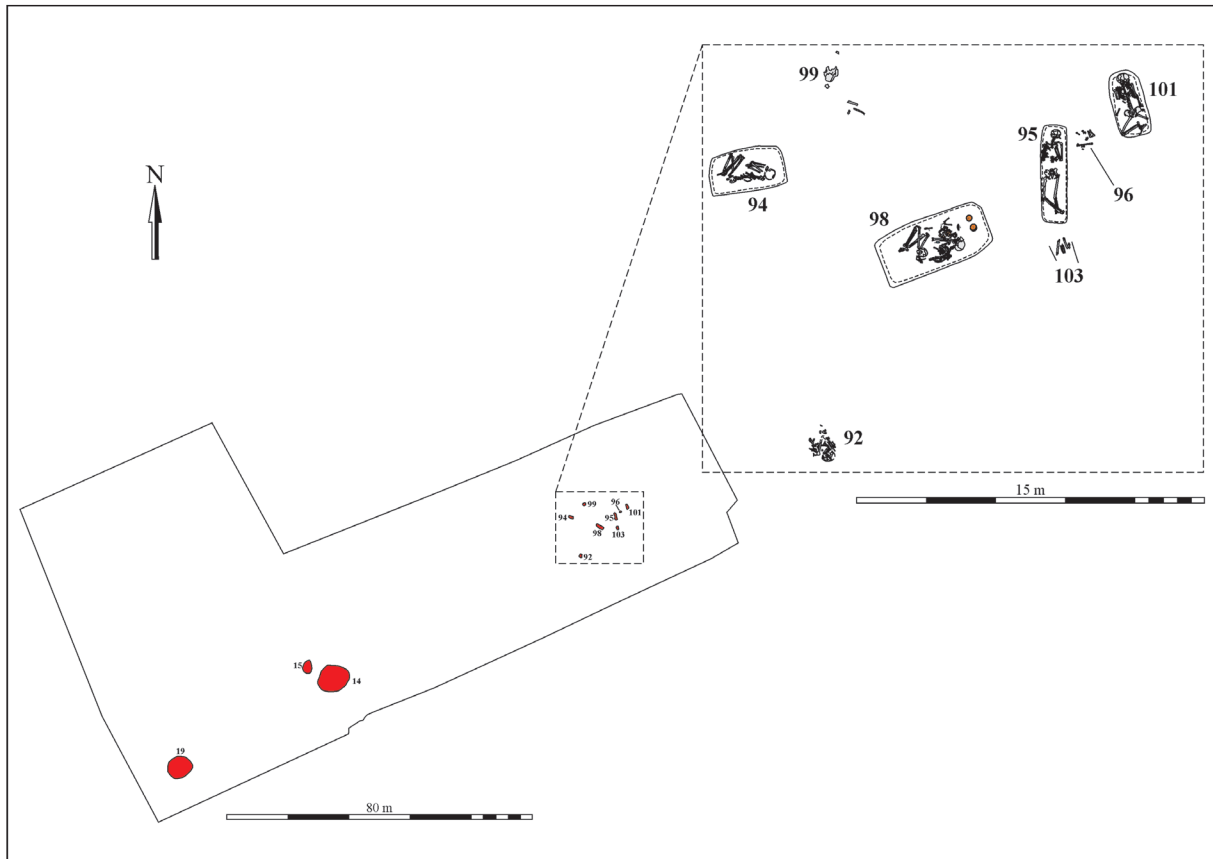


Fig. 7. Plan of the excavation carried out at the PEC002 site, showing the EEN contexts (by the authors).

age from 30 to 50, displaying one or more perimortal skull lesions. All this indicates the possibility that these individuals were victims of violent conflicts. On the opposite side of the excavated area, about 50 m southwest of the grave cluster, scattered evidence of a contemporary settlement was identified. These consist of several Tiszapolgár pottery fragments, identified in a secondary position in the fill of three LEN pits. The three pits in which Tiszapolgár pottery was found probably constitute the edge of a small settlement south of the area we investigated.

During the same period, at a distance of approx. 1.5 km northeast of PEC002, an area situated on the Forgaci Valley starts to be used as a burial space. The site was named PEC011 = East = Smart

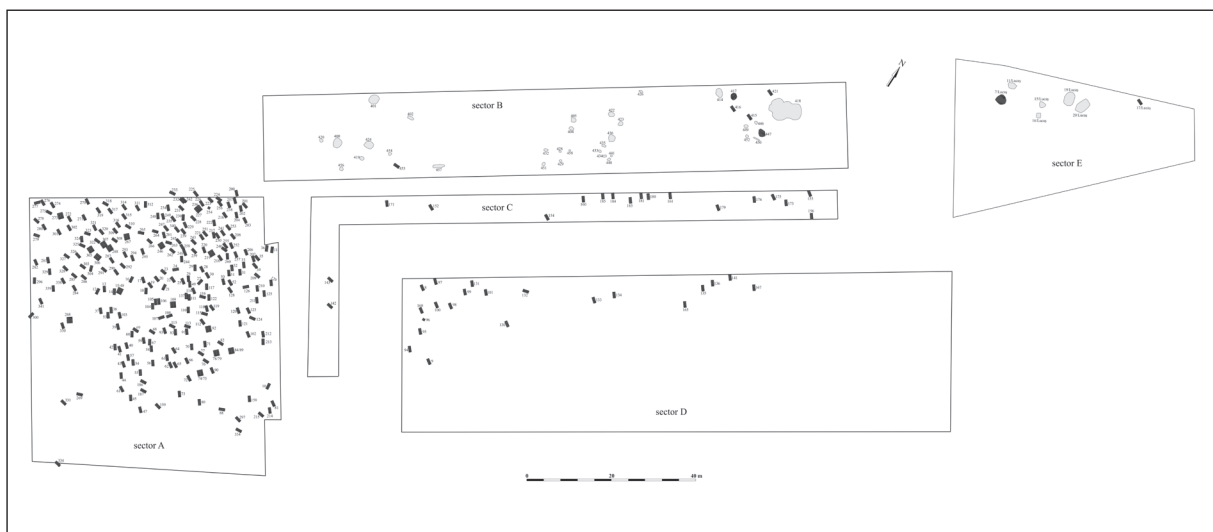


Fig. 8. Plan of the PEC011 EEN cemetery and settlement (with black showing the graves and grey the settlement features) (source: Sava, Ursuțiu 2020a).

Diesel²⁷. It continues to be in use for about four centuries (ca. 4400-4000 B.C.). At first the pottery used here belongs to the Tiszapolgár style, later Bodrogkeresztúr and in a few cases Salcuța pottery was used²⁸. Pre-development excavations have led to the discovery of 278 inhumation graves (Fig. 8). In most of the graves only one individual was buried, lying on the right or left side, and oriented on the SE-NV axis. Occasionally double, triple or atypical burials were found, such as secondary burials, deceased laid in supine position, etc. It can be stated that the burial site discussed here represents the largest EEN cemetery in the intra-Carpathian area. Besides these peculiarities, the number of artifacts displayed in the graves stands out, such as ceramic vessels, copper axes and ornaments, gold ornaments (Fig. 9), stone arrowheads, etc.

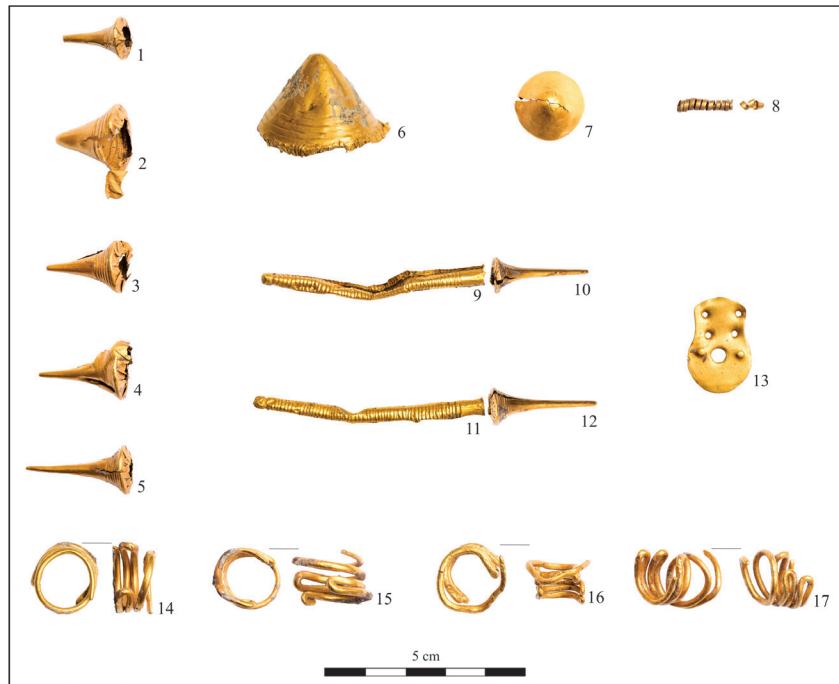


Fig. 9. Gold ornaments found in the EEN PEC011 cemetery (source: Sava, Ursuțiu 2020a; photos by Ioan Scripciuc).



Fig. 10. Drone photography indicating the EEN sites near PEC011 cemetery (by the authors).

²⁷ See the most recent overview of the site in Sava et al. 2022c.

²⁸ Sava et al. 2017; Sava, Ursuțiu 2020b.



Fig. 11. Satellite imagery of PEC035 and PEC037 EEN sites (source: GoogleEarth).

A number of EEN settlements have been discovered around the PEC011 cemetery²⁹. Excavations carried out during 2016-2017 on PEC011 site led to the discovery of a part of a Tiszapolgár settlement. The identified contexts are mainly pits with various utilities, which over time were used to dump different household debris, such as shards, animal bones, grindstones, etc. According to the available data, the excavated area of the PEC007 settlement has uncovered several pits in which large quantities of pottery decorated in the Bodrogkeresztúr style have been found³⁰. Just 450 m east of the PEC011 cemetery can be found another Bodrogkeresztúr settlement called PEC012 = Forgaci 1³¹. New excavations have defined the limits of the multistratigraphic site PEC012, which covers an area of about 10 ha. The large number of artefacts dated to this period and the large size of the settlement suggests the presence of a significant centre of regional importance. Excavations undertaken at PEC010, located approximately 800 m south-east of PEC011, have led to the discovery of another Bodrogkeresztúr settlement.

As mentioned above, one of the objectives of the ArheoPecica project is to process the data acquired during the excavation of the PEC011 EEN cemetery. In addition to the analysis of the burial finds, our research also aims to identify its contemporary sites. Recent field surveys have led to the discovery of two more sites (PEC035 and PEC037), located within close proximity to the PEC011 cemetery and the PEC012 settlement (Fig. 10). Both sites (PEC035 and PEC037) are approximately circular in shape (Fig. 11), on the surface of which Tiszapolgár pottery and animal bones were found.

In addition to the field survey, geophysical measurements were conducted at PEC035 (Fig. 12). The results of these measurements show that a round ditch surrounds a central area of approx. 1500 m² (0.15 ha). Including the ditch the whole site covers approx. 0.5 ha. Apart from the mentioned ditch no significant features can be observed. A number of round pits are the only visible anomalies. Field surveys were undertaken on 10.03.2022, and the land on which the site is located was freshly plough, therefore its features could be well distinguished. A large number of Tiszapolgár shards and a considerable number of animal bones were collected. As expected, the artefacts were concentrated in the central area. Moreover, in this central area the soil is light-coloured, greyish in consistency and very loamy, which can also be seen in satellite or aerial photography.

Site PEC037 is located approximately 170 m south-southeast of PEC035. As in the previous case, a ditch can be seen extending around a central area. Unlike PEC035, the ditch of site PEC037 stops

²⁹ Luca 1993; Virag 2013; Sava, Ursuțiu 2020b, 212-213.

³⁰ Marta *et al.* 2012; Virag 2013.

³¹ Luca 1993; Sava *et al.* 2022f.

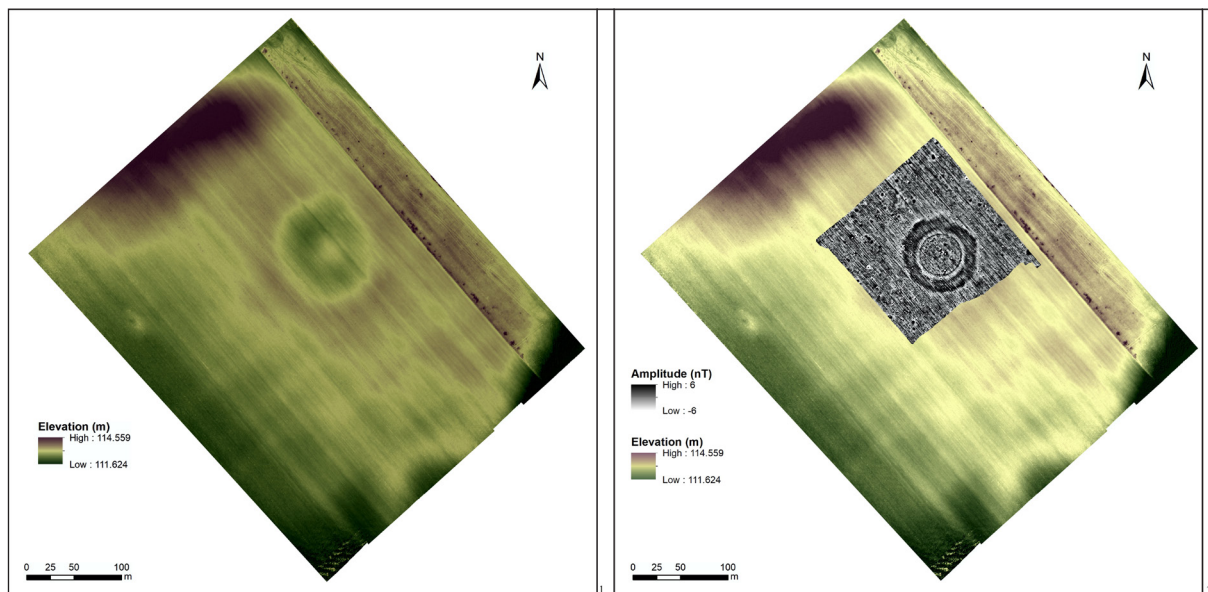


Fig. 12. Digital elevation model and the results of the geophysical survey of the PEC035 EEN site (by the authors).

at the edge of the terrace. The core occupies an area of approx. 1500 m², and together with the ditch it covers approx. 0.7 ha. In the case of this site, the field survey was conducted on 11.03.2022 when the terrain was freshly ploughed. The site was easy to identify due to the lack of agricultural crops. Most artefacts were found on the greyish coloured patch, constituting the centre of the site. As with PEC035, in the central area, where the soil is light in colour, with a greyish and very loose consistency, were found the majority of shards and animal bones. Field surveys indicate the contemporaneity of the two sites, with Tiszapolgár ceramic fragments being found³².

As mentioned above, a particular issue that arises from the analysis of EEN finds in the Pecica micro-area lies in the disproportion between the size of some cemeteries and settlements. While in the case of PEC002, where the cemetery is composed of at least four individuals and the settlement covers a relatively small area, the situation is different for the group of sites in the proximity of PEC011. This large cemetery, PEC011, was in use for several centuries. Comparing the situations found in Pecica with the whole area where the Tiszapolgár and Bodrogkeresztúr ceramic styles were used, we find that although it is difficult to estimate the size of the known cemeteries, few exceed 50 graves. The largest burial space investigated, so far, is that at PEC011. Some explanations for the varying sizes of the cemeteries were that the larger ones, such as Tiszapolgár-Basatanya, were regional cemeteries used by multiple communities³³. Usually such cemeteries are used for two to three centuries, which leads us to consider them as burial grounds of thriving settlements. Therefore, the economic prosperity of the communities developing around the PEC011 cemetery can be best assessed from the rich burial inventories of the deceased.

The archaeological context encountered at Pecica offers a unique possibility to study significant topics in the context of the EEN in the Carpathian Basin. This is due to the fact that a notable number of contemporary settlements and cemeteries are known within a small area. Moreover, most of them have been investigated through excavations, thus providing a valuable data set.

Further steps will be taken to document as accurately as possible the contemporary sites of the PEC011 cemetery. The aim is to establish chronological correlations between the various phases of the cemetery and nearby sites. Subsequently we will consider the role of each within this group of sites.

At the turn of the 4th and 3rd millennia BC (Late Eneolithic and Early Bronze Age)

Towards the mid 4th millennium BC a new pottery style begins to be used in south-eastern Europe: Cernavodă III-Boleráz³⁴. Two other styles will form the basis of this one, they are known as Baden

³² In addition to EEN pottery, numerous shards dating to the 11th-13th centuries AD were also found, evenly spread across the site.

³³ Sherratt 1997, 289.

³⁴ Roman, Diamandi 2001; Oanță-Marghitu 2003.

and Coțofeni. All these are considered to belong to LEN. With the development of the Cernavodă III-Boleráz pottery, a greater tendency towards cultural uniformity was noted, a feature that was later transmitted to the Baden and Coțofeni styles. In addition to certain common features of the Cernavodă III-Boleráz ceramics, certain wares with a wide range of distribution have also been reported, spread from the Carpathian Basin to the Balkan Peninsula, such as the Baratslava-type bowls³⁵ or the so-called pseudo-kernoï³⁶.

The last decades of excavations in the Carpathian Basin have confirmed that the communities that used Coțofeni pottery are mainly spread in the highlands of western Romania and Transylvania, while the Baden communities are spread in the Pannonian Plain³⁷. As throughout the previous periods, LEN communities are reported around Pecica. In most cases, the pottery used here was decorated in the Baden style. However, in some isolated cases there have been discovered Coțofeni shards³⁸. The reported phenomena is not singular, but rather represents a norm of the area between the Tisa and the Apuseni Mountains³⁹, highlighting the intense contacts between the mountain and lowland communities.

Among the four sites where LEN contexts have been discovered, only on PEC002 and PEC007 excavations were conducted. Pre-development excavation at PEC007 has uncovered an important Baden settlement. 72 archaeological features have been recorded: 3 dwellings, a well and 68 pits with various functions (clay extraction pits, storage or for household use)⁴⁰. Close to PEC007, to the west of it, our field surveys have identified another Baden settlement. The survey was carried out on 10.03.2022. The site is located on the terrace of the Mureș River, on a higher area. The Baden pottery was spread over an area of approx. 15 ha⁴¹.

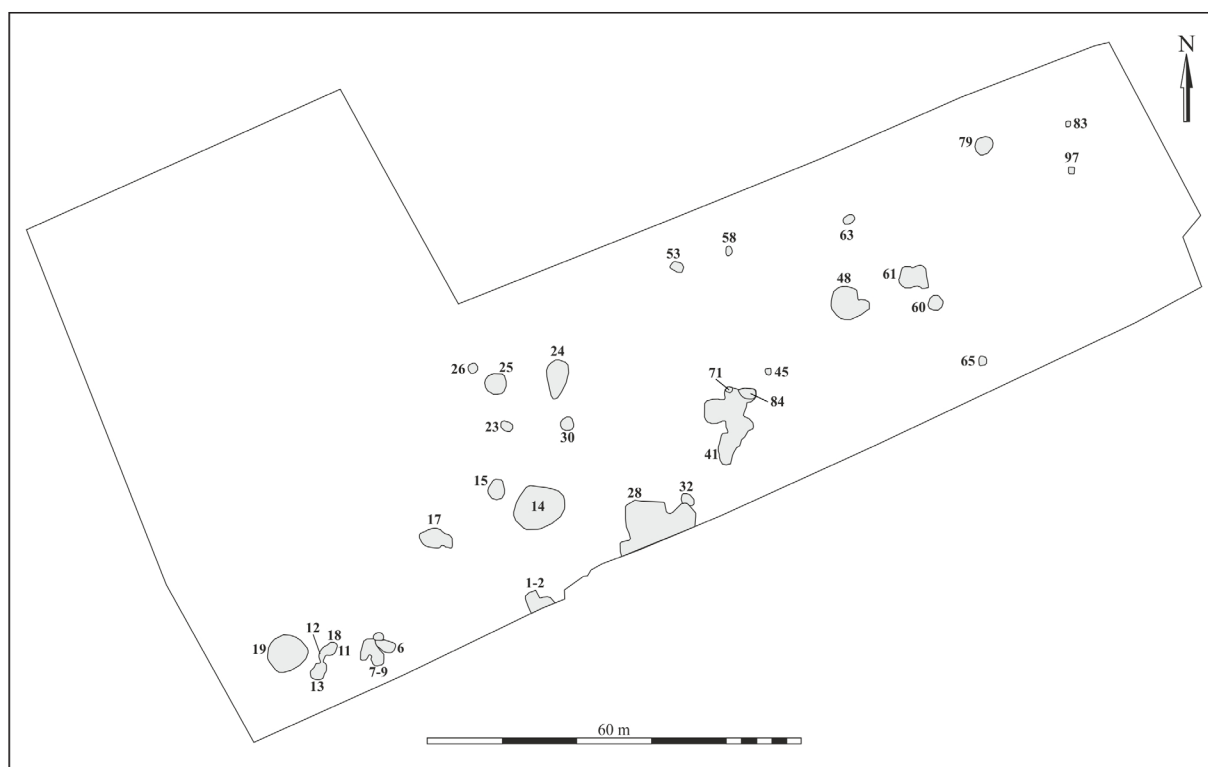


Fig. 13. Plan of the excavation carried out at the PEC002 site, showing the Late Eneolithic features (by the authors).

³⁵ Spasić 2008, 37-38, Pl. 3.

³⁶ Horváth 2009, 115, Fig. 10, 11.

³⁷ Sava 2008, 61-62.

³⁸ Sava 2015, 243-244, nr. crt. 99-100.

³⁹ See a related discussion at Sava 2015, 236-237.

⁴⁰ Marta *et al.* 2012, 289.

⁴¹ Together with the LEN pottery, we found a large number of pottery fragments from the 2nd-4th centuries AD, and mainly on the southern side of the site pottery from the 11th-13th centuries AD.

Another Baden settlement recently investigated is PEC002. During the pre-development excavation, 32 pits were discovered, which contained pottery decorated in the Early Baden style (Fig. 13)⁴². Following the fieldwork carried out around the excavated area, we were able to determine that the settlement extends south-eastwards over an area of about 3-4 ha, and that the excavated part represents its northern edge. In addition to the small and medium-sized pits whose utility remains uncertain, we can point out several features whose utility can be assumed by their shape and content. Among these, two dwellings have been identified, both provided with a fireplace. Other large-sized pits contained a significant amount of finds, were interpreted as both clay extraction pits and abandoned dwellings. Alongside these, two relatively small pits were documented, which contained a very rich inventory: numerous vessels, heavy traces of burning, animal bones, an impressive quantity of shells and turtle shells. By studying the layout of the LEN finds it is not evident that there is any particular clustering around the presumed dwellings, but rather that the features are spread relatively evenly over the entire investigated area.

One of the most significant phenomena during this period is the migration of steppe populations to Central Europe⁴³. These populations, known generically as Yamnaya, also reached western Romania and Transylvania towards the end of the 4th millennium BC and in the first part of the 3rd millennium BC⁴⁴. Collective and individual mobility seems to become a way of life⁴⁵. According to current archaeological research, the most visible manifestation of this population is the construction of earthen burial mounds, in the centre of which the deceased were buried. Sometimes the mounds also contained subsequent burials⁴⁶. On the other hand, in the highlands of Transylvania there are a number of tumuli covered in stone. These communities, which are considered local, differ in their funerary rites and rituals from those originating in the steppes⁴⁷.

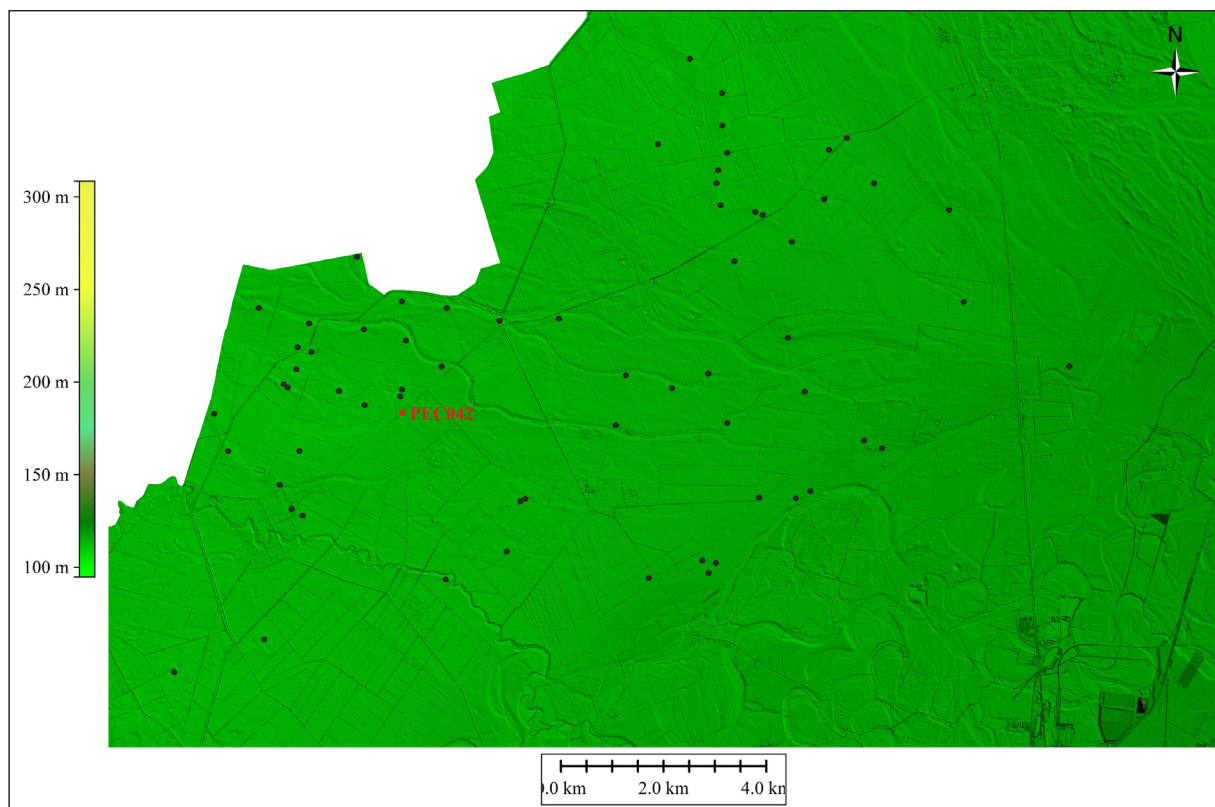


Fig. 14. Digital elevation model showing the location of PEC042 tumulus (red) and depiction of the tumuli mapped during 2022 (black circle) (by the authors).

⁴² Sava et al. 2019a; Sava et al. 2022d, 76.

⁴³ From an extensive reference list see Mathieson et al. 2018; Furholt 2018.

⁴⁴ Recent discussions and older references at Diaconescu 2020; Gogâltan 2021; Ciugudean 2021.

⁴⁵ Gerling et al. 2012.

⁴⁶ Frînculeasa et al. 2015; Diaconescu 2020; Frînculeasa 2021.

⁴⁷ Ciugudean 1996; Ciugudean 2011; Gerling, Ciugudean 2013.

Field surveys north of Pecica have identified a considerable number of burial mounds. Although the area of interest of our project covers the administrative territory of the town of Pecica, for a better understanding of these monuments it was necessary to map the entire field of tumuli. Within Turnu-Curtici-Sofronea area, 67 mounds have been reported so far (Fig. 14). It should be noted that this phenomenon is not singular, similar clusters of tumuli are also known in the administrative territory of Macea-Sânmartin, Pîlu-Grăniceri-Socodor and Mișca.



Fig. 15. PEC042 (yellow arrow) and other mounds depicted on the Josephine Topographic Survey (source: DVD Az Első Katonai Felmérés. A Magyar Királyság Teljes Területe 965 Nagyfelbontású Színes Térképszelvényen 1782-1785).

Aiming to obtain preliminary data on the burial mounds north of Pecica, we have selected the additional investigation of mound PEC042. It is located near Variașu Mare, being cut by the county road 709J. During the 18th century the construction of this road led to the partial destruction of the mound. Later, it was used by the villagers to extract clay and as a place to store waste. All these actions led to the destruction of an important part of the burial monument. The mound proposed for investigation was depicted on the first Josephine topographical survey, carried out in the second half of the 18th century (Fig 15). In this period the mound was located in the vicinity of an dirt road. The same map shows a number of mounds extending from north of Battonya (Hungary) to Curtici. On the second military topographical survey of the Habsburg Empire conducted during the 19th century, the PEC042 mound is already illustrated as being heavily damaged by the development of the road linking Turnu to the newly established Variașu Mare village (Fig. 16). The same situation can be found on the third military topographical survey prepared later (Fig. 17). Today only the south-western side of this mound is preserved, on an area of about 1200 m² (Fig. 18-21). Even under these conditions the maximum height of the mound is close to 3 m.

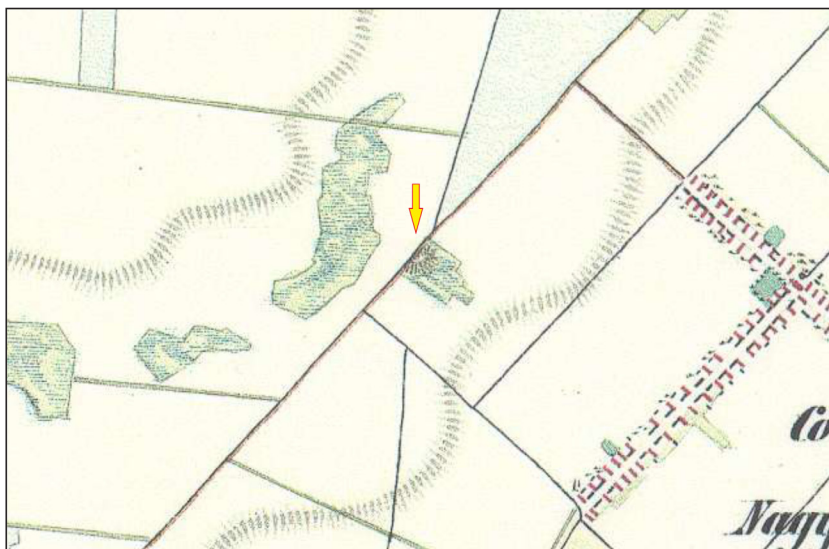


Fig. 16. PEC042 mound (yellow arrow) depicted on the Franciscan topographic survey (19th century) (sursa: DVD Die Hochauffösenden Fardigen Kartenprofilen des Königreichs Ungarn und Banat von Temes).

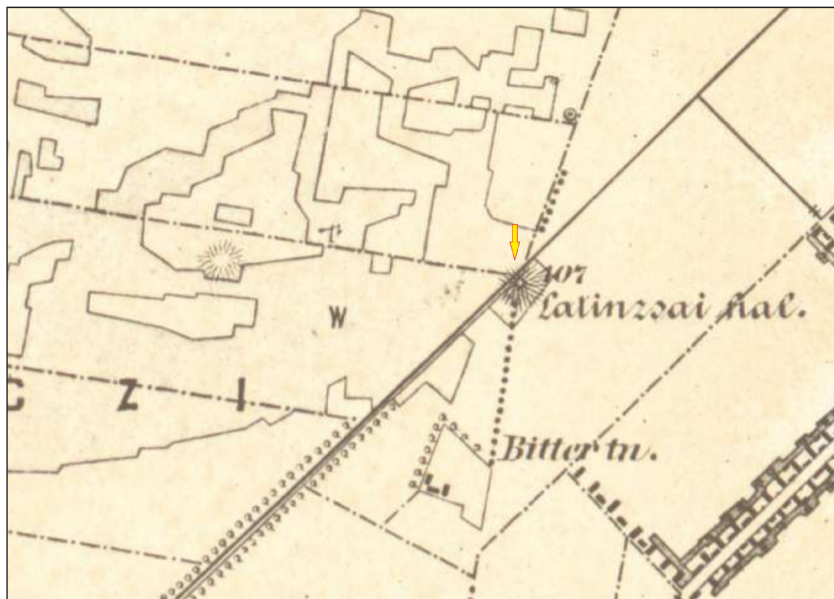


Fig. 17. PEC042 mound (yellow arrow) depicted on the Third Topographic Survey of the Austro-Hungarian Empire (1869 - World War I) (source: www.commonswikimedia.org).

Fig. 18. Drone photography of mound PEC042 (12.04.2022) (by the authors).



Fig. 19. Drone photography of mound PEC042 (12.04.2022) (by the authors).

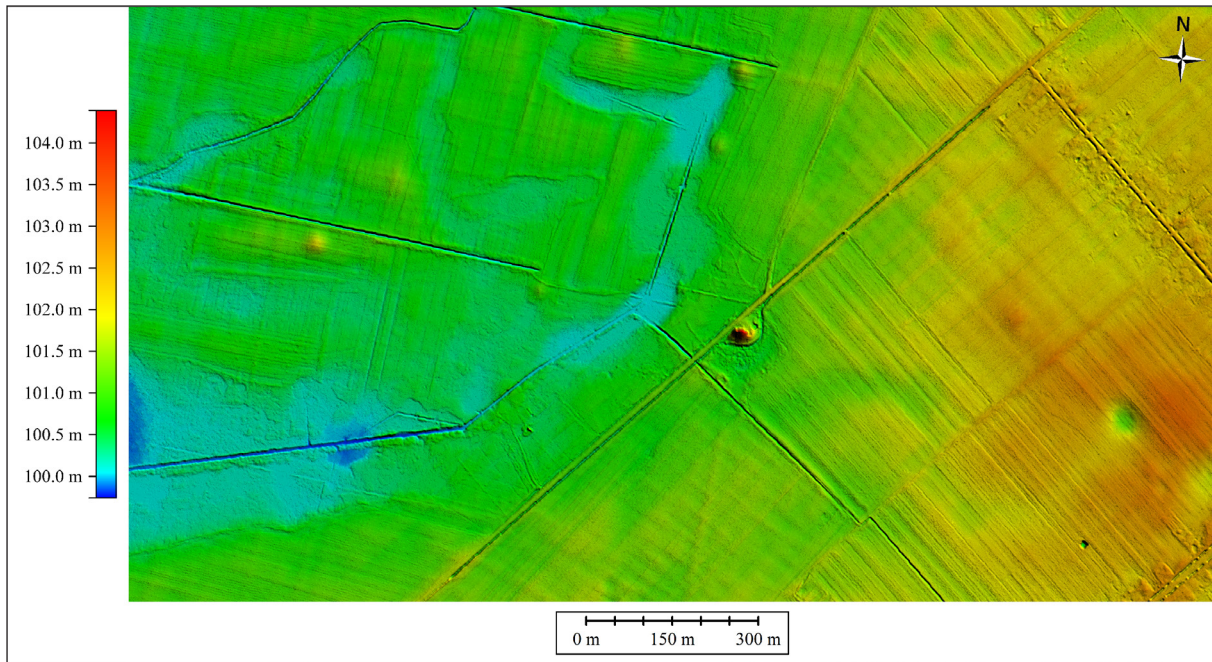


Fig. 20. Digital elevation model of mound PEC042 and surrounding area (by the authors).

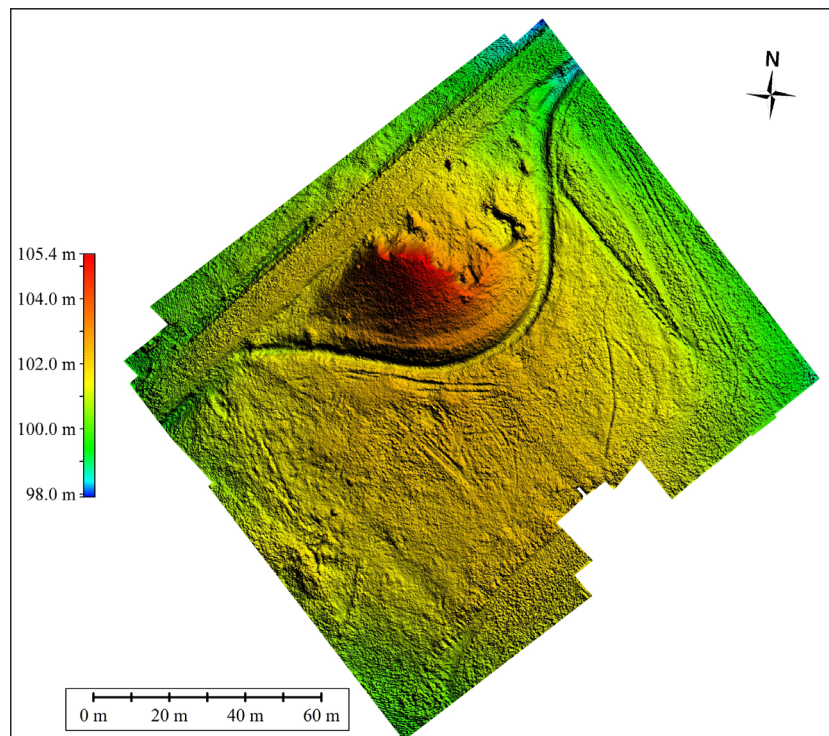


Fig. 21. Digital elevation model of mound PEC042 (by N. Kapcsos).

As a first step towards investigating the PEC042 tumulus, geophysical survey was carried out in the undisturbed area (Fig. 22). Before survey began, the entire area was cleared to reduce as much as possible the number of modern and contemporary debris. On this occasion the existing vegetation on the north-eastern side of the tumulus was removed, which is why at a depth of approx. 0.30 m, measured from the highest point of the mound, human bones were observed in anatomical connection. The results of the non-invasive investigation indicate the existence of several archaeological features (Fig. 23). By shape, some of these appear similar to graves, others suggest smaller pits, or possible narrow ditches (Fig. 24).

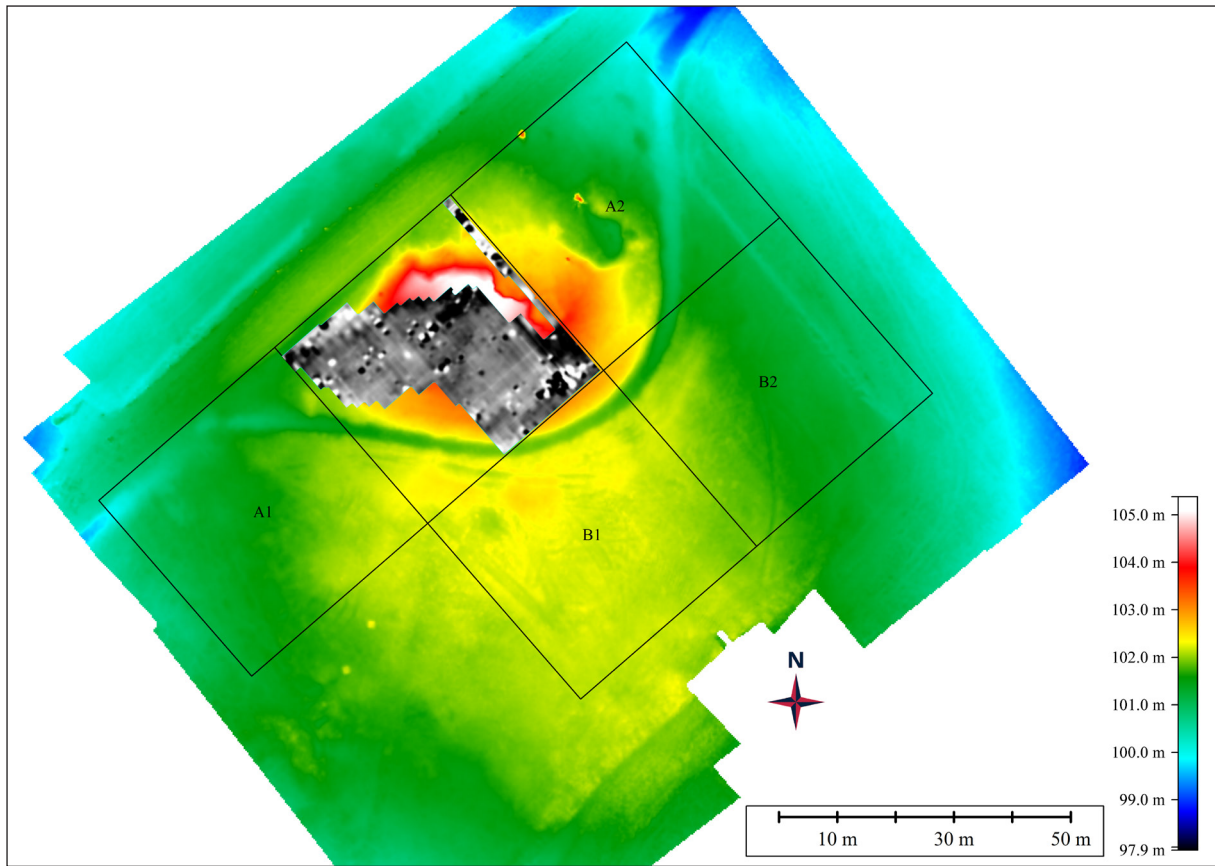


Fig. 22. Digital elevation model of mound PEC042 and the results of geophysical survey (by the authors).

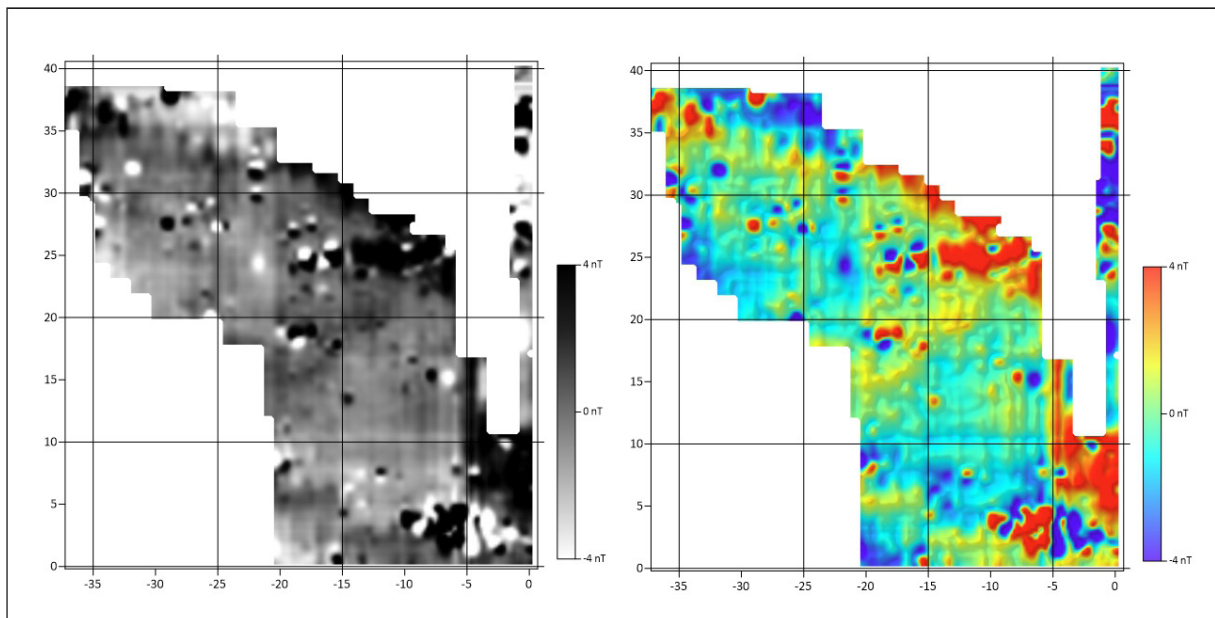


Fig. 23. The results of the geophysical survey of the PEC042 mound (by the authors).

To verify the accuracy of the geophysical measurements, but also to save the skeleton discovered in the ad-hoc profile of the mound, we decided to open a small trench. The 2.25 m long trench was positioned so as to encompass the entire anomaly, named by us as anomaly 3, which overlapped with the skeleton (Fig. 25). At a depth of about 0.30 m, the remains of an individual were identified, so anomaly 3 was confirmed by excavation. The left side of the skeleton was heavily disturbed by non-

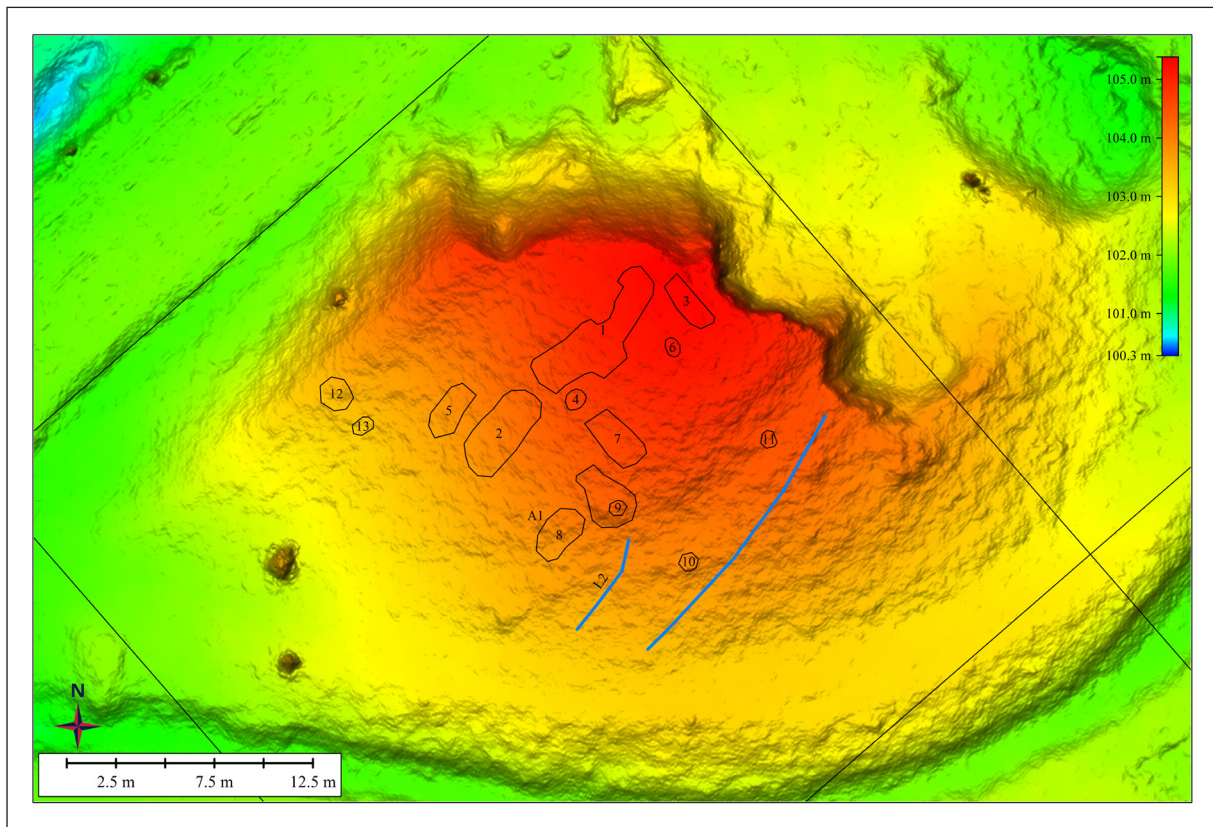


Fig. 24. Digital elevation model of the PEC042 mound and the interpretation of geophysical survey measurements (by the authors).



Fig. 25. Drone photography of the mound and the grave cx. 1 (30.06.2022) (by the authors).

archaeological interventions on the mound. Although the state of preservation of the individual was poor, we found that it was laid out on an approximately east-west axis, facing left, laid on its back, with the lower limbs next to the body and the lower limbs flexed to the left (Fig. 26). The only funerary inventory item consisted of a copper ring, found in the skull area. From a stratigraphic point of view, it is as obvious as possible that the grave was excavated in the mound, and was consequently later than the mound itself. Its dating is provided by a ^{14}C date which offered the following chronological range: 2878-2634 calBC (95.4%). The position of the deceased and his chronological setting can be found in numerous Yamnaya funerary contexts from Muntenia⁴⁸, Banat and Transylvania⁴⁹.

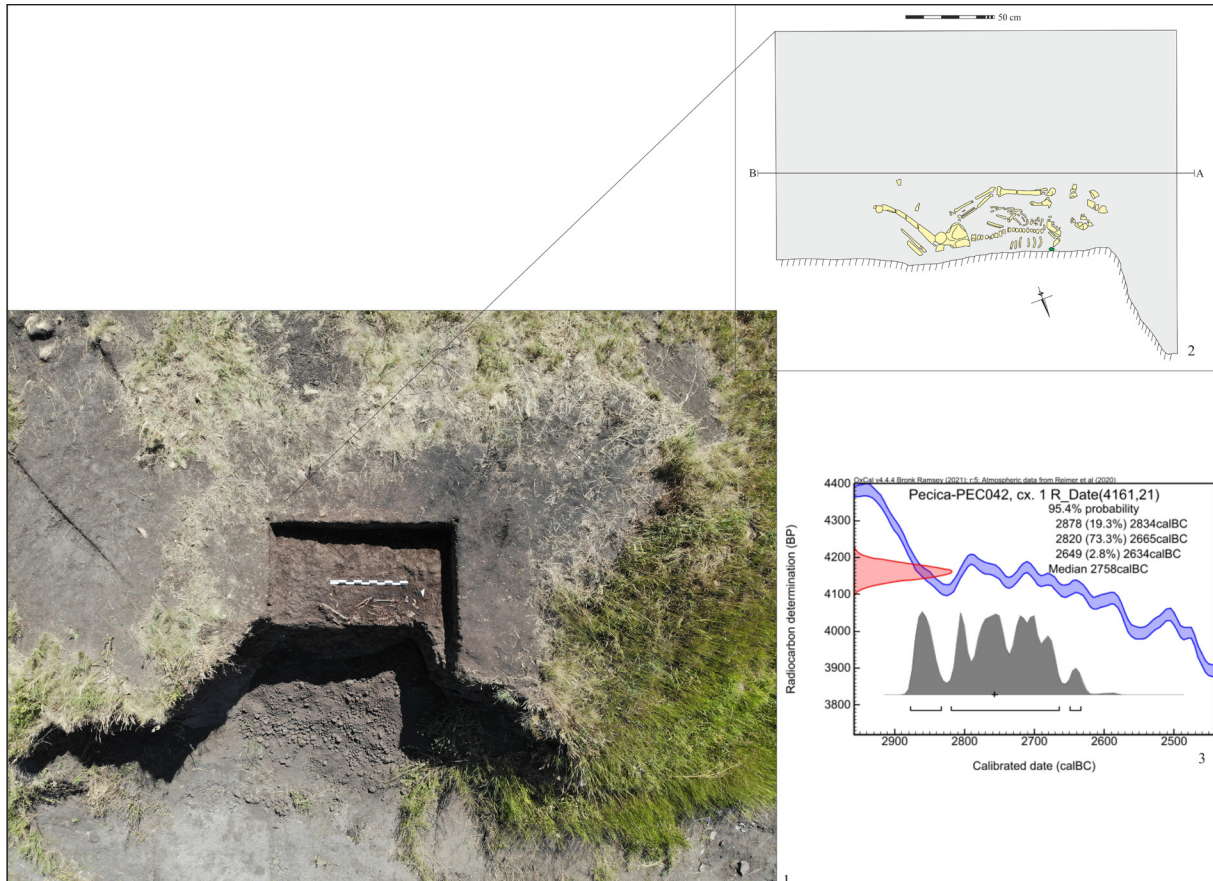


Fig. 26. Drone photography and drawings of cx. 1 grave, together with its dating (by the authors).

In addition to the burial mounds identified north of the town of Pecica, there is available another set of data relating to the EBA. We are referring to the earliest layer of the PEC006 site (Fig. 27). During the excavations carried out in 2011, evidence of a settlement that dates back to ca. 2600-2400 BC was discovered⁵⁰. A significant number of pits of various sizes were documented. The pottery found is decorated in the manner of the Makó-Kosihy-Čaka style, widespread in the Carpathian Basin from western Romania to south-western Slovakia⁵¹. Fragments of stone axes and chisels complete the existing data set. The recent study of animal bones found here suggests that the focus of the economy was animal husbandry rather than hunting. However, hunting was also a substantial source of food. The study shows that members of the community hunted both boar and deer. Archeozoological data for the EBA in the areas bordering the Lower Mureş Region show that a significant part of the studied assemblages are dominated by cattle, followed by sheep, pigs, rarely dogs and horses⁵². Certain assemblages such as those at Kiszombor-Új-Élet phases 3-4 or the Csongrád-Sertéstelep site in the

⁴⁸ See for ex. Frînculeasa 2021, Fig. 4; Frînculeasa *et al.* 2022, Fig. 6, 8, Pl. VIII/2-3.

⁴⁹ Jarosz *et al.* 2021, Fig. 34; Gogâltan 2021, Pl. 1-2, with older references; etc.

⁵⁰ Sava, Gogâltan 2022a, 29-30, Fig. 7.

⁵¹ Kulcsár 2009.

⁵² Pop *et al.* 2018, 130-131, Fig. 2.

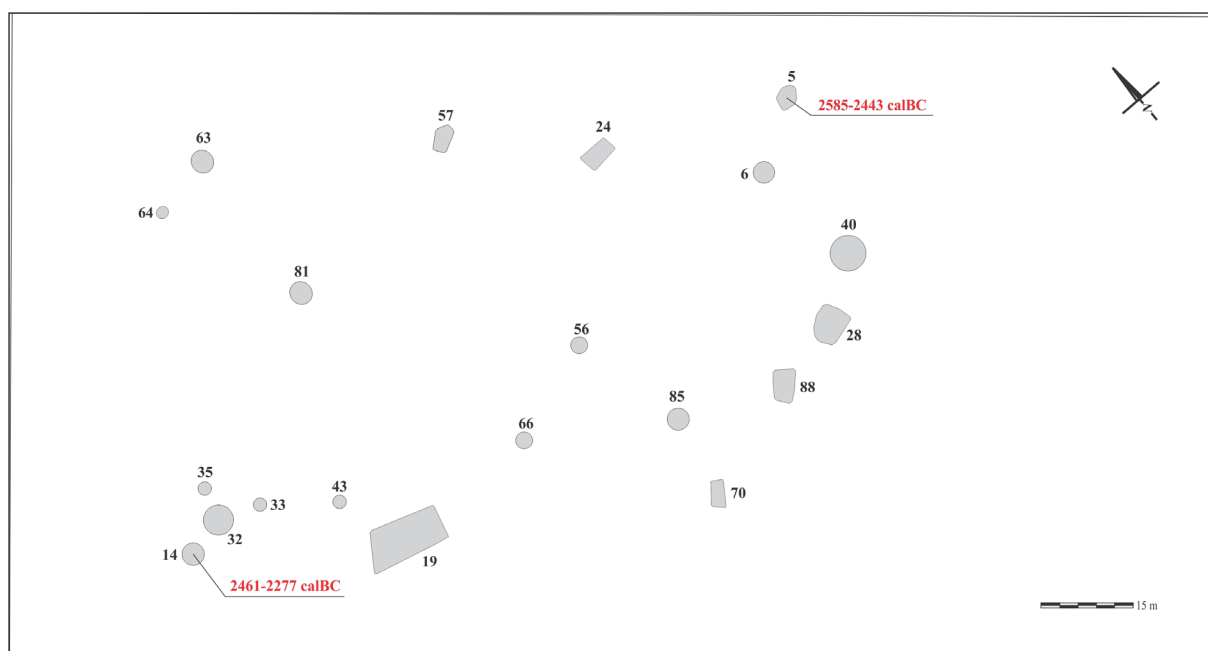


Fig. 27. Plan of the PEC06 settlement, showing the Early Bronze Age features (by the authors).

northern proximity of the Lower Mureş differ from the general trend. Here sheep and goats have the largest share, followed by cattle⁵³. Another peculiar situation in the Makó settlement of Pecica is the importance given to the horse breeding. From these data it is clear that the domestic economy of our settlement was centred on cattle and horse breeding. Pigs and sheep and goats, although present in the contexts studied, are found in a small proportion. The community was interested in slaughtering them for meat, less for by-products.

The mapping of the burial mounds located north of the town of Pecica, the excavations carried out in the LEN settlements (PEC002 and PEC007) and in the EBA settlement at PEC006, represent a solid starting point for interpreting the cultural phenomena of the first half of the 3rd millennium BC. The most important goal for this period is to determine the absolute chronological connection between the LEN communities, the burial mounds considered to belong to the Yamnaya steppe population and the EBA settlement at PEC006.

Late Bronze Age II – the world of the mega-forts

The gradual abandonment of the tells, which occurred after ca. 1600 BC⁵⁴, coincides with the development of new settlements and cemeteries, attributed to the LBA. According to the ¹⁴C data collected from certain Lower Criş Region multi-layer settlements⁵⁵, or MBA cemeteries, such as Ostojićevo-Stari Vinogradi⁵⁶, we can argue that the evolution of some MBA sites ends long after most of the tell were abandoned. Moreover, some tells continue to be inhabited even during the 16th and 15th centuries BC, such as Klárafalva⁵⁷ or Toboliu⁵⁸. Simultaneously, a number of studies show that between 1550 and 1450 BC a significant population growth took place in Europe⁵⁹, which most probably had major impacts in our area of interest. Supported by the available data, the gradual abandonment of the tells and the development of new settlements should be regarded more as a survival of MBA traditions, to which are added a number of Central European components, reflected both in material culture and in funerary rites and rituals⁶⁰. Equally, the evidence suggests an internal evolution of

⁵³ Nicodemus 2014, 366-367, Tab. 13.4; Pop *et al.* 2018, Fig. 2.

⁵⁴ Gogáltan 2015; Sava 2020; Sava, Gogáltan 2022a; Sava, Gogáltan 2022b.

⁵⁵ Duffy *et al.* 2019.

⁵⁶ O'Shea *et al.* 2019.

⁵⁷ O'Shea *et al.* 2019, Fig. 8.

⁵⁸ Lie *et al.* 2019; Gävan *et al.* 2021; Lie 2021; Gävan *et al.* 2022.

⁵⁹ Capuzzo *et al.* 2018.

⁶⁰ Sava, Ignat 2016; Sava, Gogáltan 2019; Sava, Gogáltan 2022b.

local communities, reflecting a series of macro-regional developments. A similar pattern of evolution towards greater socio-economic and political complexity reflected in an internal process in terms of population flow has recently been demonstrated in other parts of Europe⁶¹.

Towards the end of the 16th century and during the 15th century BC large fortifications began to be built at the confluence of the Mureş and Tisa Rivers. These are known as mega-forts or mega-sites. Among the best known are Sântana-Cetatea Veche and Corneşti-Iarcuri. Apparently the mega-fort at Corneşti is the earliest, probably built towards the end of the 16th century BC⁶². The four enclosures encompass more than 1700 ha and consist of earthen ramparts, palisades and ditches. During the 13th century BC the fortifications have suffered significant destruction⁶³. Another important mega-fort was built in the 15th century BC at Sântana-Cetatea Veche⁶⁴. The four enclosures cover about 130 ha. The IIIrd fortification system, the most massive, consists of a 26 m wide, 2.5 m high rampart, on the top of which a wall of wood and clay was built. This defensive system includes two deep ditches. Among the most significant features of the site are numerous large buildings, impressive funerary monuments and a considerable number of gold, bronze, glass and faience artifacts. The mega-fort was besieged and destroyed in the 13th century BC and habitation never resumed⁶⁵. A further significant mega-fort is Orosháza-Nagyatársánc. The available data is scarce, but we can state that the area of approx. 110-120 ha was fortified by an earthen rampart, probably a palisade and a defensive ditch⁶⁶.

The Idoş-Gradište⁶⁷, Csánadpalota-Földvár⁶⁸, Makó-Rákos-Császárvár⁶⁹ or Végegyháza-Zsibrikdomb⁷⁰ mega-forts seem to have been organised differently. They present a heavily fortified, small central enclosure surrounded by a network of ditches, which may encompass an area of up to approx. 400 ha. However, a different pattern can be noted at the Munar-Wolfsberg. The MBA tell here was enclosed in a LBA fortification of approx. 15 ha⁷¹.

Besides the aforementioned mega-forts, there are a number of LBA II settlements in Banat surrounded by several ditches⁷². Due to the lack of excavations or geophysical surveys, it cannot be determined whether these settlements were provided with a rampart and a palisade. This phenomenon was not restricted to the Lower Mureş Region, but also extended to the Serbian Banat. A large number of similar settlements enclosed by ditches have been reported here⁷³.

Similar examples are also known in the Pecica area and the surroundings. Among them is PEC020⁷⁴. The site is located on the edge of the high terrace of the Mureş River, and a number of five semicircular ditches⁷⁵ start from the edges of this terrace (Fig. 28). The section in which the settlement is situated is the highest part of the terrace, having at the same time the steepest edges. However, the large number of archaeological layers (MBA, LBA, 2nd-4th century AD, 11th-13th century AD and 14th-16th century AD) makes it difficult to investigate this important site and almost impossible at this point to assign the ditches to a specific settlement. Whether the ditches were doubled by palisades, if any, is not yet clear. Certainly the 1st enclosure, the smallest (approx. 1 ha) belongs to a medieval nobiliary residence. The other four ditches enclose the following areas: 6, 23, 54 and 103 ha. Our field surveys indicate the presence of an extensive LBA II settlement, which is concentrated on the central-eastern and eastern sides of the site. Two bronze hords, Pecica III and Pecica IV, have been discovered within this site (Fig. 29). Without further investigation the dating of the fortification systems to the LBA II remains probative. However, the complexity of the fortifications, their size and the existence of an important

⁶¹ Cavazzuti *et al.* 2019.

⁶² Lehmpful *et al.* 2019.

⁶³ Medeleţ 1993; Szentmiklosi *et al.* 2011; Heeb *et al.* 2017; Lehmpful *et al.* 2019.

⁶⁴ Sava *et al.* 2019b.

⁶⁵ Rusu *et al.* 1999; Gogâltan, Sava 2010; Gogâltan *et al.* 2019.

⁶⁶ Banner 1939.

⁶⁷ Molloy *et al.* 2020.

⁶⁸ Szeverényi *et al.* 2014; Szeverényi *et al.* 2017.

⁶⁹ Szeverényi *et al.* 2017, 139, 141.

⁷⁰ Lichtenstein, Rozsa 2008.

⁷¹ Gogâltan 2016, 90-94; Sava, Gogâltan 2017.

⁷² Dorogostaisky, Ardelean 2014; Dorogostaisky, Micle 2016; Dorogostaisky, Hegyi 2017.

⁷³ Molloy *et al.* 2022.

⁷⁴ Dörner 1970, 459; Dorogostaisky, Ardelean 2014; Sava *et al.* 2022e.

⁷⁵ The smallest ditch was dug during the Middle Ages.

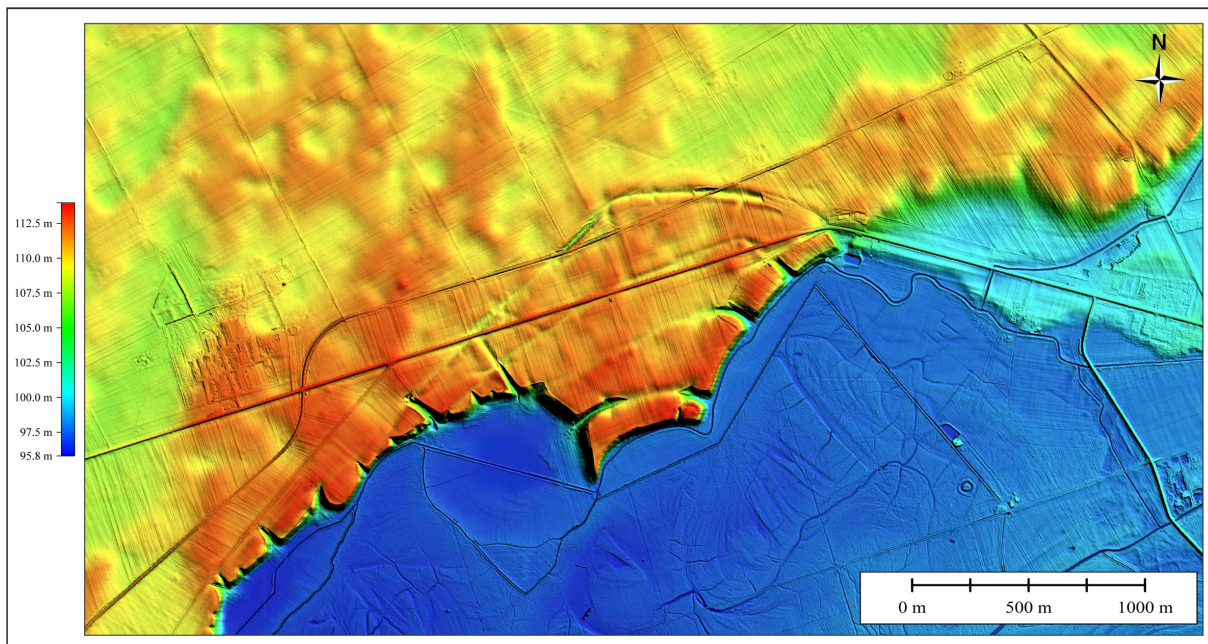


Fig. 28. Digital elevation model of the site PEC020 (by the authors).



Fig. 29. The Pecica IV hoard, discovered within the PEC020 site (photo by Ioan Scripciuc).

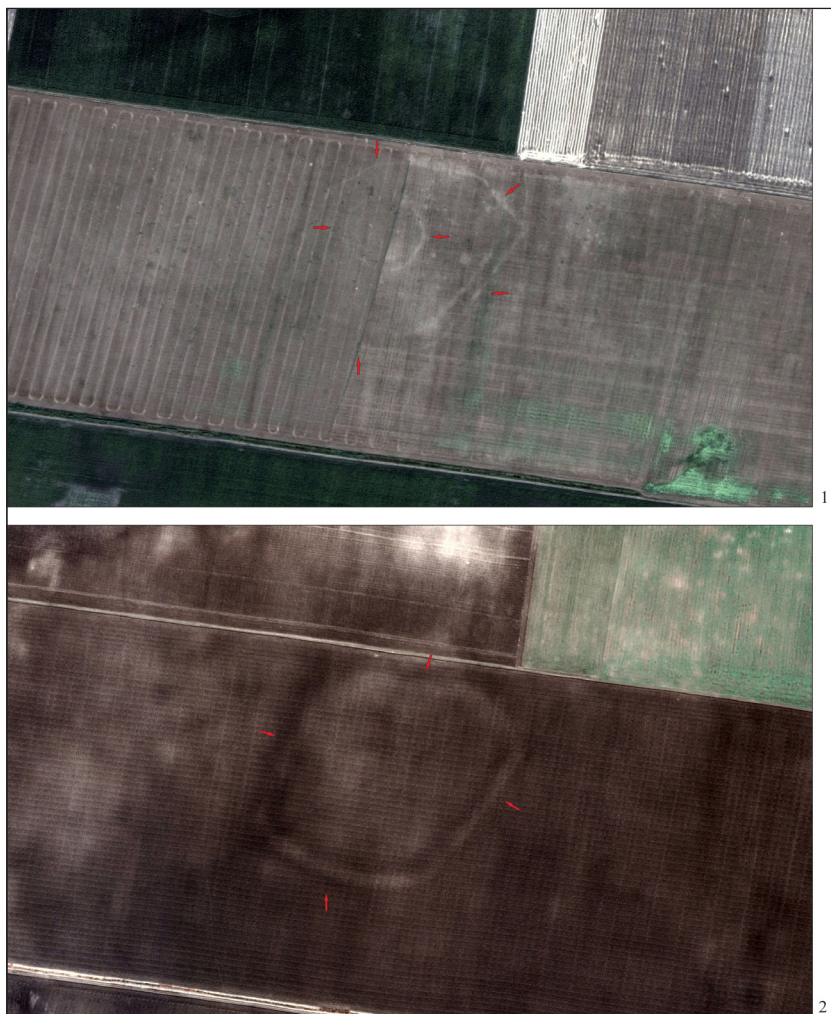


Fig. 30. Satellite imagery of the LBA site PEC038 (source: GoogleEarth).

LBA II settlement at this site are plausible arguments for dating the four enclosures (enclosures 2, 3, 4 and 5) during LBA II.

Another LBA II settlement, PEC038, is located in a lower area, bordered by several paleochannels. Two ditches, hardly visible on the field, are noticeable on the satellite imagery, enclosing approx. 0.7 ha and 6.8 ha (Fig. 30). The shape of the first enclosure is round, while the other is roughly rectangular with rounded corners. Our field survey conducted on 22.03.2022 was carried out under the condition that the land was cultivated with wheat, having at that time a height of 10 cm. Few LBA II pottery fragments were identified on the surface. About 200 m northwest PEC068 mound is located. On either side of this mound, to the west and east respectively, we identified numerous artefact clusters. Towards the west, two

greyish patches were noted where LBA II shards were found. The LBA II pottery is spread over an area of approx. 12 ha⁷⁶.

Located on the border between Romania and Hungary, the PEC040 = La Prioran site⁷⁷ is composed of three concentric ditches, encompassing areas of approx. 2.7, 15 and 63 ha (Fig. 31). The field surveys only focused on the eastern side, located on Romanian territory. In this area, few shards were found, some of them certainly dated during LBA II. Most artefacts were clustered towards the Hungarian border, i.e. towards the central area of the site.

Another LBA II settlement, enclosed by ditches, lies close to the contact area between the low and high ground of the Pecica micro-zone. The site was named PEC041 = Duleu lui Bran (Fig. 32). Both in the satellite imagery and on the field three ditches are visible. These encloses areas of approx. 3, 14 and 33 ha, with the observation that the 3rd enclosure does not seem to be complete. It is difficult to explain at this stage of the investigation that the three enclosures have been arranged according to a strait ditch of approx. 4.6 km in length, running north-north-east – south-south-west. Field survey carried out on 21.03.2022 led to the discovery of numerous LBA II sherds⁷⁸.

In the proximity of the above-mentioned sites a similar settlement is to be found, consisting of four enclosures, Semlac-SML021 = Pusta lui Cucu (Fig. 33). The study of satellite imagery suggests the

⁷⁶ A large number of shards dating to the 2nd-4th centuries AD were also found.

⁷⁷ Sites PEC040 = La Prioran, PEC041 = Duleu lui Bran and Semlac-SML021 = Pusta lui Cucu were first reported in Rada *et al.* 1988 by studying aerial photographs. The data presented in Rada *et al.* 1988 have been briefly mentioned in other publications, such as Micle *et al.* 2006, but without being located in the field. Our field surveys proved that they belong to LBA II.

⁷⁸ Pottery fragments dating between the 2nd and 4th centuries AD were also identified on the eastern side of the site.

existence of four concentric ditches. The first two can be easily detected, as they enclose areas of about 2.2 ha and 9.5 ha. The third ditch is not complete on the western side, the area enclosed being approx. 27 ha. Towards the north and east, the route of another ditch can be seen in some places, which would constitute the fourth enclosure; as it is not complete, its area cannot be estimated. As in the case of PEC041, the Smezac enclosures are arranged next to a network of linear ditches. The most visible one runs for approx. 22 km in length, being dug between the village of Şeitin and south of Battonya, on a north-east – south-west axis. Two more parallel ditches can be seen in places, and another ditch runs perpendicular to Nădlac from south of SML021. The field survey carried out on 18.03.2022 revealed that the ditches identified on the satellite imagery are visible

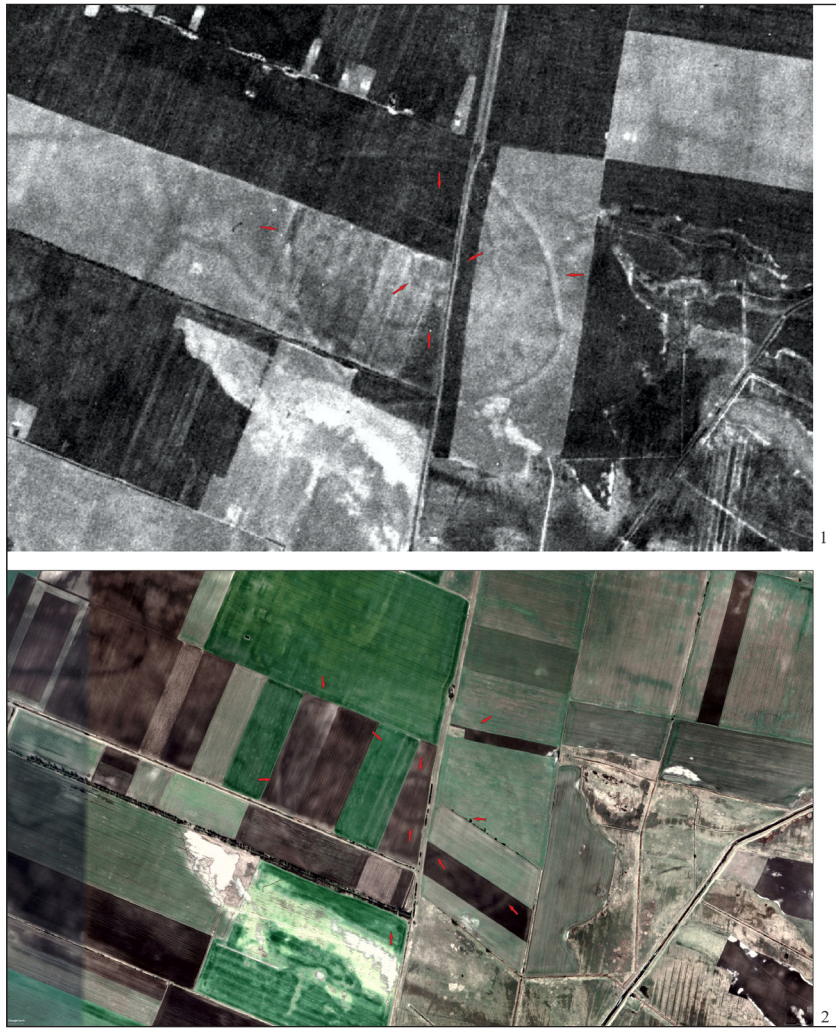


Fig. 31. Satellite imagery of the LABA PEC038 site (source: <https://corona.cast.uark.edu/atlas#zoom=3¢er=0,3000000> and GoogleEarth).



Fig. 32. Satellite imagery of the PEC041 LBA site (source: GoogleEarth).

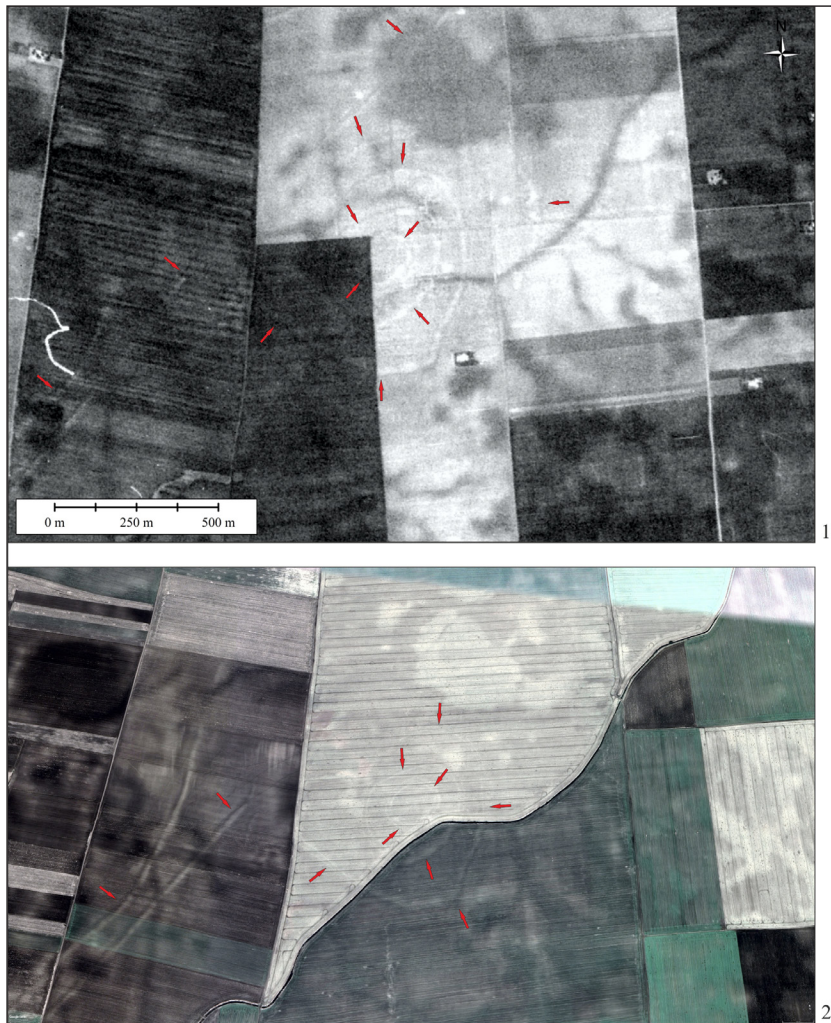


Fig. 33. Satellite imagery of the SML021 LBA site (source: <https://corona.cast.uark.edu/atlas#zoom=3¢er=0,3000000> și GoogleEarth).

on the field, the most well preserved being the first two enclosures and the linear ditches. Numerous LBA II shards were noted. The majority of the shards, adobe and stone grinders were concentrated towards the north and north-east of the three enclosures. However artefacts are visible throughout the site.

Another site enclosed by ditches is Arad-AR026. Satellite imagery and field surveys have led to identify enclosures of various shapes (circular or rectangular with rounded corners) (Fig. 34). As with the other sites mentioned, the enclosures are composed of ditches, without having been doubled by ramparts. In the case of AR026, a first enclosure has a circular shape and delimits an area of approx. 7.5 ha. A second one is somewhat rectangular in shape, enclosing 45 ha. The ditch of the second enclosure is doubled to the north, east and south by

another ditch, called by us enclosure three, which would enclose approx. 59 ha. To the north of these enclosures a short section of a fourth ditch can be seen.

As can be seen from the above overview of the LBA II sites enclosed by ditches, they present a number of similarities (Fig. 35). These include the existence of several enclosures, usually concentric. In terms of fortification systems, we can certify the existence of ditches. In some cases, such as SML021, we assume the existence of palisades, due to the large amount of adobe that have been found behind the ditches. In neither case were any earthen ramparts found. In most cases the ditches are roughly circular in shape and concentric. AR026 shows both circular and rectangular ditches with rounded corners. PEC041 and SML021 are bordered by linear ditch systems, dug over considerable lengths. As we have seen, a peculiar case is PEC020, which stands out both in shape and size. This site is located at the edge of the upper terrace of the Mureș River, like the most representative EBA and MBA sites (ex. Semlac-Livada lui Onea and Pecica-Sanțul Mare). PEC020's ditches extend from the edge of the high terrace and are arranged in the shape of half-circles, reminiscent of the earlier period tradition. Moreover, this is the site where Pecica III and IV hoards were found, suggesting an obvious prosperity of this community.

These fortified settlements differ from the massive mega-fort of Sântana-Cetatea Veche mainly due to the lack of ramparts. In the case of the sites studied by us within the ArheoPecica project, the results of the investigations are at an early phase. Further investigations through large-scale geophysical surveys and targeted excavations, combined with the dating of relevant contexts, will provide us answers on the construction of the fortification systems, the planimetry of the sites and their absolute chronology.

As can be seen in fig. 36, these enclosures are located in an area where many other LBA II sites have been identified. In the case of the unfortified settlements, most of them are known from field surveys⁷⁹, or from the reassessment of older finds⁸⁰. Of these, PEC007 is the only one to have been extensively excavated. The settlement found here is typical of LBA II⁸¹. Unfortunately, in the published excavation report, we do not find details about this settlement. In order to briefly provide an overview of the planimetry of an LBA II settlement and the economic activities that were carried out, we can offer the example of the one at Şagu-Site A1_1. This settlement dates back to the 16th century BC, reaching its peak during the following centuries, and finally being abandoned, most likely during the 13th century BC⁸². Based on current evidence, we know that the inhabitants of the settlement were involved in agricultural activities, mainly raising cattle and sheep, but also in growing cereals. At the same time they were intensely involved in metallurgy and the pottery production⁸³. It is therefore possible that the settlements at Pecica were similar to the one at

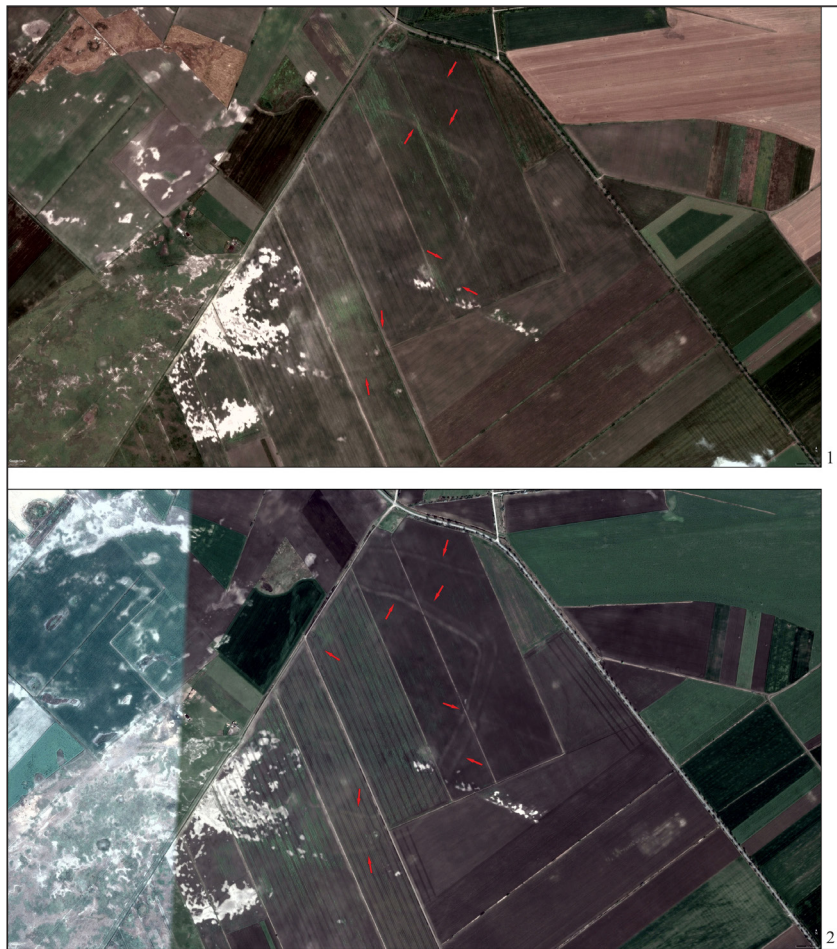


Fig. 34. Satellite imagery of AR026 LBA site (source: GoogleEarth).

⁷⁹ Arad-Bufniți (Sava, Matei 2013, 96, Pl. 9/1-2), Arad- Uzina de apă (Sava, Pădurean 2009, 37), Nădlac-Situl N8 (unpublished collection of the Museum of Arad), Semlac-Situl 21 (unpublished collection of the Museum of Arad).

⁸⁰ Arad-Gai (Sava, Pădurean 2009, 36-37), Arad-Palatul Cultural (Sava, Pădurean 2009, 38), Felnac-Complexul Zootehnic (Sava 2016), Zădăreni (Sava, Grumeza 2018).

⁸¹ Marta *et al.* 2012, 289.

⁸² Sava 2019b.

⁸³ Sava *et al.* 2011; Orfanou *et al.* 2022.

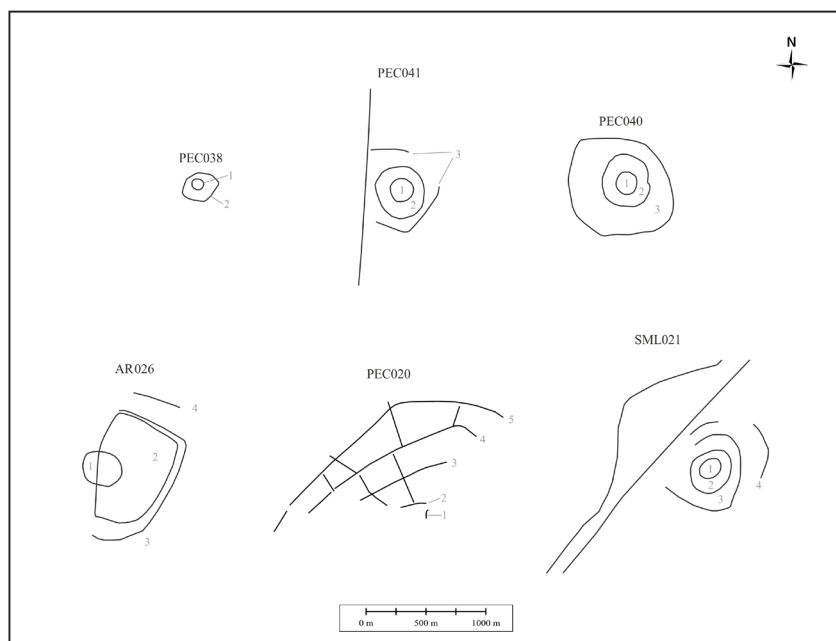


Fig. 35. Graphic representation of LBA II sites enclosed by ditches in studied micro-region (by the authors).

Şagu. In the absence of detailed studies of the LBA II finds in this area, it is impossible at this moment to determine the chronological, social, political and economic relations between these settlements and the mega-forts.

While the available data on settlements allows us to outline the general development trend of the LBA II society, the data on burial finds are scarce. In the studied area, the PEC006 cemetery is the only one able to provide specific answers. The excavation carried out during 2011 led to the identification of 38 LBA graves⁸⁴. Given available ¹⁴C data, it is safe to state that the cemetery was in use for a long period of time, from the 16th century BC to the 10th/9th centuries BC. During the first phases (16th-14th century BC - LBA I and LBA II), inhumation graves prevailed. Beside the deceased, rich funerary inventory consisting of amber beads, bronze items (weapons and ornaments), ceramic vessels and meat offerings were found. During the 13th century BC, cremation became the favourite burial rite. As during MBA and LBA I, LBA II burial sites are biritual, but inhumation predominates. Analysis of the development of the LBA II burial inventory shows a trend towards a decrease in the number of weapons in the graves, with greater uniformity of the inventory. Although no particularly rich graves typical of the elites of the time have been discovered so far. However, we consider that there are evidence to support their existence of elite graves during LBA II. We mainly point to the 'hoard' from Sântana-Cetatea Veche, which is very likely to have been part of a funerary inventory⁸⁵. At the Sântana mega-fort, three tumuli are located near the south-west gate of the IIIrd enclosure; one of them started to be excavated during 2022⁸⁶. The existence of LBA II burial mounds in this area is also supported by excavations at Susani⁸⁷. All of the above provides us with a view of a diverse funerary landscape, structured primarily according to the social stratification that probably led to the development of the mega-forts.

The construction of impressive fortifications such as those at Sântana, Corneşti, or sites enclosed by ditches, or ditches and palisades, such as Arad-AR026, Pecica-PEC020, Pecica-PEC038, Pecica-PEC040 = La Prioran, Pecica-PEC041 = Duleu lui Bran, Semlac-SML021 = Pusta lui Cucu, denotes considerable demographic growth, but especially economic prosperity. Parts of the individual or community wealth reflected in gold, bronze, glass or amber items began to be increasingly hoarded from the 16th century BC⁸⁸. The peak of this phenomenon is achieved during LBA II and III. This trend can also be traced in our area, where five such hoards have been discovered over time, illustrating prosperity, but also a possible social insecurity. Three such hoards have been discovered in the Pecica area, one at Sânpetru German⁸⁹ and another at Felnac⁹⁰. The Pecica II⁹¹ and IV⁹² hoards consist of a large number of items, such as swords, spearheads, daggers, various ornaments, etc. It is also worth mentioning the Sânpetru German hoard, where two passementerie-type fibulae stand out alongside tools and weapons. It is interesting to note that these hoards are concentrated around the Pecica-PEC020 and Munar-Wolfsberg fortifications.

Considering the territory of Pecica in an LBA II larger area, a consistent number of fortified settlements, flat settlements, burial sites and hoards can be found (Fig. 36). One of the first points to be noted from the study of this areal is that the settlements were located only in places where there was easy access to water resources. Most of them are situated on the high terraces of the Mureş River or in hydrographically rich areas (northeast of the area illustrated in Fig. 36). By examining the settlement patterns we conclude that most of the fortified sites are located north of the Mureş (except Munar-Wolfsberg). Of interest for our future research would be to investigate the two linear ditch systems, which can probably be linked to PEC041 and SML021. They seem to obstruct the access to the PEC020 fortification, which from the available data seems to represent the most significant centre in the surveyed area.

⁸⁴ Sava, Andreica 2013; Sava, Ignat 2014; Sava, Ignat 2016, 185-186; Ignat, Sava 2019, 7, 8, 9, 14-15; Sava, Gogâltan 2019, 224-225; Sava 2020, 263.

⁸⁵ Dörner 1960; Gogâltan, Sava 2010, 17, Fig. 5.

⁸⁶ Gogâltan *et al.* 2023.

⁸⁷ Diaconescu *et al.* 2018.

⁸⁸ This phenomenon can be observed throughout the Carpathian Basin, see Dani *et al.* 2016, 233, 235, Fig. 14.

⁸⁹ Petrescu Dîmboviţa 1977, 107, Pl. 186/17-18; 187.

⁹⁰ Kacsó 2015.

⁹¹ Kemenczei 1991.

⁹² Petrescu Dîmboviţa 1977, 102, Pl. 176/29-33; 177; 178/1.

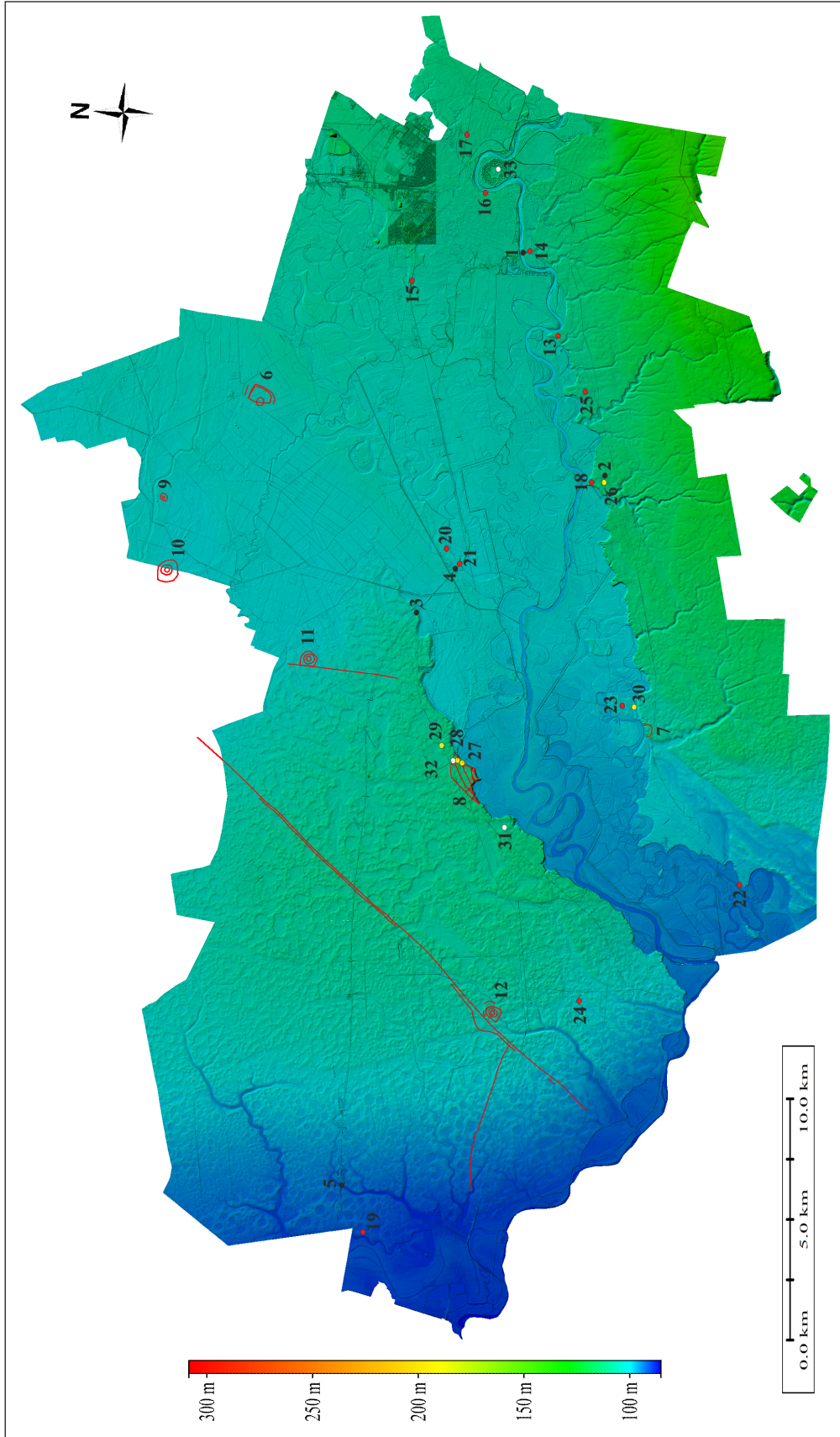


Fig. 36. Digital elevation model of the municipalities of Pecica, Arad, Felnac, Iratoș, Nădlac, Peregu Mare, Secusigiu, Semeș, Șeitin, Zădăreni, with indication of the LBA II sites. Funerary discoveries (black dot): 1. Arad-Site B0_3; 2. Felnac-Complexul Zootehnic; 3. Pecica-PEC006; 4. Pecica-PEC007; 5. Nădlac-Site 9M. Incinte (red lines): 6. Arad-AR026; 7. Munar-Wolfsberg; 8. Pecica-PEC020; 9. Pecica-PEC038; 10. Pecica-PEC040 = La Prioran; 11. Pecica-PEC041 = Duleu lui Bran; 12. Semlac-SML021 = Pusta lui Cucu. Settlements (red dot): 13. Arad-Bufniț; 14. Arad-Bypass B03-B04; 15. Arad-Gai; 16. Arad-Palatul Cultural; 17. Arad- Uzina de apă; 18. Felnac-Complexul Zootehnic; 19. Nădlac-Situl N8; 20. Pecica-PEC012; 21. Pecica-PEC007; 22. Satu Mare; 23. Sâmpetru German; 24. Semlac-Situl 21; 25. Zădăreni. Bronze hoards (yellow dot): 26. Felnac; 27. Pecica II; 28. Pecica III; 29. Pecica IV; 30. Sâmpetru German. Metal stray finds (white dot): 31. Pecica, lângă Șanțul Mare; 32. Pecica-PEC020; 33. Zona Arad (by the authors).

Conclusions

The surveys carried out during 2022 in the area of Pecica has lead to significant results. First of all, a new LN settlement has been identified, a timespan previously lacking in the area. The investigations conducted around the PEC011 cemetery provide a more accurate insight of the EEN communities here. By studying this network of sites consisting of the largest cemetery in the Carpathian Basin and the settlements in its proximity, we have the rare opportunity to better understand how the society functioned in the early metal ages.

Several burial mounds have also been mapped in the north-eastern part of Pecica. One of these, PEC042, was selected for excavations. As a result of this, a burial was excavated, whose funerary ritual and rite resembles to that of the Yamnaya population. By studying the finds from the excavations already undertaken, such as the early Baden settlement PEC002 and the Makó settlement PEC006, we will be able to provide a context for the world of burial mounds at Pecica.

Mapping and surveying the planimetry of the LBA II settlements is another significant objective of the ArheoPecica project. With the large number of LBA II settlements and bronze hoards, the Pecica micro-region will complete the overall picture we are starting to build up of the mega-forts society of the Lower Mureş Region.

Future research within the ArheoPecica project will focus both on continuing invasive and non-invasive field investigations, on examining the excavations already undertaken, and on carrying out numerous complementary studies (anthropology, archaeology, absolute dating, archaeogenetics, etc.). All this will contribute to a much better understanding of the past. At the same time, our approach promote archaeological field research, with the desire to arouse interest and answer some of the questions of all those interested in the historical dimension of the territory that today we identify as the town of Pecica.

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