



COMMUNICATIONES
ARCHÆOLOGICÆ
HUNGARIÆ

2025

COMMUNICATIONES
ARCHÆOLOGICÆ
HUNGARICÆ

2025

Magyar Nemzeti Múzeum
Budapest, 2025

Főszerkesztő / editor-in-chief
SZENTHE GERGELY

Szerkesztő / editor
FÜZESI ANDRÁS

A szerkesztőbizottság tagjai / editorial board
CSIPPÁN PÉTER, IVAN BUGARSKI, HORIA I. CIUGUDEAN, MARKO DIZDAR,
GÁLL ERWIN, LANGÓ PÉTER, LÁNG ORSOLYA, LENGYEL GYÖRGY, MORDOVIN MAXIM

Szerkesztőség / editorial office
MNMKK Magyar Nemzeti Múzeum Régészeti Tár
H-1088, Budapest, Múzeum körút 14–16.

A folyóirat cikkei elérhetők / journal access: <http://ojs.elte.hu/comarchhung>
Kéziratbeküldés és szerzői útmutató / submission and guidelines: <http://ojs.elte.hu/comarchhung/about/submissions>

© A szerző(k) / Author(s)

Ez egy nyílt hozzáférésű tudományos folyóirat, amely a Creative Commons CC BY-NC 4.0 licence alapján, megfelelő hivatkozással, nem üzleti célra, szabadon felhasználható. / This is an open-access scientific journal distributed under the terms of the Creative Commons Attribution-Non Commercial 4.0 International Licence (CC BY-NC 4.0).

ISSN 0231-133X (Print)
ISSN 2786-295X (Online)

Folyóiratmenedzser, technikai szerkesztő / Journal manager, technical editor
Vácsi Gábor

Felelős kiadó / publisher responsible
Dr. Habil. Zsigmond Gábor, elnök, főigazgató / General Director of the HNM

TARTALOM – INDEX

T. BIRÓ Katalin	Emlékek és adatok Dobosi Violáról (1942–2025)	5
Katalin T. BIRÓ – Judit REGENYE – Annamária BÁRÁNY	Results of the study of Kup-Egyes prehistoric settlement	19
	Kup-Egyes őskori településének vizsgálati eredményei	80
Zsuzsa HEGEDŰS – Klára P. FISCH	The Hunyadihalom culture's site at Gelej-Huszty-Arkay-dűlő	81
	A Hunyadihalom-kultúra lelőhelye Gelej-Huszty-Arkay-dűlő lelőhelyen	122
Mario GAVRANOVIĆ – Aleksandar KAPURAN	Workingman's death – Burials of Bronze Age copper producers in Eastern Serbia	123
	Munkáshalál – Bronzkori réztermelők sírjai Kelet-Szerbiában	137
Victor SAVA – Florin GOGÂLTAN	Settlement dynamics in the Lower Mureş region during the 2nd millennium BCE	139
	Az Alsó-Maros mente településtörténeti változásai a Kr. e. 2. évezredben	189
BÓKA Gergely	Tájformálás és komplex változások a késő bronzkori Délkelet-Alföldön	191
	Landscape transformation and complex change in the South-Eastern Great Plain during the Late Bronze Age	223
Mira MAJDÁN	A new Iron Age settlement at Töttös, Southwestern Hungary: Preliminary report	225
	Egy új vaskori település: Töttös, Délnyugat-Magyarország. Előzetes jelentés	250
Anita KIRCHHOF	Old and new aspects of the iconographic interpretation of the Dirke mosaic of Aquincum	253
	Az aquincumi Dirké mozaik ikonográfiai értelmezésének régi és új aspektusai	277
MARSI Attila – LIBOR Csilla – MIKLÓS Dóra Georgina – LYUBLJANOVICS Kyra – VIDA István	Szarmata temetkezések Jászfényszaru, Hatvani-határ lelőhelyről	279
	Sarmatian graves from Jászfényszaru, Hatvani-határ	344

Michel KAZANSKI		
	The Huns in the Cimmerian Bosphorus	347
	A hunok a Kimmer Boszporusznál	364
Danijela ROKSANDIĆ VUKADIN		
	A Late Roman pit (SU 19/20) from the Glagoljaška 16 site in Vinkovci (Eastern Croatia)	365
	Késő római gödör (SU 19/20) a Vinkovciban (Kelet-Horvátország) található Glagoljaška 16. lelőhelyről	387
SZÉNÁSY-LACZKÓ Virág		
	Avar kori településrészlet Tatabánya-Zöld-dombi-dűlő lelőhelyről	389
	Part of an Avar Period settlement at Tatabánya-Zöld-dombi-dűlő	416
Máté FÜLÖP – Zsolt Csók		
	Pottery in the Castle of Bologa (Sebesvár, Romania) from the first half of the 18th century	417
	Egy 18. század első feléből származó kerámia leletegyüttes Sebesvárról	447

SETTLEMENT DYNAMICS IN THE LOWER MUREŞ REGION DURING THE 2ND MILLENNIUM BCE

Victor SAVA¹  – Florin GOGÂLTAN² 

The Lower Mureş Region (LMR) is a distinct geographical area in the southeastern part of the Carpathian Basin. It stretches from where the Mureş River exits the mountain corridor to its confluence with the Tisza River. Systematic field surveys conducted over the last 15 years in an area of ca. 2,200 km² have led to the identification of 100 settlements that date back to the 2nd millennium BC. This makes the LMR one of the most thoroughly investigated microregions in the Eastern Carpathian Basin.

This article presents a synthesis of data on the Middle Bronze Age and the Late Bronze Age settlements, discussing their geographic setting, size of the inhabited areas, fortification systems, average distance between contemporary settlements, and internal organisation. Starting from this data set, an overall picture regarding the diachronic evolution of LMR settlements can be outlined. The status of Middle Bronze Age tell and tell-like settlements within the LMR settlement network is examined, as well as the position of Late Bronze Age megaforts as central sites for a catchment area.

Az Alsó-Maros mente a Kárpát-medence délkeleti részén található, jól körülhatárolható földrajzi terület. A Maros folyó hegyvidékről való kilépésétől a Tiszával való összefolyásáig terjed. Az elmúlt 15 évben egy körülbelül 2200 km²-es területen végzett szisztematikus terepbejárások eredményeként mintegy száz, a Kr.e. 2. évezredben lakott települést azonosítottunk a területen. Ezzel az Alsó-Maros mente a Keleti-Kárpát-medence egyik legátfogóbban kutatott mikrorégiójává vált.

A tanulmány a középső és késő bronzkori településekre vonatkozó adatokat tekinti át beleértve a földrajzi elhelyezkedés, a lakott területek mérete, az erődítményrendszerek, az egykorú települések közötti átlagos távolság és a belső szerveződés elemzéseinek eredményeit, melyek alapján felvázolható az Alsó-Maros mente településfejlődésének átfogó képe. Vizsgáljuk a középső bronzkori tellek és tell-szerű települések, valamint az egy-egy nagyobb vonzáskörzet központjaként működő késő bronzkori mega-erődítések pozícióját az Alsó-Maros mente településhálózatában.

Keywords: Lower Mureş Region, Middle Bronze Age, tells and tell-like settlements, Late Bronze Age, megaforts

Kulcsszavak: Alsó-Maros mente, középső bronzkor, tellek és tell-szerű települések, késő bronzkor, mega-erődítések

Introduction

The Lower Mureş Region (LMR) is a distinct geographical area in the southeastern Carpathian Basin. It stretches from the point where the Mureş River emerges from the mountain corridor at Lipova to its confluence with the Tisza River at Szeged. To the north, the area is bordered by the Crişul Alb River and to the south by the high Vinga Plain (Sipos

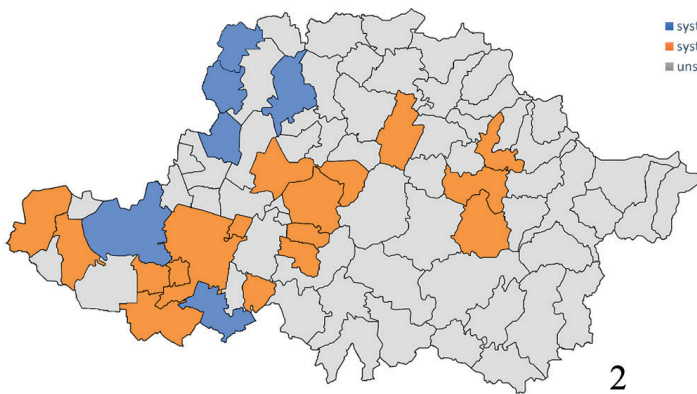
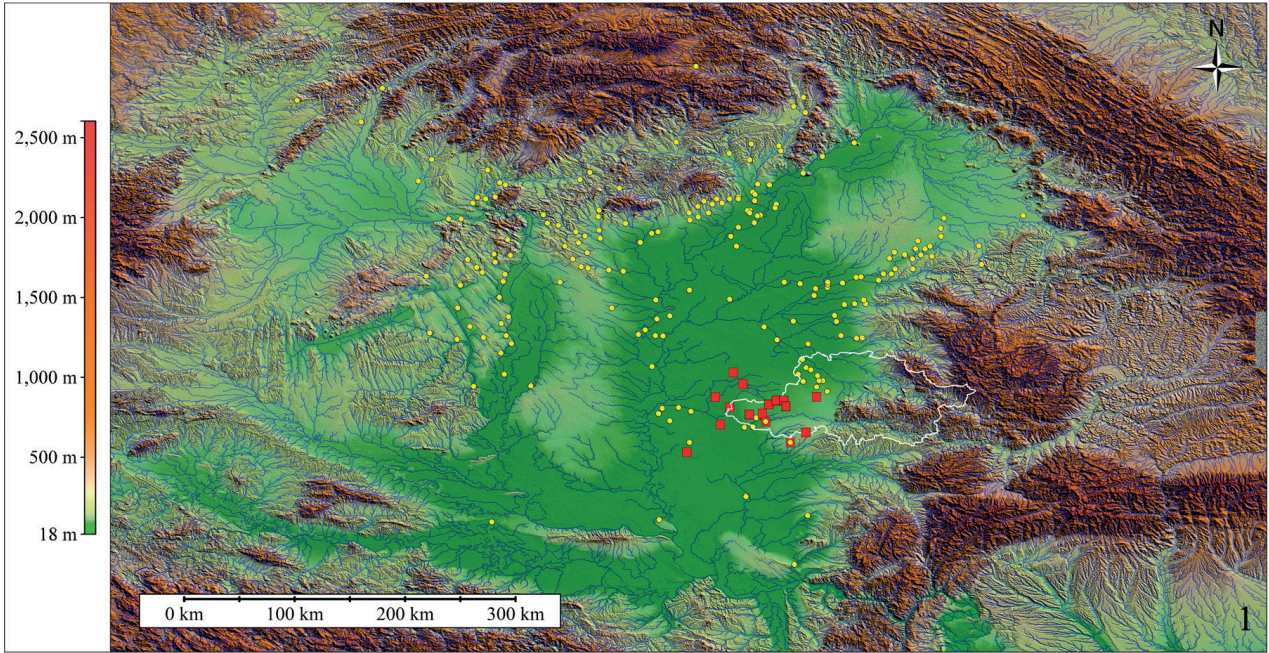
2012). This area overlaps with a large part of the current Arad County, excluding the region located to the north of the Crişul Alb River. Its eastern half is represented by the Zărand Mountains, the Nadăș Hills, the Bihor Mountains, the Codru Moma Mountains, and the Lipova Hills to the south (Fig. 1. 1, 5).

This area witnessed a unique evolution during the Bronze Age (BA), being located at the intersection of major routes that were connecting both the

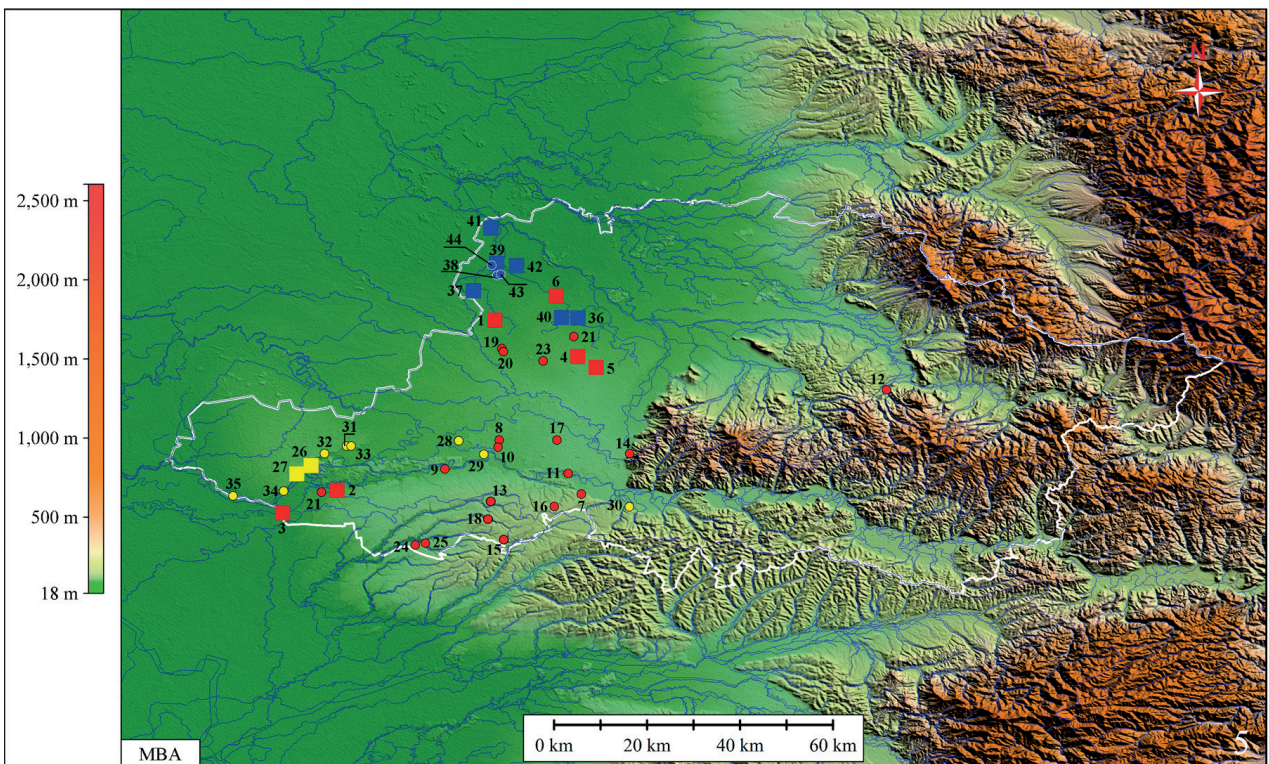
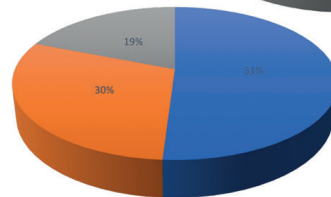
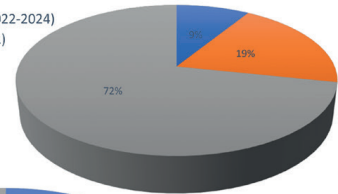
▷ Received 22.7.2025 | Accepted 4.11.2025 | Published online 29.12.2025

¹ Institute of Social Sciences and Humanities „Titu Maiorescu”, Romanian Academy, Timisoara Branch / Museum of Arad; victor.sava.cma@gmail.com; ORCID: <https://orcid.org/0000-0002-0411-3227>

² Institute of Archaeology and History of Art, Cluj-Napoca, Romanian Academy, Cluj-Napoca Branch; floringogaltan@gmail.com; ORCID: <https://orcid.org/0000-0002-0853-394X>



■ systematic field survey + LiDAR (2022-2024)
■ systematic field survey (2009-2021)
■ unsystematic field survey

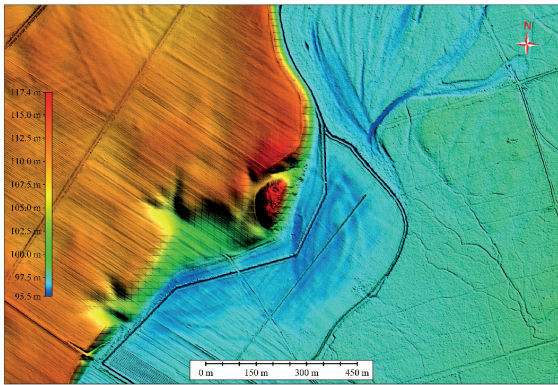


Balkans to Central Europe and Transylvania to the rest of the Carpathian Basin. The region was particularly rich in natural resources. The communities that abandoned the multilayered settlements of the first half of the 2nd millennium BC (*tells* and *tell*-like settlements) built impressive fortifications after 1500 BC, some of which covered thousands of hectares and are called megaforts (Kristiansen, Suchowska-Ducke 2015, 383; Harding 2017; Gaydarska, Chapman 2022).

Both multilayered settlements and megaforts clearly illustrate the profound social transformations that took place during the 2nd millennium BC within the Continental BA. Consequently, over the past 25 years, Middle Bronze Age (MBA) *tells* in the Carpathian Basin have become the focus of numerous projects (Gogâltan et al. 2020, 73–74, fig. 6. 1 with early literature; see also new literature in Gävan et al. 2021; Kienlin, Gävan 2021; Jaeger et al. 2022; Kienlin 2022; Fischl 2023; Gävan et al. 2023;

- ◀ *Fig. 1. 1: MBA multilayer sites in the Carpathian Basin (highlighted with yellow circles) alongside LBA II megaforts (highlighted with red square) (the list of multilayer settlements is based on Gogâltan 2017). 2: The status of archaeological research within the administrative-territorial units of Arad County (grey: not systematically surveyed; orange: systematically surveyed; blue: systematically surveyed with the logistic support of LiDAR scanning). 3: Visual depiction of the research status of the ATUs in Arad County (unsystematic field survey: 5,558.03 km²; systematic field survey /2009–2021/: 1,513.78 km²; systematic field survey + LiDAR /2022–2024/: 682.19 km²). 4: Percentage chart of settlements uncovered between 2009 and 2024 (until 2009: 51 settlements; between 2009–2021: 30 settlements; between 2022–2024: 19 settlements). 5: MBA settlements in Arad County. Finds associated with the Corneşti-Crvenka pottery style (red): Enclosed settlements (red square): 1. Macea-MAC062ASZ; 2. Munar-Wolfsberg; 3. Satu Mare-Weingarten; 4. Sântana-La nord de oraş; 5. Sântana-Tell 2; 6. Socodor-Căvăjdia; Unenclosed settlements (red circle): 7. Aluniş-Dealul molizilor; 8. Arad-Grădişte-Sere; 9. Arad-Bufniţi; 10. Arad-Uzina de apă; 11. Cicir-Spinul lui Stanca; 12. Chişindia-Podul Vechi; 13. Cruceni-SAG037ASZ; 14. Cuvin-Valea Danciuului; 15. Firiteaz-SAG004ASZ; 16. Frumuşeni-2.5 km south the village; 17. Horia-Slatini = Situl V6; 18. Hunedoara Timişană-SAG009ASZ; 19. Macea-Topila; 20. Macea-MAC002ASZ; 21. Munar-Site 1; 22. Olari-Holomb; 23. Sântana-Holomb; 24. Vinga-Izvor/Site 6; 25. Vinga-Site 19. Finds associated with the Mureş pottery style (yellow): Enclosed settlements (yellow square): 26. Pecica-PEC019 = Şanţul Mare; 27. Semlac-Livada lui Onea; Unenclosed settlements (yellow circle): 28. Arad-Gai I; 29. Arad-Palatul cultural; 30. Neudorf-Vest; 31. Pecica-PEC014 = Fosta cărămidărie C.A.P. Ogorul; 32. Pecica-PEC020 = Şanţul Mic = Între Vii = Fostul sălaş Donat; 33. Pecica-PEC030 = terasa torcida situl 14; 34. Semlac-Situl 5; 35. Şeitin-Tăietura. Finds associated with the Otomani pottery style (blue): Enclosed settlements (blue square): 36. Chişineu-Criş-CHC005ASZ; 37. Grăniceri-GRA033ASZ; 38. Grăniceri-GRA65ASZ; 39. Pilu-PIL001; 40. Şimand-SMD001; 41. Vârşand-Movila dintre vii; Unenclosed settlements (blue circle): 42. Grăniceri-GRA056ASZ; 43. Grăniceri-GRA057ASZ; 44. Pilu-PI-L036ASZ = Sit 1 (source: 1–4: the authors)*

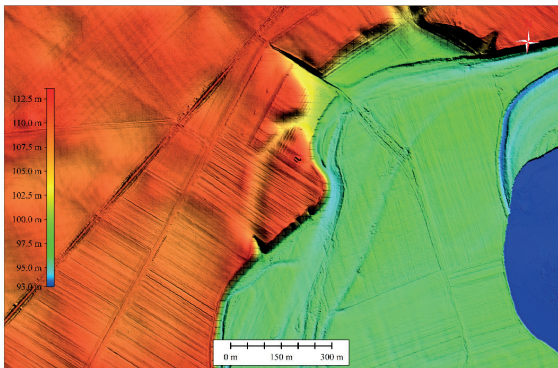
1. kép. 1: MBA többrétegű települések (sárga körök) és LBA II mega-erődítések (piros négyzetek) a Kárpát-medencében (a többrétegű települések listája Gogâltan 2017 alapján készült). 2: A régészeti kutatások állapota Arad megyében az adminisztratív-területi egységek szerint (szürke: nem szisztematikusan feltérképezett; narancssárga: szisztematikusan feltérképezett; kék: LiDAR-szkenneléssel kiegészített szisztematikus feltérképezés). 3: Az Arad megyei adminisztratív-területi egységek kutatási állapotának megjelenítése diagramon (nem szisztematikus terepi felmérés: 5558,03 km²; szisztematikus terepi felmérés /2009–2021/: 1513,78 km²; szisztematikus terepi felmérés + LiDAR /2022–2024/: 682,19 km²). 4: A 2009 és 2024 között felfedezett települések százalékos aránya (2009-ig: 51 település; 2009–2021 között: 30 település; 2022–2024 között: 19 település). 5: MBA-települések Arad megyében. A Corneşti-Crvenka kerámia stílushoz kapcsolódó leletek (piros): erődített települések (piros négyzet): 1. Macea-MAC062ASZ; 2. Munar-Wolfsberg; 3. Satu Mare-Weingarten; 4. Sântana-La nord de oraş; 5. Sântana-Tell 2; 6. Socodor-Căvăjdia; erődítetlen települések (piros kör): 7. Aluniş-Dealul molizilor; 8. Arad-Grădişte-Sere; 9. Arad-Bufniţi; 10. Arad-Uzina de apă; 11. Cicir-Spinul lui Stanca; 12. Chişindia-Podul Vechi; 13. Cruceni-SAG037ASZ; 14. Cuvin-Valea Danciuului; 15. Firiteaz-SAG004ASZ; 16. Frumuşeni-2.5 km south the village; 17. Horia-Slatini = Situl V6; 18. Hunedoara Timişană-SAG009ASZ; 19. Macea-Topila; 20. Macea-MAC002ASZ; 21. Munar-Site 1; 22. Olari-Holomb; 23. Sântana-Holomb; 24. Vinga-Izvor/Site 6; 25. Vinga-Site 19. A Maros kerámia stílushoz kapcsolódó leletek (sárga): erődített települések (sárga négyzet): 26. Pecica-PEC019 = Şanţul Mare; 27. Semlac-Livada lui Onea; erődítetlen települések (sárga kör): 28. Arad-Gai I; 29. Arad-Palatul cultural; 30. Neudorf-Vest; 31. Pecica-PEC014 = Fosta cărămidărie C.A.P. Ogorul; 32. Pecica-PEC020 = Şanţul Mic = Între Vii = Fostul sălaş Donat; 33. Pecica-PEC030 = terasa torcida situl 14; 34. Semlac-Situl 5; 35. Şeitin-Tăietura. Az Ottomány kerámia stílushoz kapcsolódó leletek (kék): erődített települések (kék négyzet): 36. Chişineu-Criş-CHC005ASZ; 37. Grăniceri-GRA033ASZ; 38. Grăniceri-GRA65ASZ; 39. Pilu-PIL001; 40. Şimand-SMD001; 41. Vârşand-Movila dintre vii; erődítetlen települések (kék kör): 42. Grăniceri-GRA056ASZ; 43. Grăniceri-GRA057ASZ; 44. Pilu-PI-L036ASZ = Sit 1 (forrás: 1–4: a szerzők)



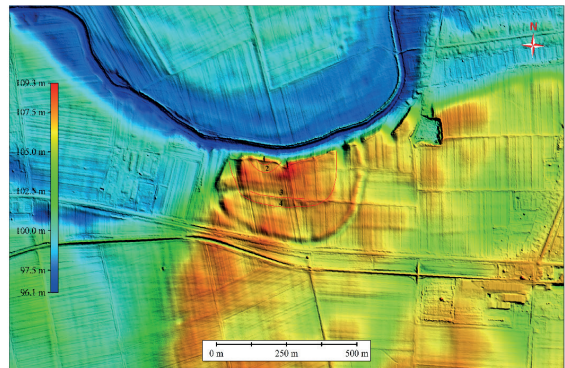
1



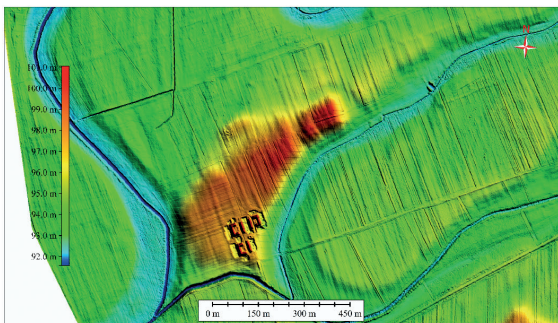
2



3



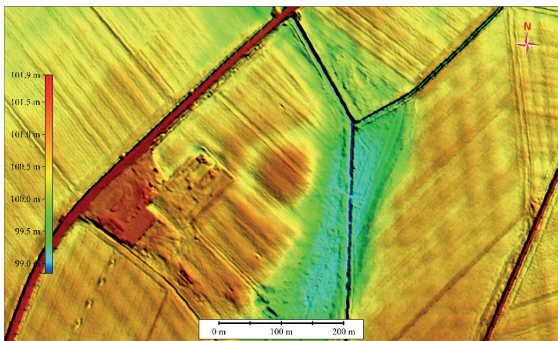
4



5



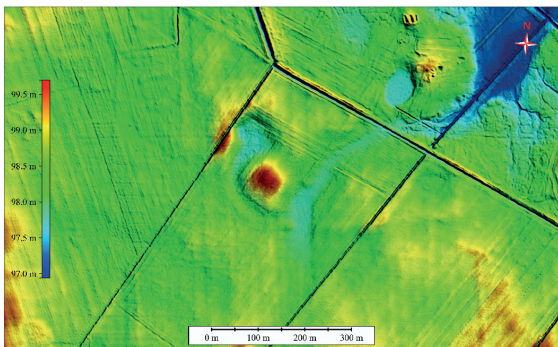
6



7



8



9



10

Vicze, Stig Sørensen 2023; Fazecaş et al. 2024; Kienlin 2024; Lie et al. 2024). This settlement type, which became particularly widespread across the lowlands of the Carpathian Basin (*Fig. 1. 1*) from the second part of the 3rd millennium BC (Gogâltan 2017), was considered by some scholars as the peak of BA civilisation in this region (Kristiansen 2000, 9; Kadrow 2001, 266–267; Hänsel 2003, 80; Uhnér 2005, 745; Gogâltan 2010, 40).

Over the past 15 years, systematic research of the megaforts in the Lower Tisza Region (LTR) and LMR has gradually shifted the previous paradigm (Gogâltan, Sava 2010; Szentmiklosi et al. 2011; Szeverényi et al. 2015; Czukor et al. 2017; Sava, Gogâltan 2017; Szeverényi et al. 2017; Molloy et al. 2017; Heeb et al. 2017; Gogâltan, Sava 2018; Heeb et al. 2018; Gogâltan et al. 2019; Gumnior, Stobbe 2019; Krause et al. 2019; Lehmpfuhl et al. 2019; Sava et al. 2019; Molloy et al. 2020; Krause et al. 2022a; Krause et al. 2022b; Molloy et al. 2022; Szeverényi et al. 2022; Bóka et al. 2022; Agapiou et al. 2023a; Estanqueiro et al. 2023; Molloy et al. 2023a; Teinz et al. 2023; Agapiou et al. 2023b; Bruyère et al. 2024; Molloy 2025). Similar to *tells*, these large fortifications have been built only in the plains, often in close proximity to multilayered settlements (Sântana, Munar, Pecica), proving through pottery and metal production a habitation continuity in the same geographic area for almost 1,000 years (*Fig. 1. 1*). The size of the fortifications, the complexity of the defense systems, the management of their upkeep, and the defensive and offensive strategies (Sava, Gogâltan 2023) prove a clear evolution and manifestation of social stratification (Gogâltan, Borş 2022). This period was a time of prosperity for the local communities, who achieved a status similar to that of the contemporary Terramare and Mycenaean civilizations (Sava, Gogâltan 2022, 146, 148; Molloy et al. 2023b; Molloy 2023).

In addition to multilayered settlements surrounded by defensive elements and megaforts, older and newer research has identified a significant num-

ber of unfortified settlements (Bóka et al. 2017; Bóka 2020; Melis et al. 2022; Sava, Gogâltan 2022, 98–101; Estanqueiro et al. 2023; Molloy et al. 2023a; Bruyère et al. 2024), which complete the landscape of BA settlements in the broader area of the LTR and of LMR.

In a recent publication, we presented a phase of our research regarding the archaeological findings typical for the first part of the 2nd millennium BC in LMR (Sava, Gogâltan 2022). In this new study, we build on that research by incorporating systematic field investigations conducted between 2022 and 2024, and by expanding our analysis regarding the interpretation of diachronic evolution of settlements throughout the entire 2nd millennium BC.

Methodology

Between 2009 and 2021, systematic field surveys were carried out in order to verify the location of sites referenced in the older literature (Barbu et al. 1999) and to identify new settlements. These surveys covered the following administrative-territorial units (ATUs) in Arad County: Arad, Buteni, Chişindia, Covăsânt, Felnac, Frumuşeni, Ghioroc, Ineu, Nădlac, Pâncota, Sântana, Sebiş, Semlac, Şiria, Vladimirescu, Vinga, and Zădăreni (Sava, Gogâltan 2022, Tab. 1). A total area of 1,513.78 km² was covered, representing 19% of Arad County's total area of 7,754 km². These surveys were conducted before LiDAR data became available for the region¹ (*Fig. 1. 2–4*). Since 2021, the field surveys have used LiDAR technology to target additional ATUs, including Pecica (Sava et al. 2023), Şagu (Sava et al. 2025), and other ATUs in the lower plain of Crişul Alb: Chişineu-Criş, Grăniceri, Macea and Pilu (Sava 2024a). These surveys covered a total area of 682.19 km², accounting for 9% of Arad County's total area (*Fig. 1. 2*).

An area spanning 5,558.03 km²—approximately 72% of Arad County—has not been systematically investigated (see *Fig. 1. 3*). However, this does not imply that there are no known discoveries that can be attributed to the BA. Of the settlements dating

◀ *Fig. 2.* Lower Mureş and Crişul Alb, MBA multilayer settlements. Pecica-PEC019 = Şanţul Mare: 1: Digital elevation model (DEM); 2: photograph, taken during the excavations by I. H. Crişan. 3: DEM of Semlac-Livada lui Onea. 4: DEM of Munar-Wolfsberg. Satu Mare-Weingarten: 5: DEM; 6: satellite photograph. Şimand-SMD001ASZ: 7: DEM; 8: aerial photograph. Macea-MAC062ASZ: 9: DEM; 10: aerial photograph (sources: 1, 3–5, 7–10: the authors; 2: Sava et al. 2022a; 6: GoogleEarth)

2. *kép.* Az Alsó-Maros és Fehér-Körös menti MBA többretegű települések. Pecica-PEC019 = Şanţul Mare: 1: digitális domborzatmodellje (DEM); 2: fotója (készítette I. H. Crişan az ásátások során). 3: Semlac-Livada lui Onea, DEM. 4: Munar-Wolfsberg, DEM. Satu Mare-Weingarten: 5: DEM; 6: műholdkép. Şimand-SMD001ASZ: 7: DEM; 8: légi felvétel. Macea-MAC062ASZ: 9: DEM; 10: légi felvétel (forrás: 1, 3–5, 7–10: a szerzők; 2: Sava et al. 2022a; 6: GoogleEarth)

back to the 2nd millennium BC, 51 were known prior to 2009, 30 new ones have been discovered between 2009 and 2021, and 19 were discovered between 2022 and 2024 (Fig. 1. 4).

Table 1 summarizes all the essential data about the 100 identified sites in LMR up to the present day. Based on the archaeological findings, the settlements were attributed generally to the MBA, without the possibility of placing them in the chronological substages already established for this period in the eastern Carpathian Basin (Gogâltan 2019). This is due to the lack of clear distinctions between the main evolutionary phases of ceramic styles in this area (Sava, Gogâltan 2022, 89–90). In the case of Late Bronze Age (LBA) settlements, they had been attributed to the main evolutionary stages (LBA I, LBA II, LBA III) based on ceramic morphology and AMS dates that have already been published and discussed already (Sava 2019; Sava 2020; Sava, Ursuțiu 2021). Table 1 also provides information on site type (fortified or unfortified), research method (incidental discovery, field survey, test trenches, preventive archaeological excavation, or systematic archaeological excavation), publication stage of the findings (incomplete information, partial excavation report, excavation report, or first time published), geographical coordinates, and references. In the case of all fortified settlements, aerial photos and digital elevation models were acquired. The boundaries of each settlement and the identified fortification structures were uploaded in a GIS database.

Intensive field surveys were also conducted as part of the ERC-funded project coordinated by Barry Molloy. Within this project, the Tisza Site Group (TSG), also referred to as the Lower Pannonian network, was defined (Estanqueiro et al. 2023; Molloy et al. 2023a; Bruyère et al. 2024; Molloy 2025). This group is located in northeastern Serbia and includes contemporary settlements that exhibit a developmental trajectory similar to that identified by us in the LMR. The same chronological system was used for dating, allowing for a direct comparison of Late Bronze Age settlement evolution across both areas.

MBA settlements (approx. 2000/1900–1550 BC)

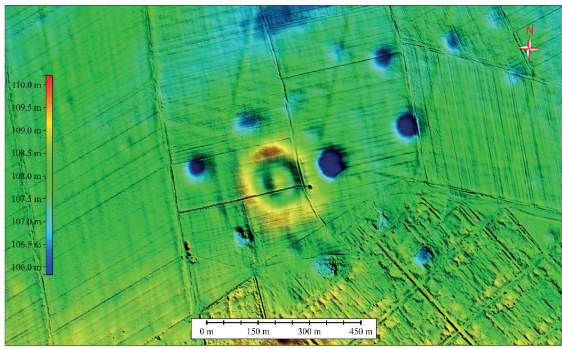
Fig. 1. 5 shows that the MBA settlements are concentrated in the plains, except for the Chișindia-Podul Vechi site (Table 1. 17). All the tells and tell-like settlements are located in the lowland areas and are absent from the higher plains of Arad. There is a possibility that this observation can be made only because of the current state of research, taking into account that in the high Plain of Vinga there are some known tell-like settlements, such as Alioș-Valea Alioșu in Timiș County (Stavilă et al. 2020).

The distribution maps of the settlements were based on both the ceramic style used by the community of each settlement and the presence or absence of a fortification system. Settlements associated with Mureș ceramics are located in the near vicinity of the Mureș River, particularly downstream of the current Pecica locality. Cornești-Crvenka settlements are spread both to the south and the north of Mureș River, following the foothills of Zăradului Mountains and extending to the valley of the Crișul Alb River. In the lowest region of Arad County near the Crișul Alb, there are settlements in which the majority of the ceramics is of Otomani style (Gogâltan 1999; Sava, Gogâltan 2022, 110–116, Fig. 31, 57–58) (Fig. 1. 5).

Multilayered settlements are characterised by a central area that is higher and separated from the outer settlement by one or more ditches. In addition to this type of site, numerous flat settlements have been documented with no identifiable fortification features on the ground surface. While most settlements in Fig. 1. 5 have been discussed in previous papers (Gogâltan, Sava 2019, 66–75; Sava, Gogâltan 2022, 93–101), new systematic field surveys (Sava 2024a; Sava et al. 2025) have contributed to the discovery of additional MBA settlements that were included in this paper. The layout of these settlements on the digital elevation model of LMR offered the possibility of creating individual models at a higher resolution. Aerial, satellite, and ground-level photographs were associated with digital elevation models. As expected, the best results were achieved for the multilayered settlements, which were surrounded by

Fig. 3. MBA multilayer settlements in the Lower Mureș and Crișul Alb area. Sântana-La nord de oraș 1: DEM; 2: satellite photograph; 3: aerial photograph. Socodor-Căvăjdia: 4–5: DEM; 6–7: aerial photograph. Pilu-PIL001ASZ: 8: DEM; 9: aerial photograph; 10: DEM (sources: 1, 3–10: the authors; 2: GoogleEarth)

3. kép. Az Alsó-Maros és Fehér-Körös menti MBA többretegű települések. Sântana-La nord de oraș: 1: DEM; 2: műholdfelvétel; 3: légifelvétel. Socodor-Căvăjdia: 4–5: DEM; 6–7: légifelvétel. Pilu-PIL001ASZ: 8: DEM; 9: légifelvétel; 10: DEM (forrás: 1, 3–10: a szerzők; 2: GoogleEarth)



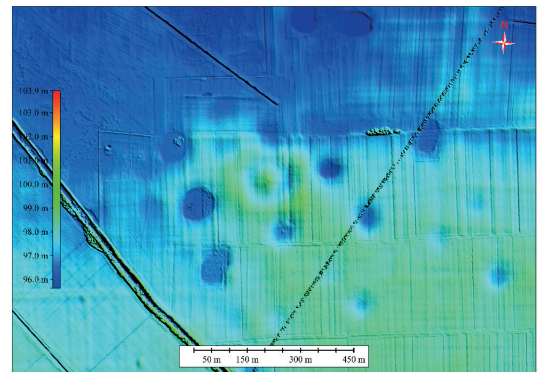
1



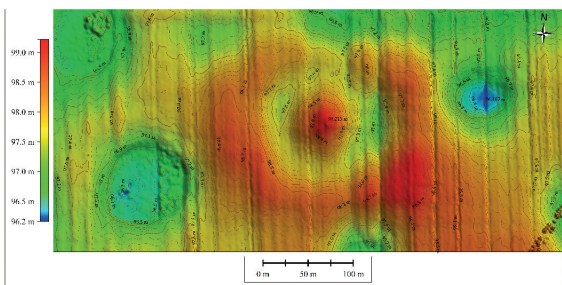
2



3



4



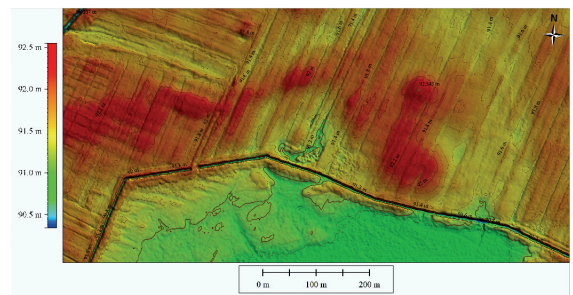
5



6



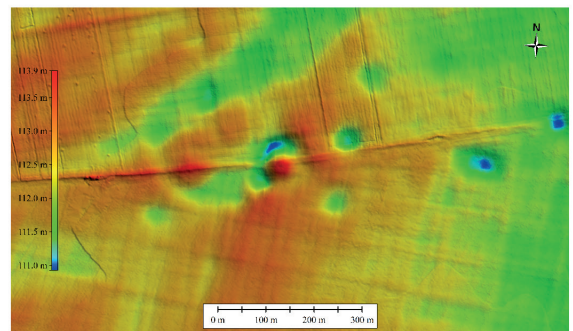
7



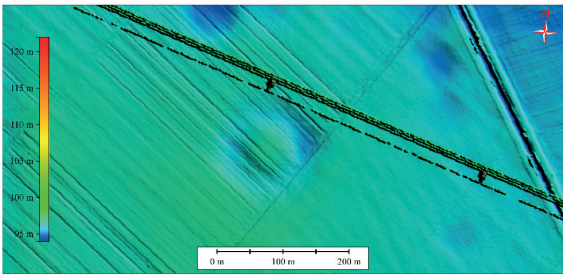
8



9



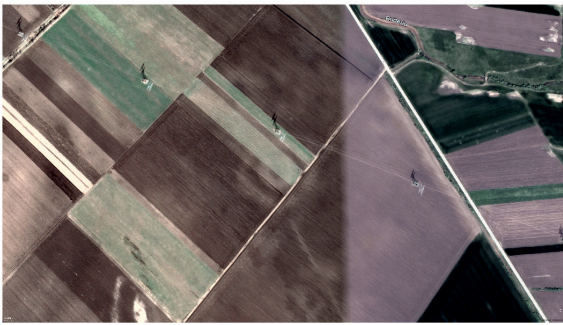
10



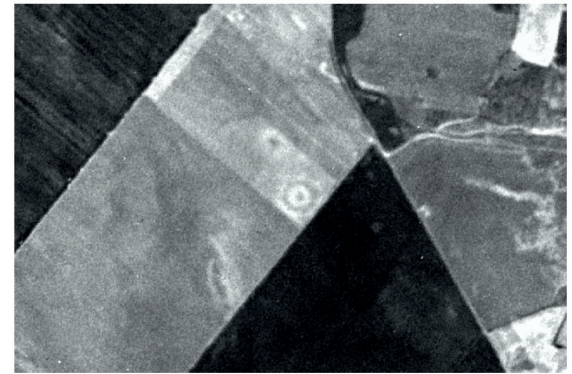
1



2



3



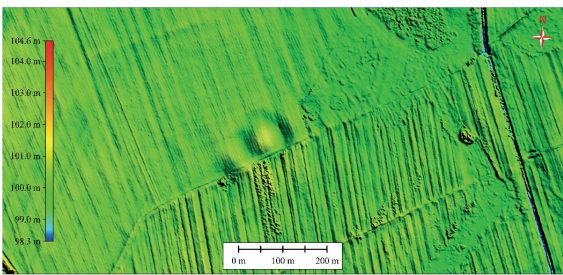
4



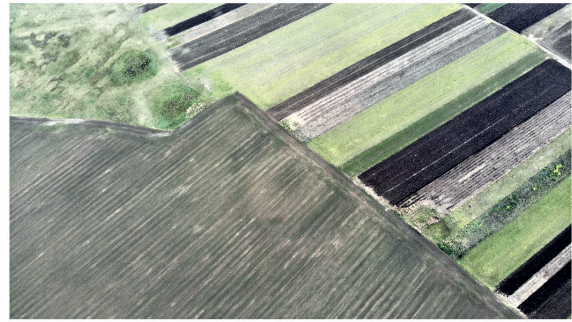
5



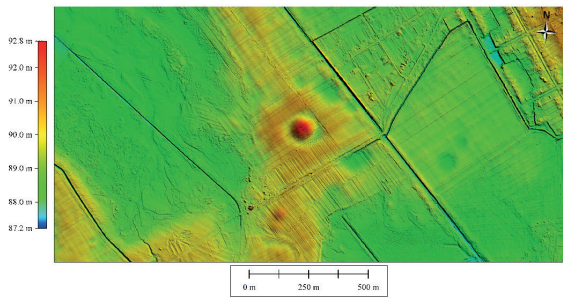
6



7



8



9



10

ditches that were bordering a central area with thicker stratigraphic accumulations than in the nearby areas (Fig. 2–4).

Investigations of multilayered settlements reveal the existence of multiple layout options throughout the territory. Mureş valley settlements are situated on high river terraces along well-defined paleochannels. The most representative examples are Pecica-Şanţul Mare (Fig. 2. 1–2), Semlac-Livada lui Onea (Fig. 2. 3), Munar-Wolfsberg (Fig. 2. 4), and Satu Mare-Weingarten (Fig. 2. 5–6). All of them are placed on the edge of a very high terrace, up to 20 m higher than the lower area of the valley. The settlements are separated from the surrounding landscape by one or more semicircular ditches. The same layout strategy used in the Mureş Valley was also followed by the communities from Şimand-SMD001 (Fig. 2. 7–8) and Macea-MAC062ASZ (Fig. 2. 9–10); both sites are located on the edge of some paleochannels. It is worth noting that the presence of deep semicircular ditches is an exceptional situation. In fact, more than half of the settlements lack fortification elements that are visible at ground level.

A significant number of *tells* and *tell*-like settlements were also identified in the northwestern region of the area (Figs. 3–4). The best known are Sântana-La nord de oraş (Fig. 3. 1–3), Socodor-Căvăjdia (Fig. 3. 4–7), and Vârşand-Movila dintre vii (Fig. 4. 9–10). Field surveys conducted in recent years have revealed new settlements and provided new data regarding the size of MBA settlements. As a result, it has been possible to approximate the size of 33 settlements. The smallest settlement covers approx. 0.7 ha (Grăniceri-GRA065ASZ), and the largest one is Satu Mare-Weingarten with a size of 28 ha (Fig. 5).

In the absence of geophysical investigations, satisfactory answers regarding the internal organisation of multilayered settlements cannot be offered with only field surveys, digital elevation models, and aerial photographs. However, a compelling example can be found at Sântana-La nord de oraş (Gogâltan,

Sava 2010, 39–40; Sava 2014a; Gogâltan, Sava 2019, 71–72; Sava, Gogâltan 2022, 97–98). Our surveys have documented the fact that the maximum extent of the artifact scatter covers approx. 10 ha, with the most artefacts found in the core area, surrounded by a ditch. All the data indicated the existence of a central area surrounded by a wide ditch. Occupation also extends outside the ditch, making it a classic example of a multilayered settlement in the Carpathian Basin. Around the settlement itself there are large circular pits (Fig. 3. 1; Fig. 6. 1–2). Similar large pits have also been observed in Socodor-Căvăjdia (Fig. 3. 4–5), Sântana-tell 2 (Fig. 3. 10) or Grăniceri-GRA033ASZ (Fig. 4. 1). It is hard to determine whether these alveolate pits are geological or anthropological formations. It is certain that their bottom reached the groundwater, providing a consistent water source for people and animals. Similar examples are more frequent in the northern side of the studied region, in the area of the Crişul Alb River, a good example for this being the case of Toboliu-Dâmbul Zănăcanului (Bihar County) (Lie et al. 2019, Fig. 6).

Geophysical investigations at Sântana-La nord de oraş, covering ca. 7 ha, have radically changed our understanding of the site (Fig. 6). Within the surveyed area, 95 buildings were identified, arranged around the ditch. Taking into account the fact that non-invasive investigations were not conducted for the entire settlement, it can be presumed that the total number of buildings likely exceeds those currently identified. By overlaying the geophysical measurement results over the digital elevation model (Fig. 3. 1; Fig 6. 2), it is visible that the remains from burned buildings represent the high area from outside the ditch. The buildings range in size from 40 to 100 m², indicating a high degree of uniformity. Interestingly, these features are arranged in rows separated by wider or narrower paths, which serves as proof of the existence of a preconceived plan for the internal organization of the settlement. The ditch surrounding the central area is 20 m at its widest and 8 m at its

- ◀ Fig. 4. MBA multilayer settlements in the Lower Mureş and Crişul Alb area. Grăniceri-GRA033ASZ: 1: DEM; 2: aerial photograph; 3–4: satellite images, Grăniceri-GRA065ASZ: 5: satellite image; 6: aerial photograph. Chişineu-Criş-CHC005ASZ: 7: DEM; 8: aerial photograph. Vârşand-Movila dintre vii: 9: DEM; 10: satellite image (sources: 1–2, 6–9: the authors; 3, 5, 10: GoogleEarth; 4: <https://corona.cast.uark.edu/atlas#zoom=3¢er=0,3000000>)
4. kép. Az Alsó-Maros és Fehér-Körös menti MBA többretegű települések. Grăniceri-GRA033ASZ: 1: DEM; 2: légifelvétel; 3–4: műholdfelvételek, Grăniceri-GRA065ASZ: 5: műholdkép; 6: légifelvétel. Chişineu-Criş-CHC005ASZ: 7: DEM; 8: légifelvétel. Vârşand-Movila dintre vii: 9: DEM; 10: műholdkép (forrás: 1–2, 6–9: a szerzők; 3, 5, 10: GoogleEarth; 4: <https://corona.cast.uark.edu/atlas#zoom=3¢er=0,3000000>)

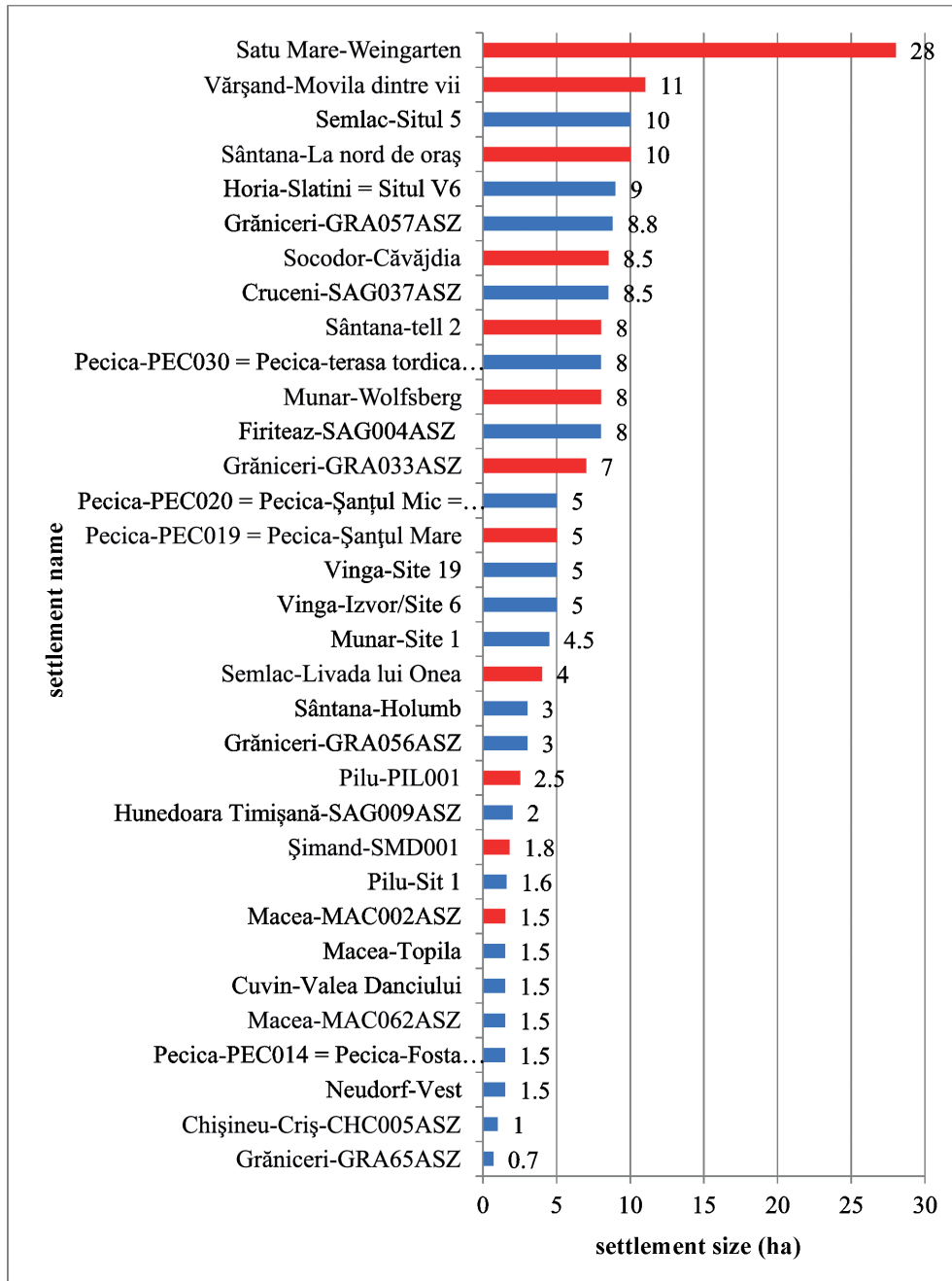


Fig. 5. MBA settlement size (red: enclosed sites) (source: the authors)
 5. kép. MBA települések mérete (piros: erődített telepek) (forrás: a szerzők)

narrowest, bordering an interior surface of approx. 5,200 m². In the central area there were no identifiable buildings, magnetic anomalies being scarce.

Buildings outside of the ditch surrounding the settlement's 'core' were also found in Alioș-Valea Alioșu (Stavilă et al. 2020, Pl. 2–4), Ároktó-Dongóhalom (Kienlin 2020, Fig. III. 134), Crestur-Cetățuie (Kienlin 2021, 55–56, Fig. 122), Emőd-Nagyhalom (Kienlin 2020, 146, Fig. III. 117–122), Tibolddaróc-Bércút (Kienlin 2020, Fig. III. 136), Tiszakeszi-Bálinthát Újtemető (Kienlin 2020, Fig. III. 135), Toboliu-Dâm-

bu Zănăcanului (Găvan et al. 2024), and Vatta-Testhalom (Kienlin 2020, Fig. III. 133). A very similar situation to the one in Sântana-La nord de oraș was identified in Roșiori-Cetatea de pământ, where rows of well-preserved buildings were identified (Kienlin 2021, 47–48, Fig. 17).

Analogies for the internal organization of the Sântana-La nord de oraș settlement can be found within the same microregion. In Socodor-Căvăjdia, D. Popescu's excavations did not reveal any buildings in the core area. However, evidence of wood and clay

buildings was found outside of the ditch. A similar situation was identified in Vârşand, as stated by D. Popescu: "We find ourselves facing a round, central settlement, surrounded by a large «ring» of dwellings, not only in Socodor, but also in Vârşand" (Popescu 1956a, 44). Despite investigating over 800 m² over time, the excavations conducted in Vârşand-Movila dintre vii did not provide sufficient information about the structure and internal organization of the multilayered settlement. Archaeological deposits measure between 60 and 80 cm in thickness, with most buildings arranged in a circular pattern around

the mound bordered by the ditch, with the fewest remains found in the central area. D. Popescu states that "through the Vârşand excavations we established a completely unknown form of primitive settlement in our regions: a small round settlement whose remains were found in the surrounding ring" (Popescu 1956b, 122). Both M. Roska (Roska 1941, 46) and D. Popescu (Popescu 1956b, 121) mention that the buildings were rectangular and built on a wooden frame that was covered with clay.

While the multilayered settlements in northern LMR have certain distinctive features, those near the

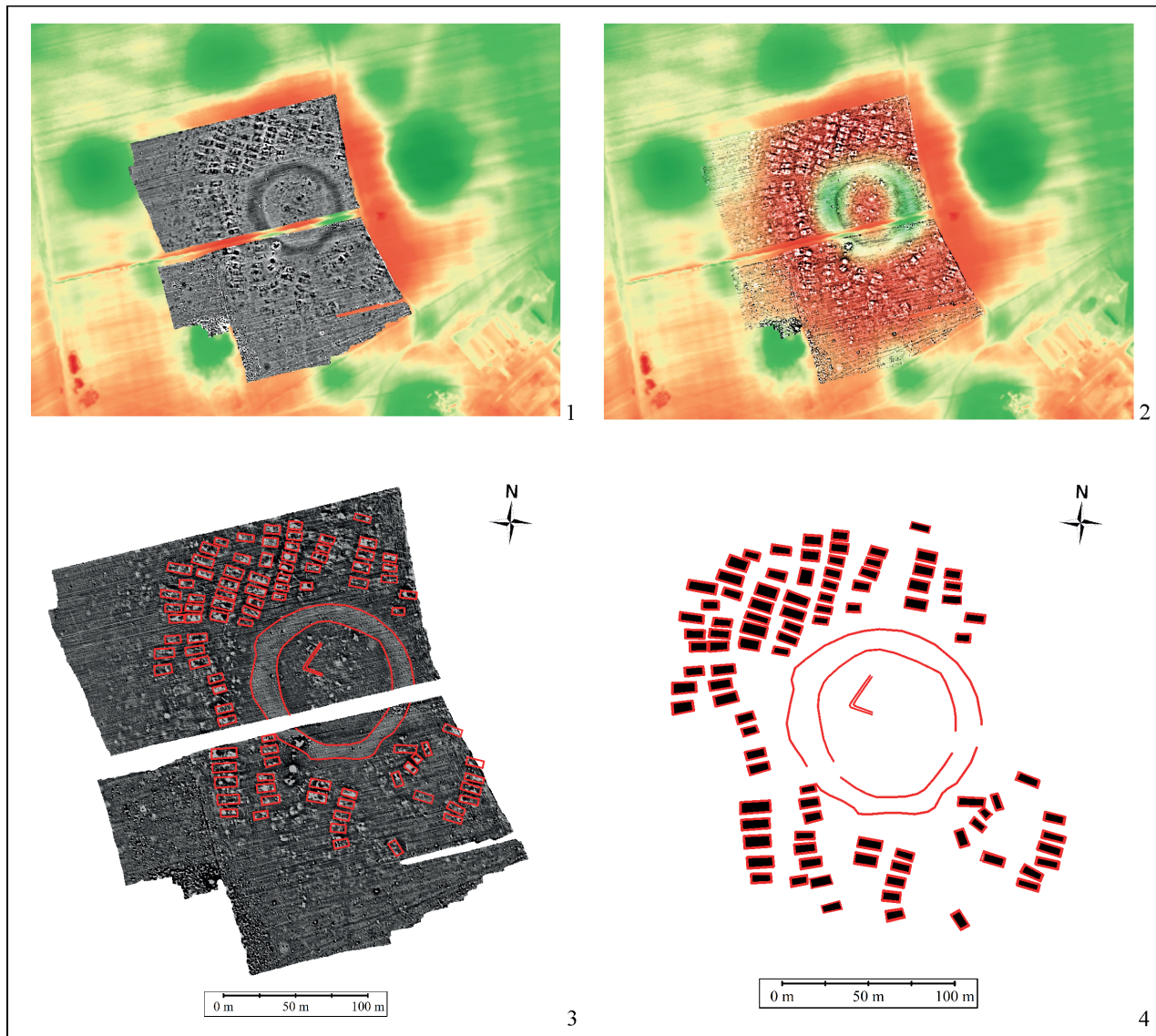


Fig. 6. MBA multilayer settlement of Sântana-La nord de oraş. 1–2: Overlay of geophysical measurements and DEM. 3: Main structures identified by geophysical measurements (red outline). 4: Settlement plan derived from the interpretation of geophysical measurements (source: the authors)

6. kép. Sântana-La nord de oraş, MBA többretegű település. 1–2: Geofizikai mérések és DEM összevetése. 3: A geofizikai mérésekkel azonosított fő struktúrák (piros kontúr). 4: A geofizikai mérések értelmezéséből készült településrajz (forrás: a szerzők)

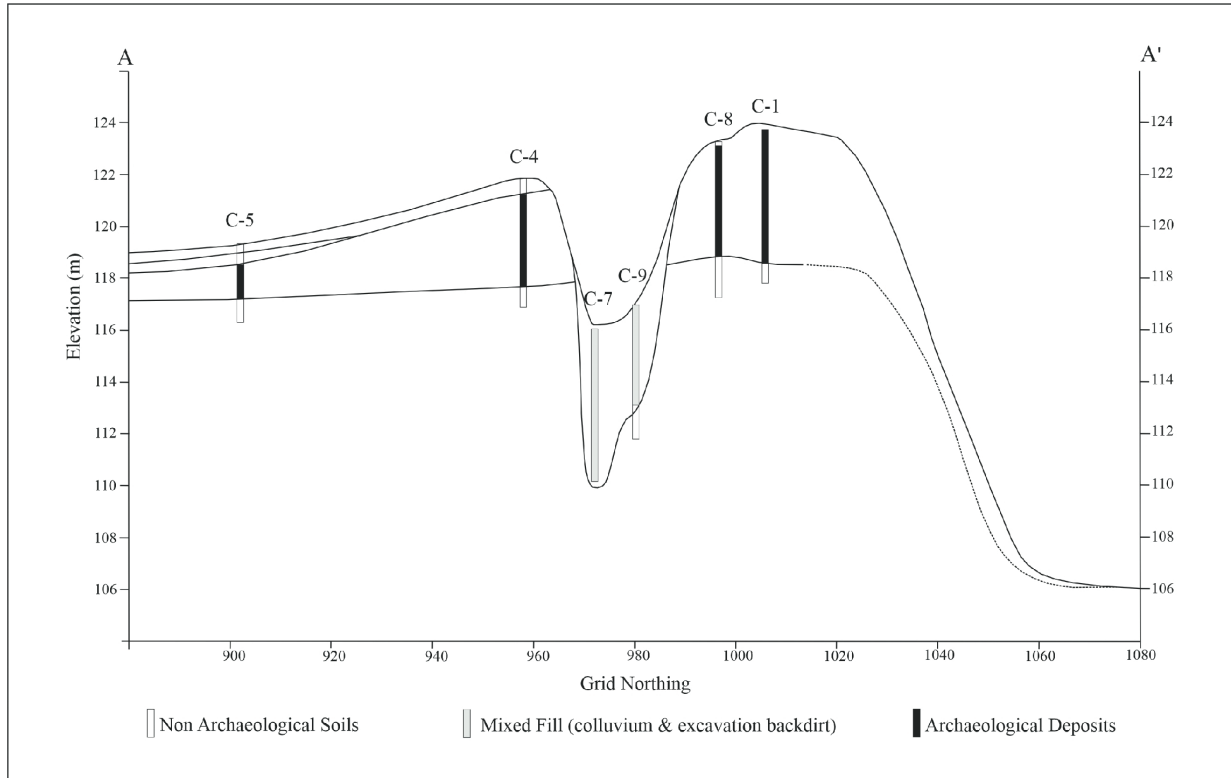


Fig. 7. 1: The ideal plan of a dwelling from Pecica-PEC019 = Șanțul Mare, the plan is based on Structure 4 (source: O'Shea et al. 2011, redrawn by the authors). 2: Schematic illustration of the main structures identified in Pecica-PEC019 = Șanțul Mare (source: O'Shea et al. 2011; Nicodemus et al. 2015, redrawn by the authors)

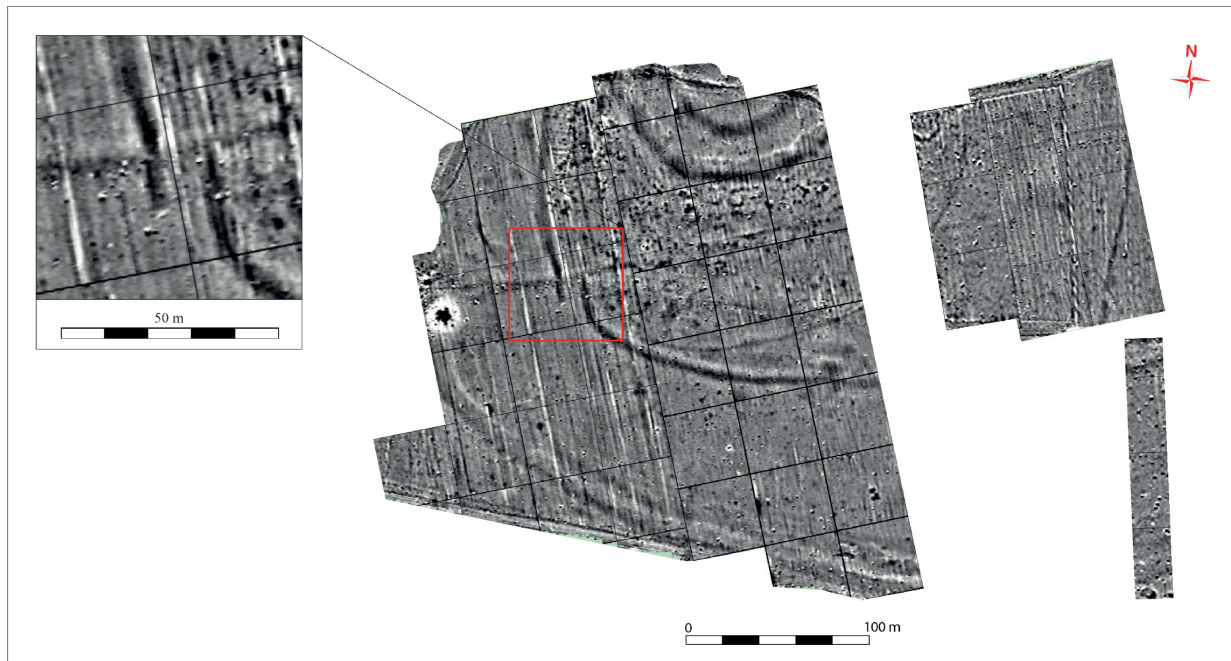
7. kép. 1: Egy épület idealizált alaprajza Pecica-PEC019 = Șanțul Mare településről, a 4. struktúra alapján (forrás: O'Shea et al. 2011, a szerzők által újrarajzolva). 2: A Pecica-PEC019 = Șanțul Mare településen azonosított fő struktúrák sematikus ábrázolása (forrás: O'Shea et al. 2011; Nicodemus et al. 2015, a szerzők által újrarajzolva)

Mureș River stand out due to their location and internal organization. These differences are likely due to the distinct geographic characteristics of the two microregions. For instance, multilayered settlements from the Mureș area, as already shown, are situated on high terraces, bordered by the rest of the area through semicircular ditches. The 'core' of the Pecica-

Șanțul Mare tell (approx. 4,000 m²) is separated from the rest of the terrace by a deep, semicircular ditch (Fig. 2. 1–2). The houses discovered there had a rectangular shape and a wattle and daub structure (Fig. 7). Outside the impressive defensive ditch (Fig. 8. 1), excavations in the 1960s identified an area of continuous occupation (Crișan 1978, 64–65; Sava et al.



1



2

Fig. 8. 1: Section of the Pecica-PEC019 = Şanţul Mare tell, based on coring evidence (redrawn from: O'Shea et al. 2005). 2: Settlement plan of Munar-Wolfsberg derived from geophysical data, highlighting details of the entryway at the fourth enclosure (source: the authors)

8. kép. 1: Pecica-PEC019 = Şanţul Mare tell metszetrajza, fúrás adatok alapján (átrajzolva O'Shea et al. 2005 alapján).

2: Munar-Wolfsberg településrajza geofizikai adatok alapján, a negyedik erődítés bejáratának részletei kiemelve (forrás: a szerzők)

2022a). Unfortunately, the limited investigations conducted in the outer settlement did not clarify the nature of the occupation and its chronology.

On the southern bank of the Mureş River, located approx. 6 km south-south-east of Pecica-Şanţul Mare, lies the Munar-Wolfsberg settlement. The entire MBA settlement covers approx. 8 ha and includes four enclosures, each of which enclosed by a semicircular ditch extending from the edge of the high terrace (Sava, Gogâltan 2014; Gogâltan 2016, 90–94; Sava, Gogâltan 2017). Evidence of intense activity, such as numerous magnetic anomalies, was identified, especially between the second and fourth ditches (Fig. 8. 2). The first two enclosures, which spread over a small area, show no clear signs of buildings. This fact is also confirmed by the 2017 test trench (Sava, Gogâltan 2017, 93–95). A similar situation exists in Alioş-Valea Alioşu (Stavilă et al. 2020, Pl. 2–4), in the far south-eastern area of LMR. An interesting feature at Munar is the distinctive layout of the entrance to the fourth enclosure (Fig. 8. 2 detail).

As we documented, the single element of multi-layered settlements that constitutes a fortification is the ditch or ditches that separate the core from the outer settlement (Gogâltan 2008; Kienlin 2020, 105–132). However, it cannot be excluded that future investigations may identify evidence of palisades. Of the 44 Middle Bronze Age settlements identified so far in LMR, 14 (31.8%) have one or more ditches. Based on the available data, it can be stated that, in addition to the ditches, there were no other fortification elements, such as wooden palisades or earthen ramparts. The layout of these ditches appears to vary by subregion. In the lower basin of the Crişul Alb River, settlements have only one circular ditch (Grăniceri-GRA033ASZ, Chişineu-Criş-CH-C005ASZ, Socodor-Căvăjdia, Sântana-La nord de oraş, Sântana-Tell 2, and Vărşand-Movila dintre vii). The exception is Pilu-PIL001ASZ, where two concentric ditches were documented. Near the Mureş River meadow, the ditch or ditches have the shape of circular arcs (Şimand-SMD001ASZ, Macea-MA-C062ASZ, Pecica-PEC019=Şanţul Mare, Semlac-

Livada lui Onea, Satu Mare-Weingarten, and Munar-Wolfsberg) (Fig. 9. 1).

To quantify and compare different fortification systems, we chose to calculate the length of each ditch (Fig. 9. 3). Most settlements have only one ditch, whose length varies from 271 to 545 m. However, some settlements, such as Satu Mare-Weingarten, Pilu-PIL001, and Munar-Wolfsberg, have more ditches; consequently, their combined length is greater. The ratio between the settlements with the fewest linear metres of ditches and the ones with the most linear metres of ditches is 1 to 3.8. Comparing the effort spent on digging and maintaining the ditches, the difference does not appear to be substantial.

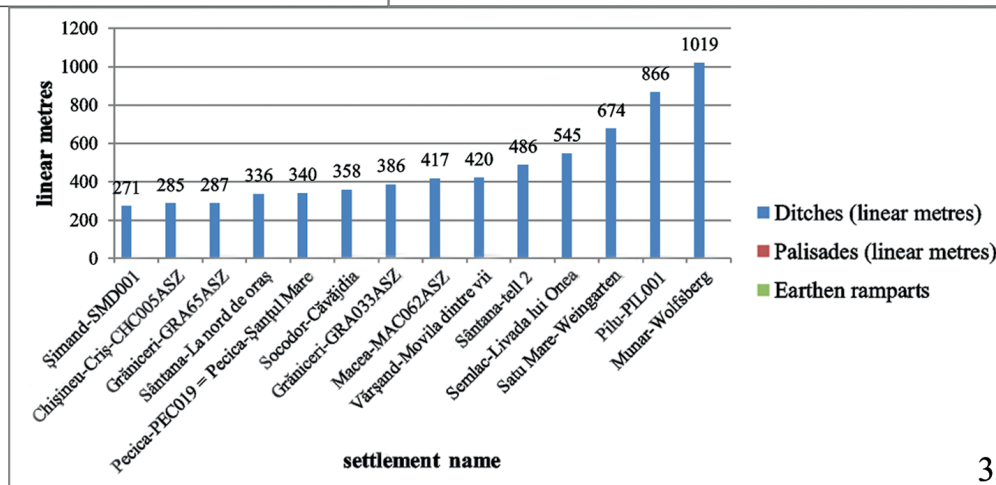
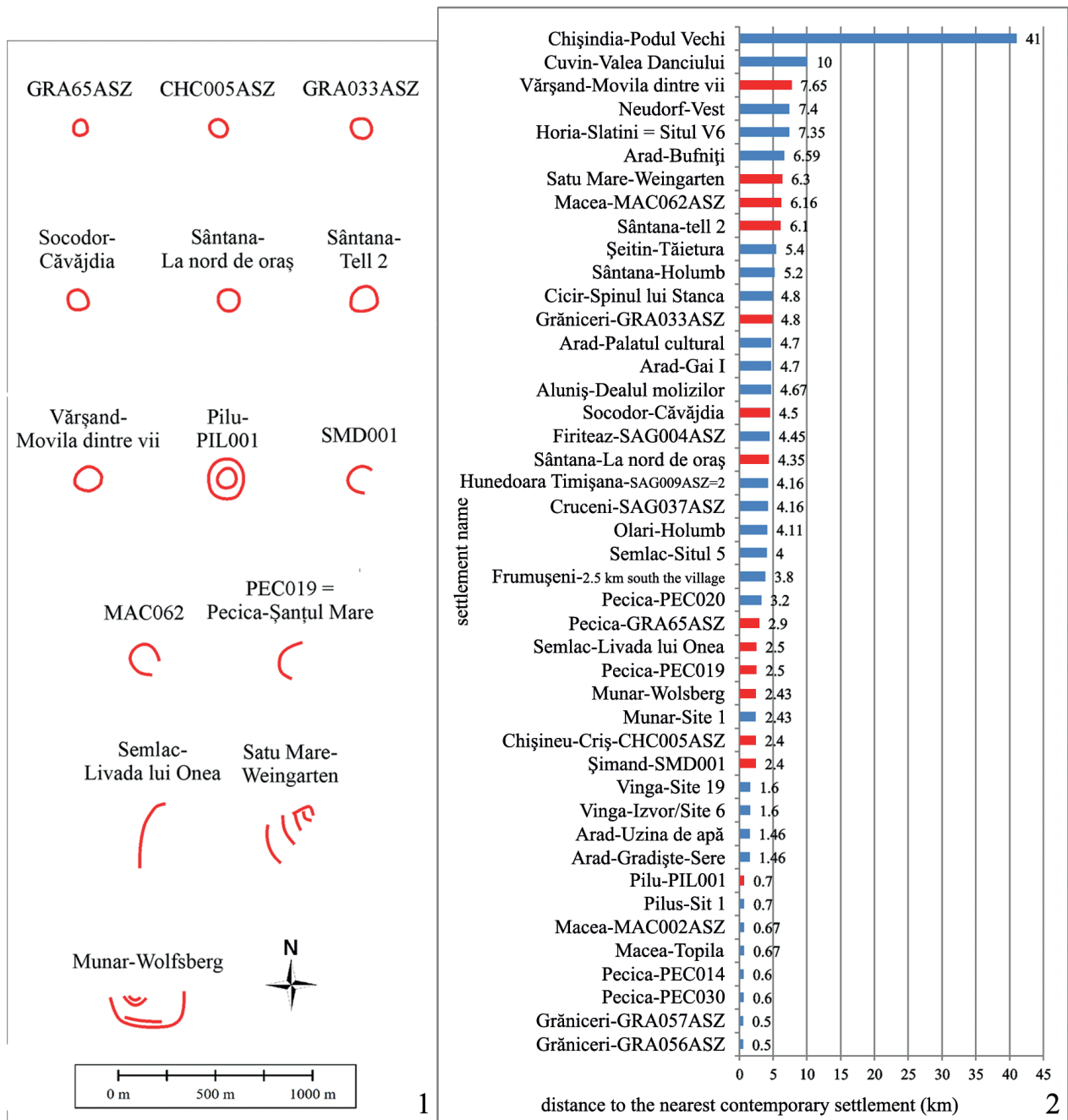
Another element of our analysis was calculating the distance to the nearest contemporary settlement. This was done to estimate the approximate territory of the settlements and identify possible patterns in their distribution. It should be noted once again that we cannot separate the chronological phases of the MBA sites. Probably not all settlements were contemporary during the approximate 500 years of the MBA period, which is why our analysis may be imprecise. From the data presented in Fig. 9. 2 it results that in most cases the distance to the nearest contemporary settlement ranges from 2 to 8 km, with an average of approx. 4.5 km. If we exclude Chişindia-Podul Vechi from the analysis, as it is located at a great distance from the other settlements (41 km), being unusually located in mountainous area, the average distance to the nearest contemporary settlement is approx. 3.6 km.

LBA I settlements (approx. 1550–1450 BC)

New settlements that emerged in the LMR following the abandonment of multilayered settlements have already been discussed (Sava, Ignat 2016; Sava, Gogâltan 2019; Sava, Gogâltan 2022, 121–122, 142–146). However, subsequent investigations have provided new insights. For example, absolute dating of contexts at the sites of Conop-Situl 5/La Pătul/La Cotârci (Sava, Gogâltan 2019, 225, 226, Fig. 1; Sava, Gogâltan 2022, Fig. 59) and Sântana-Cetatea Veche

Fig. 9. 1: Plans of MBA enclosure systems (red: ditches; black: earthen ramparts; green: palisades). 2: Distance to the nearest contemporary MBA settlement (red: enclosed settlements). 3: Chart showing the linear extent of MBA ditches, palisades, and earthen ramparts (source: the authors)

9. kép. 1: MBA erődítésrendszerek alaprajzai (piros: árkok; fekete: földsáncok; zöld: palánkok). 2: A legközelebbi egykorú MBA településtől való távolság (piros: erődített települések). 3: Az MBA árkok, palánkok és földsáncok lineáris kiterjedését bemutató diagram (forrás: a szerzők)



has led to a re-evaluation of their chronology. Based on pottery typology, we previously assigned several assemblages from these sites to the LBA I stage. However, the available ¹⁴C data, which is unpublished, places the features during LBA II, despite the pottery retaining features of LBA I. The LBA I stage is a short transitional phase that preserves a number of MBA traditions but also adopts some characteristics that will become emblematic of LBA II (Sava, Gogâltan 2022, 142–143). This complicates the proper dating of several settlements (Sava, Gogâltan 2019, 223, 225–226; Sava, Gogâltan 2022, 121). Another unresolved issue is the duration of MBA settlements. The presence of LBA I specific artifacts in the MBA settlements such as Pecica-Şanţul Mare, Periam-Movila Şanţului, and Satu Mare-Weingarten (Sava, Ignat 2016, 189–190) proves a continuity of the area's occupation through LBA I.

As shown in *Fig. 10. 1*, the distribution of LBA I settlements is confined to the higher areas of the plain, where during LBA II megaforts will be built. While the lower valley of Crişul Alb was densely occupied during the MBA, it seems that the area was depopulated during the LBA I. Climatic factors may have contributed to this development, with increased precipitation leading to the abandonment of floodplains. However, the environmental reconstruction data we have is contradictory (Gogâltan 2021, 13–16; Sava, Gogâltan 2022, 88–89; Molloy et al. 2023a, 4–5, 26–29, Tab. 1). We also observe a higher density of settlements in the proximity of the Zarandului Mountains, closer to the copper and gold resources of this area.

As seen in *Table 1*, most LBA I settlements are only known through field surveys. Several of these settlements developed over several chronological stages, making it difficult to estimate the extent of the settlements or the intensity of habitation. A good example of this is the settlement of Şagu-Situl A1_1. The site appears to have been occupied by a small community beginning in the 16th century BC. Archaeological finds included several pits containing pottery fragments and animal bones (Sava et al. 2011). The most significant feature of this early settlement is the discovery of a clay mould made for casting socketed axes (Sava, Gogâltan 2022, 136, Fig. 55). By dating the context in which the mould was discovered to the 16th century BC, it shows that the production of socketed axes existed before Bz D (Dietrich 2025, 662–672). Starting in the 15th century BC, archaeological contexts became much more

numerous, indicating a prosperous settlement, whose inhabitants practiced various economic activities.

Sânpetru German-Cărămidărie was another significant LBA I settlement in the LMR. Our fieldwork led to the discovery of a large amount of pottery sherds that based on their morphology, can be attributed to LBA I. The artifacts were collected from an area of approx. 1.8 ha. It is worth noting that in the proximity of this settlement stands the site of Munar-Wolfsberg, which was inhabited both during the MBA and in LBA II, when a fortification of about 15 ha was built. The MBA community from Munar may have relocated to this site, later returning to build the LBA II fortification. This demonstrates long-term continuity of habitation on the same high terrace of the Mureş River.

Due to the aforementioned difficulties in chronologically classifying the artifacts, the number of LBA I settlements is lower compared to the previous phase. Therefore, while during the MBA the average distance to the nearest contemporary settlement was 3.6 km, during LBA I the average is 10.7 km (*Fig. 10. 2*). This would suggest a reshaping of the settlement network, or perhaps reflects the state of research over this short period of time. Information on the existence of a fortified settlement at Păuliş-Dealul Bătrân (Pădureanu 1990), which could be attributed to LBA I, cannot be verified. The excavations of M. Moga from the 1960s led to the identification of a defense ditch, but it cannot be determined whether it dates back to the Copper Age, the Bronze Age or the La Tène period.

LBA II settlements (approx. 1450–1250 BC)

During the LBA I stage, settlements such as Curtici-Sud-est or Şagu-Situl A1_1 continued to be inhabited, reaching the peak of their development during the 15th and 14th centuries BC. However, most LBA II settlements were newly founded. They are located in the high plain area, which is crossed by numerous deep valleys and paleochannels. Only the settlement from Conop-Situl 5/La Pătul/La Cotârce is located in the mountain area, specifically in the Mureş riverbed (*Fig. 11. no. 17*).

In addition to unfortified settlements, a considerable number of large-scale fortifications were constructed during this chronological stage. Enclosing or fortifying very large areas constitutes one of the characteristics of LBA II of the LMR and the Lower Tisza area (Gogâltan, Sava 2010; Szeverényi et al.

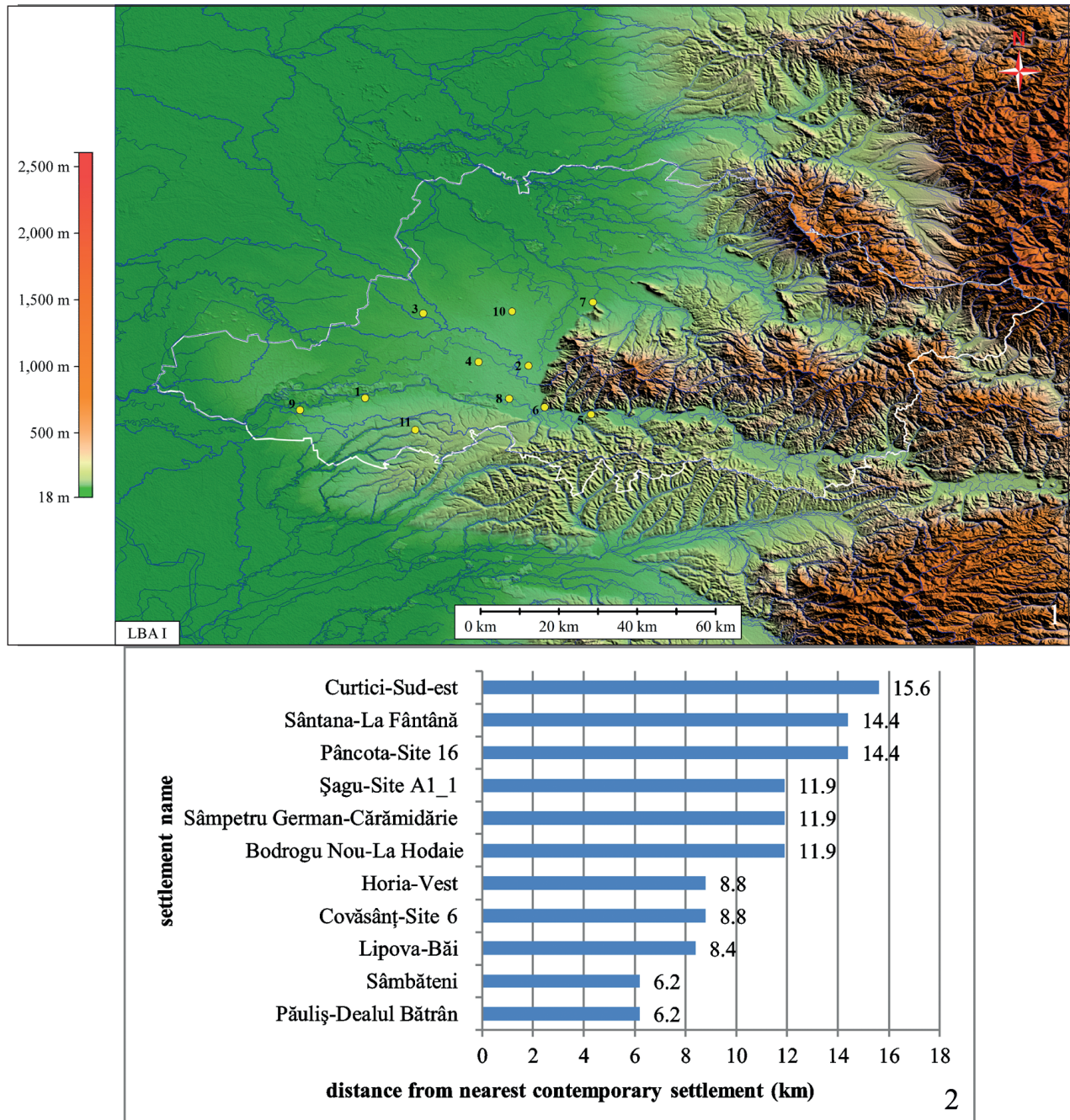


Fig. 10. 1: LBA I settlements in Arad County: Unenclosed settlements (yellow circle): 1. Bodrogu Nou-La Hodaie = Către Vale; 2. Covăsânt-Site 6; 3. Curtici-Sud-est; 4. Horia-Vest=Situl V7; 5. Lipova-Băi; 6. Păuliş-Dealul Bătrân; 7. Pâncota-Site 16; 8. Sâmbăteni; 9. Sâmpetru German-Căramidărie; 10. Sântana-La Fântână; 11. Şagu-Site A1_1.

2: Distance to the nearest contemporary LBA I settlement (source: the authors)

10. kép. 1: Arad megyei LBA I települések: erődítetlen települések (sárga kör): 1. Bodrogu Nou-La Hodaie = Către Vale; 2. Covăsânt-Site 6; 3. Curtici-Sud-est; 4. Horia-Vest=Situl V7; 5. Lipova-Băi; 6. Păuliş-Dealul Bătrân; 7. Pâncota-Site 16; 8. Sâmbăteni; 9. Sâmpetru German-Căramidărie; 10. Sântana-La Fântână; 11. Şagu-Site A1_1. 2: A legközelebbi erődítetlen LBA I településtől való távolság (forrás: a szerzők)

2017; Molloy et al. 2020; Bóka et al. 2022; Molloy et al. 2023a; Sava, Gogâltan 2023, 100–104). By correlating the locations of the fortifications and the unfortified settlements identified so far, we could not see a direct connection between them, in the sense of

the existence of ‘satellite’ settlements or settlements dependent on a particular political, social, economic or other centre. Several of these megaforts are situated at a considerable distance from the nearest unfortified settlement. However, megaforts are located

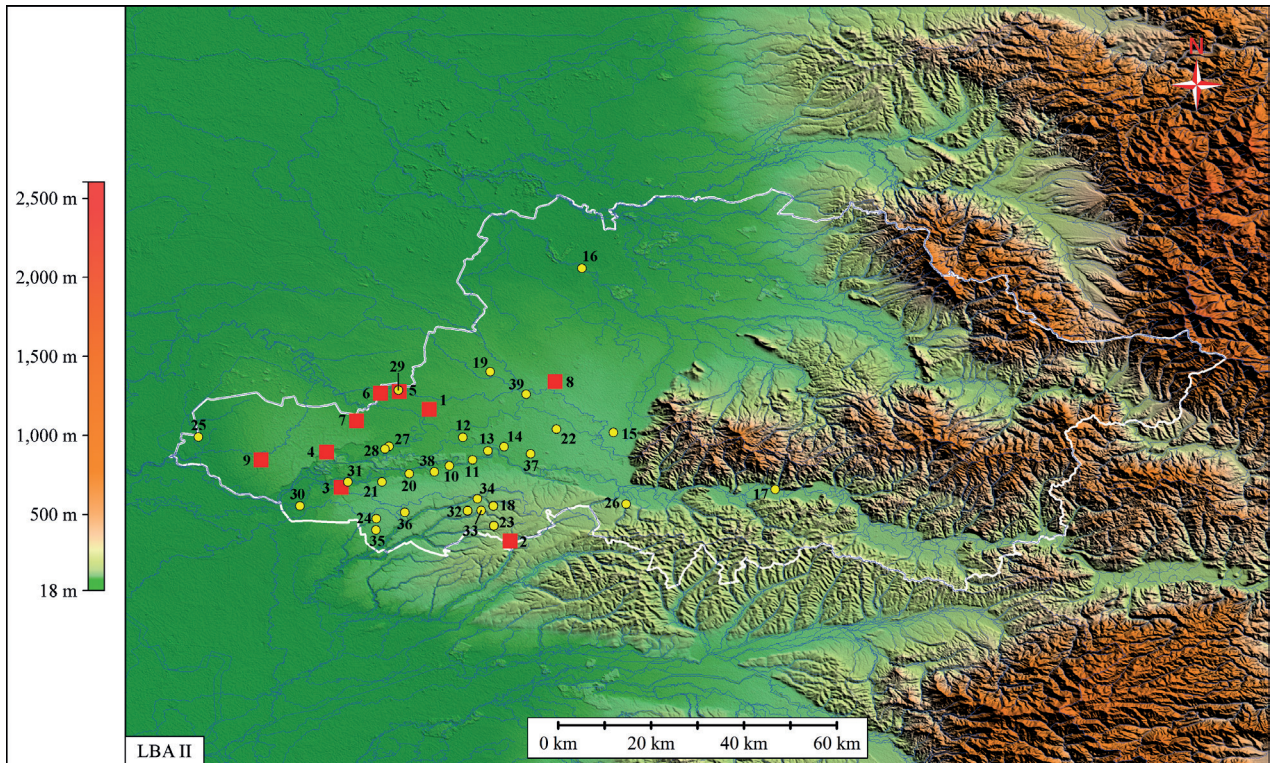


Fig. 11. LBA II settlements in Arad County: Megaforts (red square): 1. Arad-AR026; 2. Firiteaz-SAG003ASZ; 3. Munar-Wolfsberg; 4. Pecica-PEC020; 5. Pecica-PEC038-așezare fortificată; 6. Pecica-PEC040; 7. Pecica-PEC041; 8. Sântana-Cetatea Veche; 9. Semlac-SML021; Unenclosed settlements (yellow circle): 10. Arad-Bufniț; 11. Arad-Bypass B03-B04; 12. Arad-Gai I; 13. Arad-Palatul Cultural; 14. Arad-Uzina de apă; 15. Covăsânt-Situl 9; 16. Chișineu-Criș-CHC012ASZ = Situl 5; 17. Conop-Situl 5; 18. Cruceni-SAG038ASZ; 19. Curtici-Sud-est; 20. Felnac-Complexul Zootehnic; 21. Felnac-Situl 5; 22. Horia-Vest=Situl V7; 23. Hunedoara Timișană-SAG008ASZ; 24. Mailat; 25. Nădlac-Situl N8; 26. Neudorf-Pârâul Roșia; 27. Pecica-PEC012 = Forgaci 1; 28. Pecica-PEC007; 29. Pecica-PEC038-așezare nefortificată; 30. Satu Mare; 31. Sâmpetru German; 32. Șagu-SAG011ASZ; 33. Șagu-Situl A1_1; 34. Șagu-Lângă Gară; 35. Vinga-Situl 30; 36. Vinga-Situl 43; 37. Vladimirescu; 38. Zădăreni; 39. Zimandu Nou

11. kép. Arad megyei LBA II települések: mega-erődítések (piros négyzet): 1. Arad-AR026; 2. Firiteaz-SAG003ASZ; 3. Munar-Wolfsberg; 4. Pecica-PEC020; 5. Pecica-PEC038-așezare fortificată; 6. Pecica-PEC040; 7. Pecica-PEC041; 8. Sântana-Cetatea Veche; 9. Semlac-SML021; erődítetlen települések (sárga kör): 10. Arad-Bufniț; 11. Arad-Bypass B03-B04; 12. Arad-Gai I; 13. Arad-Palatul Cultural; 14. Arad-Uzina de apă; 15. Covăsânt-Situl 9; 16. Chișineu-Criș-CHC012ASZ = Situl 5; 17. Conop-Situl 5; 18. Cruceni-SAG038ASZ; 19. Curtici-Sud-est; 20. Felnac-Complexul Zootehnic; 21. Felnac-Situl 5; 22. Horia-Vest=Situl V7; 23. Hunedoara Timișană-SAG008ASZ; 24. Mailat; 25. Nădlac-Situl N8; 26. Neudorf-Pârâul Roșia; 27. Pecica-PEC012 = Forgaci 1; 28. Pecica-PEC007; 29. Pecica-PEC038-așezare nefortificată; 30. Satu Mare; 31. Sâmpetru German; 32. Șagu-SAG011ASZ; 33. Șagu-Situl A1_1; 34. Șagu-Lângă Gară; 35. Vinga-Situl 30; 36. Vinga-Situl 43; 37. Vladimirescu; 38. Zădăreni; 39. Zimandu Nou

towards the edges of areas with non-fortified settlements, forming a possible defensive belt (Fig. 11).

Although data on the LBA II megaforts can be found in the relevant literature, we re-examined previously published information and found that several megaforts are located north of the Mureș River, in the Pecica microregion (Sava et al. 2023, 265–273). The most impressive one is Pecica-PEC020, which has an enclosed space of 103 ha. It was built on the edge of the high terrace of the Mureș River (Fig. 12. 3), near the Pecica-Șanțul Mare tell (Sava et al. 2022a, Fig. 2). A similar case can be seen in Munar-Wolfs-

berg, where the MBA tell was encased within an LBA II fortification. Similar to Pecica-PEC020, the fortification system from Munar was erected on the edge of the high terrace of the Mureș River (Fig. 12. 2). The recently investigated fortifications from Arad-AR026 (Fig. 12. 1), Pecica-PEC038-așezare fortificată (Fig. 12. 5), Pecica-PEC040 (Fig. 17. 6), Pecica-PEC041 (Fig. 12. 7), and Semlac-SML021 (Fig. 12. 8–9) have been added to the list.

A series of unfortified settlements, funerary spaces, and bronze hoards (Sava et al. 2023, Fig. 36) can be associated with the fortifications in the Pecica mi-

croregion. A key objective for future research is to investigate the two linear ditch systems, which can be linked to Pecica-PEC041 and Semlac-SML021. These ditch systems seem to obstruct access to the Pecica-PEC020 fortification, which appears to be the most important centre in the area based on the available data. Similar linear ditches have been documented in the low plain of Romanian Banat (Dorogostaisky, Micle 2016; Dorogostaisky, Hegyi 2017; Dorogostaisky 2018), although their precise function remains unclear.

In the southeastern corner of our study area lies the Firiteaz-SAG003ASZ site, which stands out due to its shape and the absence of significant artifact finds (Fig. 12. 10). Due to these factors, we were initially hesitant to classify it among the LBA II fortifications of the LMR. However, after a new field survey, we decided to include it in the list of LBA II fortifications (Sava et al. 2025).

The Sântana-Cetatea Veche megafort (Fig. 13. 1–4) is perhaps the most compelling illustration of the new social, economic and political characteristics of the Late Bronze Age in the LMR (Gogâltan, Sava 2010; Gogâltan et al. 2019; Krause et al. 2022a; Krause et al. 2022b). Built during the second half of the 15th century BC (Sava et al. 2019; Gogâltan et al. 2019, 209), this megafort is located at the northern border of the LMR settlement group. Like many other settlements of that time, Sântana-Cetatea Veche was founded in a new location, far from previously inhabited MBA sites. It is the LBA II site with the largest inhabited area in the entire studied region.

As Fig. 13. 5 shows, the largest settlements of this period are clearly the megaforts: Sântana-Cetatea Veche (130 ha), Pecica-PEC020 (103 ha), Pecica-PEC041 (63 ha), and Arad-AR026 (59 ha). However, there are also some unfortified settlements of considerable size, such as Horia-Situl V7 (47 ha), Vinga-Situl 43 (40.8 ha), and Felnac-Complexul Zootehnic (40 ha). Additionally, there are more modest settlements of up to 5 ha, such as Hunedoara Timișană-SAG008ASZ (1.8 ha), Șagu-Lângă Gară (2.1 ha), Felnac-Situl 5 (4.5 ha), as well as small megaforts, like Munar-Wolfsberg (15 ha) and Pecica-PEC038-așezare nefortificată (6.8 ha).

Over the past 15 years, major infrastructure projects have facilitated preventive archaeological excavations, leading to the investigation of new LBA II settlements. These include Pecica-PEC007 (Fig. 14. 1), Conop-Situl 5 (Fig. 14. 2), and Șagu-Situl A1_1 (Fig. 14. 3). The investigations carried out in these

settlements suggest relatively modest architectural remains. Most contexts consist of hearths, artifact clusters, or pits with various functions. The large number and diversity of artifacts suggest intense economic activity.

The most representative unfortified settlement is Șagu-Situl A1_1. Excavations of about 10% of the settlement revealed evidence of various economic activities. Metalworking stands out as one of the best-documented activities in the Carpathian Basin during the 15th and 14th centuries BC (Sava et al. 2011, 50–55; Sava et al. 2012; Orfanou et al. 2022). Alongside metallurgical practice, the discovery of a pottery kiln (Sava et al. 2011, 60–63) is also an important find. The kiln was placed near a clay extraction pit, probably to facilitate the technological process. The peak stage of the settlement is associated with economic and other activities of sustenance, such as agriculture. Indirect evidence of this includes the considerable number of grinders and other artifacts that can be linked to cereal grinding. Consistent evidence of grain cultivation and processing can also be found in other contemporary settlements, such as Csanádpalota-Földvár (Szeverényi et al. 2015; Priskin 2022). A notable characteristic of this period is the affinity of the LBA communities for cultivating millet (Krause et al. 2022b, 412–413; Cavazzuti et al. 2025). The animal bones discovered in numerous contexts are evidence of animal husbandry. Archaeozoological analysis indicates that cattle and swine played an important role in the community's animal economy. In addition, the discovery of a butter-making vessel suggests activities related to the processing of secondary animal products (Sava et al. 2011, 75–80; Sava 2014b).

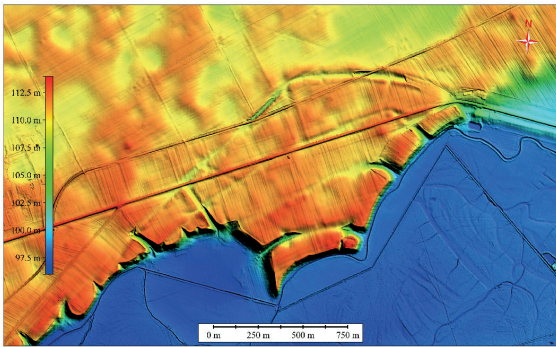
In contrast to non-fortified settlements, where economic activities predominated and no major constructions were identified, megaforts emphasized shifted the demarcation of internal space and construction of large buildings. A prime example of this is the megafort from Sântana-Cetatea Veche, where large-scale non-invasive investigations have been complemented by systematic archaeological excavations. These efforts have yielded significant insights into the internal organization of the area (Figs. 15–16). Within the four main enclosures, which cover approx. 130 ha, 29 buildings of various sizes were identified (Gogâltan et al. 2019, 199–200, Fig. 7–9). Sixteen of these are inside the first enclosure, six are inside the second, and seven are inside the third. Clearly, most of the buildings are concen-



1



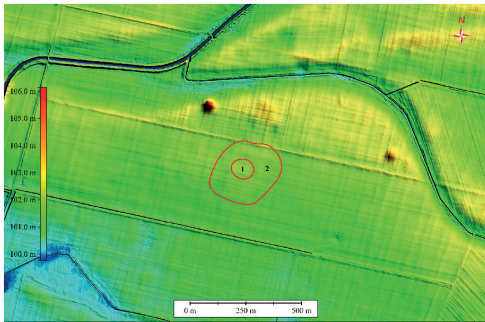
2



3



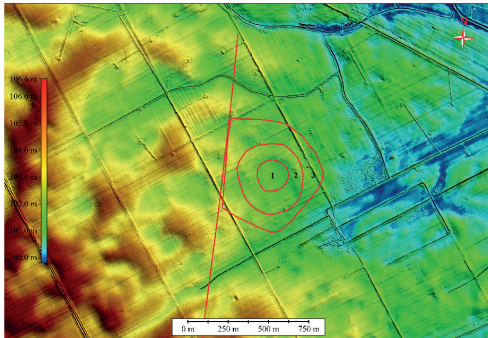
4



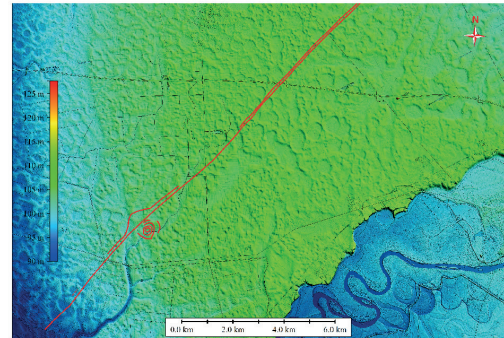
5



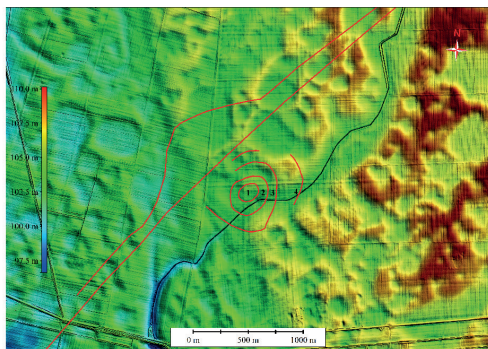
6



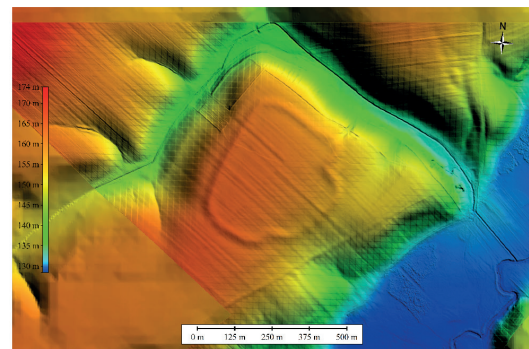
7



8



9



10

trated inside the first enclosure, these buildings also being the largest. The majority of the buildings have a surface area ranging from 50 to 200 m², are rectangular in shape, and are orientated north-west to south-east. Among these buildings, one stands out due to its large size, covering an area of about 1,700 m² in its final phase (Krause et al. 2022a; Krause et al. 2022b). This central construction is built in one of the most prominent places of the site and is connected to the southwestern gates by a path that is still visible in geophysical measurements today. In addition to this complex internal organization, three mounds were erected near the southeastern gate of the third enclosure. The middle one, with an impressive surface area of about 10,000 m² and an elevation of 3.5 m, most likely has a funerary character (Gogâltan et al. 2023; Gogâltan et al. 2024).

The defensive system of the Sântana-Cetatea Veche megafort consists of four main enclosures of various types and sizes (Fig. 15). The first enclosure is rectangular with rounded corners and consists of a palisade and a ditch. The fortification appears unfinished, with some segments lacking both the palisade and the ditch. The posts of the palisade were arranged in an implementation ditch, and the wooden structure was covered in clay (Fig. 17). The third enclosure (Enclosure III) contains the most elaborate fortification system, consisting of an earthen rampart (which has a width of over 25 m and a height of approx. 2.5 m), topped by a complex palisade constructed from logs bound with twigs and subsequently coated in clay (Fig. 18. 2–3). Two large defense ditches were dug outside (Fig. 18. 1, 4). The interior of the third enclosure, which actually includes the first one, is divided by other fortification/delimitation systems of smaller dimensions. Outside this heavily fortified centre there is another network of ditches, the most significant of which is Enclosure IV. Access to the interior was provided by entrances, which also connected the enclosures (Fig. 18. 5). In all cases, the gates are simple, a gap in the palisade, sometimes with additional features designed to make the interior difficult to access.

According to our current data, only 9 of the 39 LBA II settlements had fortification systems. As shown in Fig. 19. 1, these fortifications vary in size and structure. Pecica-PEC038, for example, has a surface area of only approx. 7 ha and consists of two simple enclosures, whereas Sântana-Cetatea Veche covers around 130 ha and contains a large number of fortification networks.

The fortification elements and the complexity of defense systems vary from case to case. For instance, the megaforts at Firiteaz-SAG003ASZ, Munar-Wolfsberg, and Sântana-Cetatea Veche have earthen ramparts, palisades, and defensive ditches. In other cases, only ditches have been documented. However, these sites have not yet been investigated through geophysical surveys or archaeological excavation. It is possible that these ditches were originally accompanied by palisades made only from wooden posts with no clay covering, judging by the lack of daub on the surface of the fortifications.

We calculated the linear meters of built fortifications (Fig. 19. 3), just like we did for the MBA settlements. Based on these calculations, we concluded that the efforts made to build defensive systems were significant during the LBA II period. When we consider only the linear meters of dug ditches, we find that they are six times greater than during the MBA period, not including ramparts or palisades.

Another aspect to discuss is the ratio between the minimum and maximum construction efforts for the fortification systems of each settlement. If we consider only the ditches, we see that for the smallest and largest megaforts, Pecica-PEC038-ășezare fortificată and Sântana-Cetatea Veche, the ratio is 1 to 10.6. Throughout the MBA, the ratio was 1 to 3.6. From this data it is clear that during the MBA the effort invested by different communities in such works was distributed evenly among contemporary settlements, while during the LBA II the effort invested showed considerable differences between the settlements.

Regarding the distance to the nearest contemporary settlement, the available data indicates no major changes compared to the MBA, when the average dis-

- ◀ Fig. 12. LBA II megaforts in the Lower Mureş Region. 1: DEM of Arad-AR026. 2: Aerial photograph of Munar-Wolfsberg. 3: DEM of Pecica-PEC020. 4: Satellite image of Pecica-PEC020. 5: DEM of Pecica-PEC038. 6: Satellite image of Pecica-PEC040. 7: DEM of Pecica-PEC041. 8–9: DEM of Semlac-SML021. 10: DEM of Firiteaz-SAG003ASZ (sources: 1–3, 5, 7–10: the authors; 4: GoogleEarth; 6: <https://corona.cast.uark.edu/atlas#zoom=3¢er=0,3000000>)
12. kép. LBA II mega-erődítések az Alsó-Maros mentén. 1: Arad-AR026, DEM. 2: Munar-Wolfsberg, légi felvétel. 3: Pecica-PEC020, DEM. 4: Pecica-PEC020, műholdkép. 5: Pecica-PEC038, DEM. 6: Pecica-PEC040, műholdkép. 7: Pecica-PEC041, DEM. 8–9: Semlac-SML021, DEM. 10: Firiteaz-SAG003ASZ, DEM (forrás: 1–3, 5, 7–10: a szerzők; 4: GoogleEarth; 6: <https://corona.cast.uark.edu/atlas#zoom=3¢er=0,3000000>)

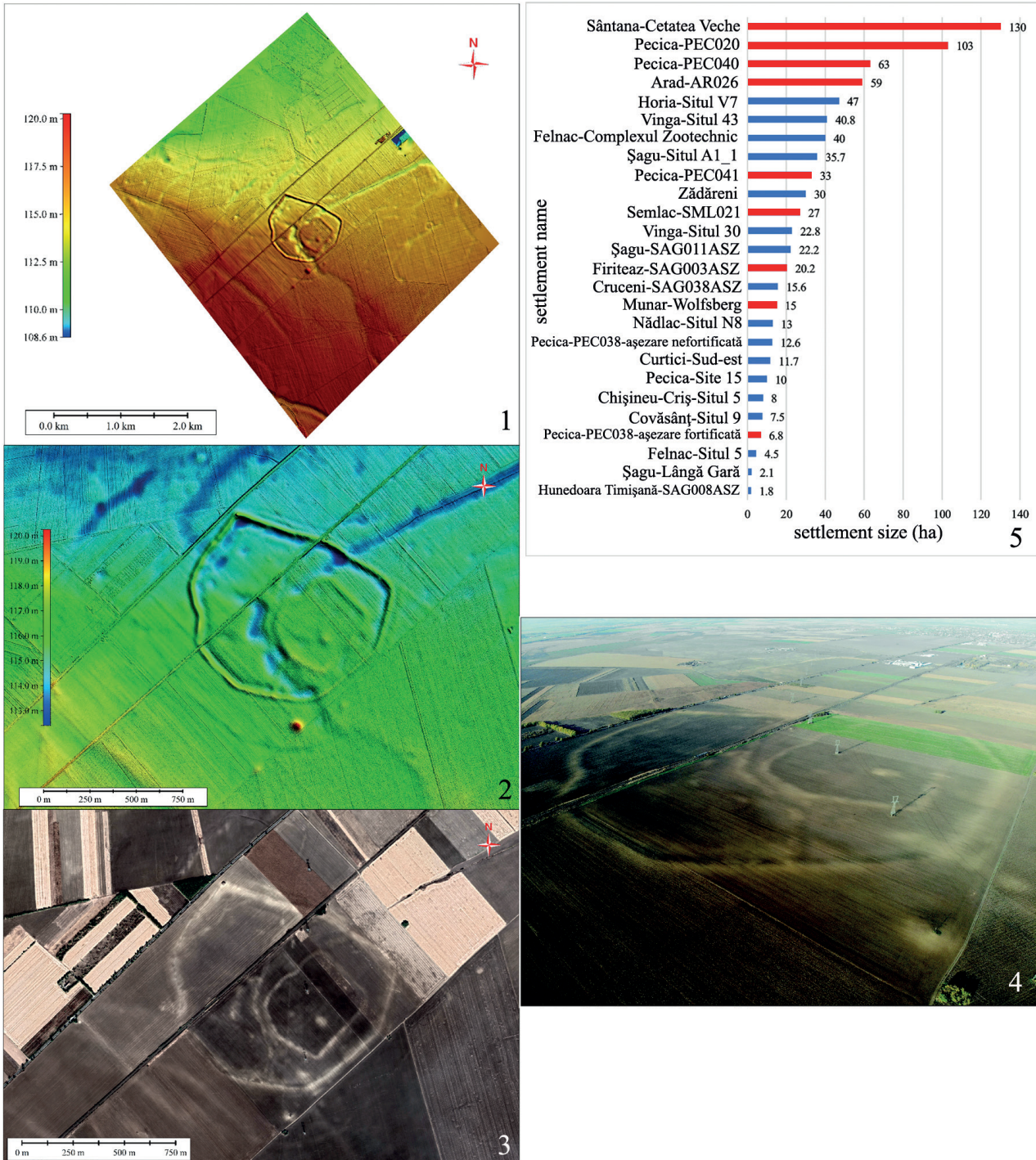


Fig. 13. 1–4: Sântana-Cetatea Veche megafort: DEM (1–2), satellite image (3), and aerial photograph of the megafort (4). 5: LBA II settlement size (red: enclosed sites) (sources: 1–2, 4–5: the authors; 3: GoogleEarth)

13. kép. 1–4: Sântana-Cetatea Veche mega-erődítés: DEM (1–2), műholdkép (3), légifotó (4). 5: LBA II települések mérete (piros: erődített települések) (forrás: 1–2, 4–5: a szerzők; 3: GoogleEarth)

tance between settlements was about 3.6 km. Excluding the outliers, Conop-Situl 5 and Chişineu-Criş-Situl 5, which are located at considerable distances from the other settlements (22.6 and 24 km, respectively), the average distance between neighboring contemporary settlements is about 3.7 km (Fig. 19. 2).

LBA III settlements (approx. 1250–900/800 BC)

The LMR experienced a marked decline as a result of the destruction of the LBA II megafortes (Sântana-Cetatea Veche, Corneşti-Iarcuri), events that certainly occurred during the 13th century BC. The col-

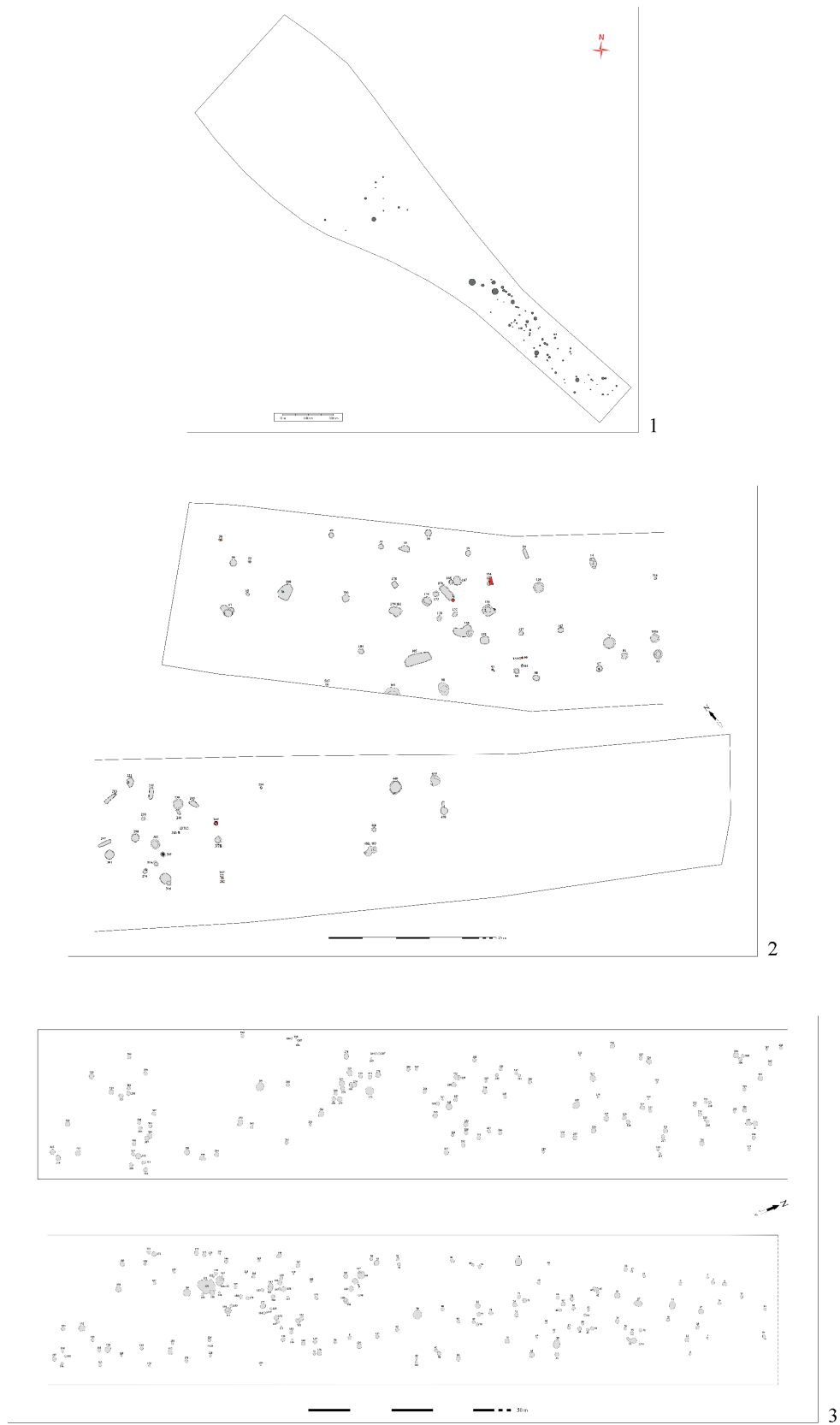
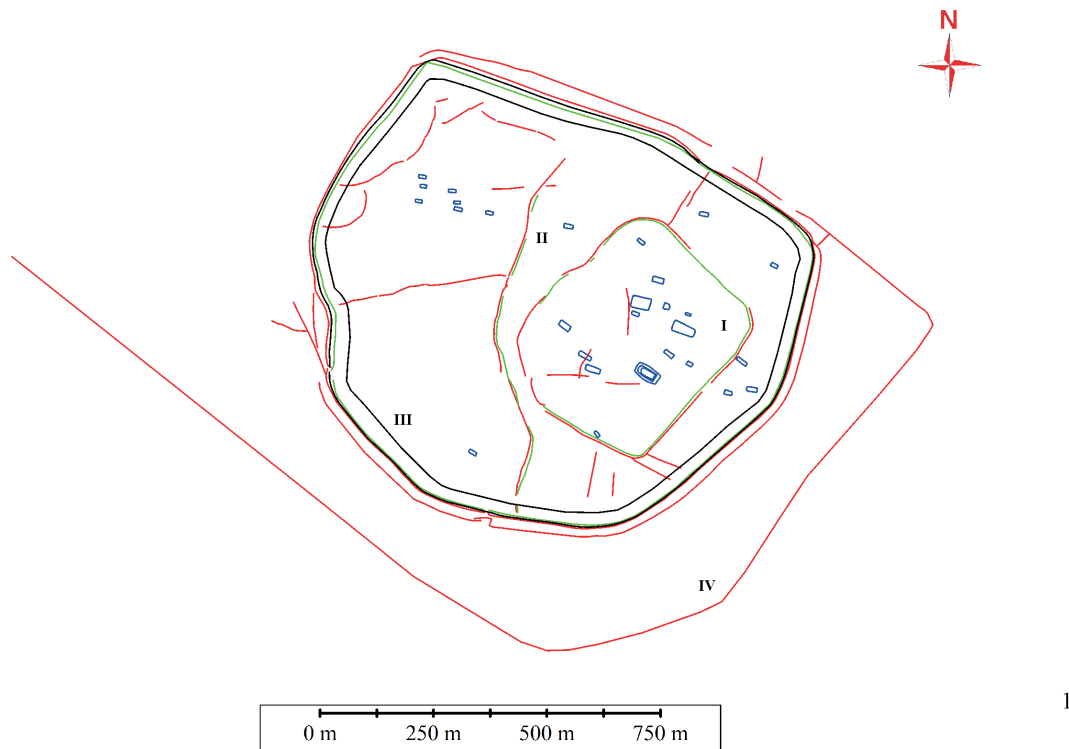
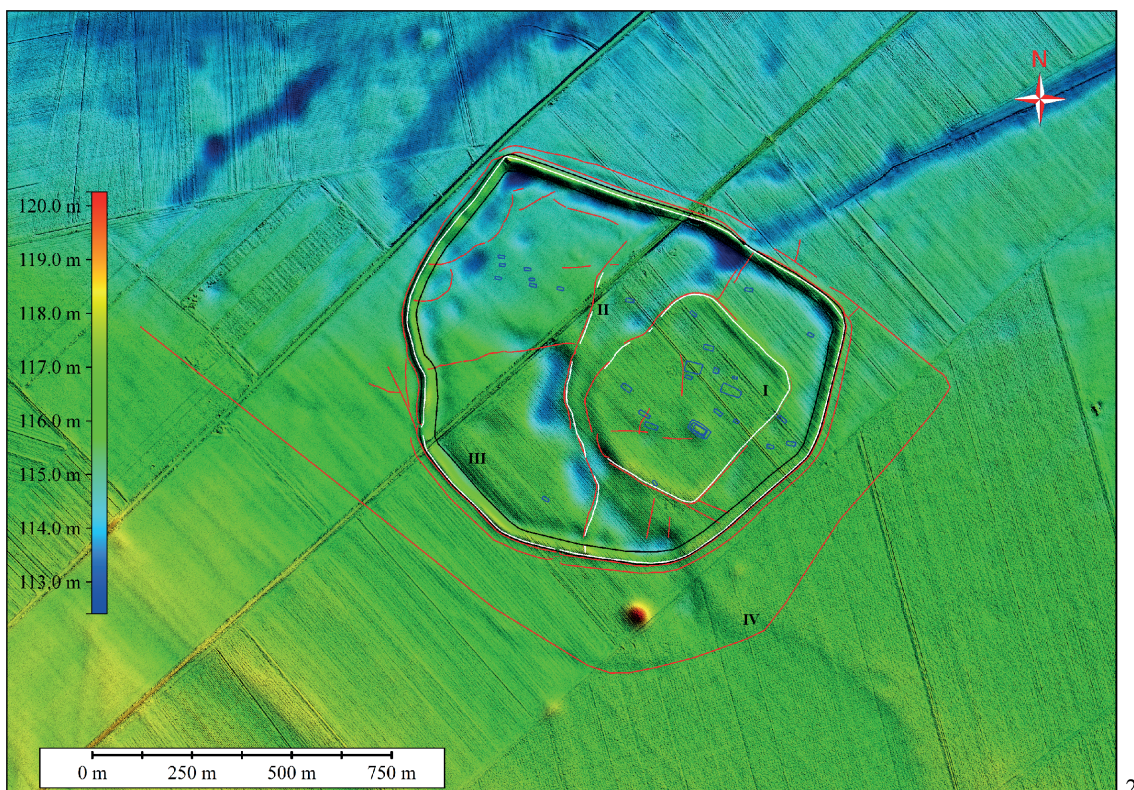


Fig. 14. LBA II unenclosed settlements. Excavation surveys. 1: Pecica-PEC007; 2: Conop-Situl 5; 3: Şagu-Situl A1_1 (source: the authors)

14. kép. LBA II erődítetlen települések. Ásatási felmérések. 1: Pecica-PEC007; 2: Conop-Situl 5; 3: Şagu-Situl A1_1 (forrás: a szerzők)



1



2

Fig. 15. Sântana-Cetatea Veche. 1: Survey of the mega-fort derived from the interpretation of geophysical measurements; 2: overlay of the mega-fort plan onto the DEM (blue line: buildings; red line: ditches; green/white line: palisades; black line: earthen ramparts) (source: the authors)

15. kép. Sântana-Cetatea Veche. 1: A mega-erődítés geofizikai mérésekből származó értelmezése; 2: a mega-erődítés terve a DEM-re illesztve (kék vonal: épületek; piros vonal: árkok; zöld/fehér vonal: palánkok; fekete vonal: földsáncok) (forrás: a szerzők)



Fig. 16. Idealized reconstruction of the Sântana-Cetatea Veche megafort (graphics: Bogdan Rus)
16. kép. Sântana-Cetatea Veche mega-erődítés idealizált rekonstrukciója (grafika: Bogdan Rus)



Fig. 17. Sântana-Cetatea Veche, first fortification system, Trench S6/2019. 1: Adobe from the burning of the palisade; 2: the implementation ditch of the palisade; 3: defence ditch placed in front of the palisade; 4: orthophoto of Trench S6/2019 (source: the authors)

17. kép. Sântana-Cetatea Veche, első erődítési rendszer, S6/2019 szelvény. 1: A palánk elégetéséből származó omladék; 2: a palánk alapozási árka; 3: védelmi árok a palánk előtt; 4: az S6/2019 szelvény ortofotója (forrás: a szerzők)

lapse of the social, economic, and political systems led to a sharp decline in the number of settlements. Only 16 sites date from this period (LBA III, Fig. 20). Over time, research has led to the identification of only one fortification from this period: Lipova-Coasta Rea/Lipovița (Pădureanu 1993, 23; Măruia 2011, Annex 2, 1361–1368). This site is located on a prominent hilltop that faces the Mureș mountain pass. The fortification system consists of a 15 m wide earthen *vallum* with a 3 m height and a ditch with an aperture of approx. 16–17 m and a depth of almost 3.5 m, judging by the current digital elevation model. The fortification bars the entrance to the plateau (Fig. 21). Although it has all the characteristics of an LBA III fortification (Bălan 2013; Becker 2022), the

one in Lipova has not been investigated through excavations, which makes it difficult to determine its exact chronological framing.

Of the 15 known unfortified settlements, most were investigated through field surveys or test excavations, as was the case for the Arad-Centru settlement (Sava, Pădureanu 2009, 36–39). Information on built structures from this period remains limited, even for settlements that have been studied through preventive excavations, such as Pecica-Est and Pecica-Forgaci (Sava, Ursuțiu 2021) (Fig. 22. 1–2). The data do not lead to conclusive assessments regarding the size of the settlements (Fig. 22. 3) and the distance between neighboring contemporary settlements (Fig. 22. 4).

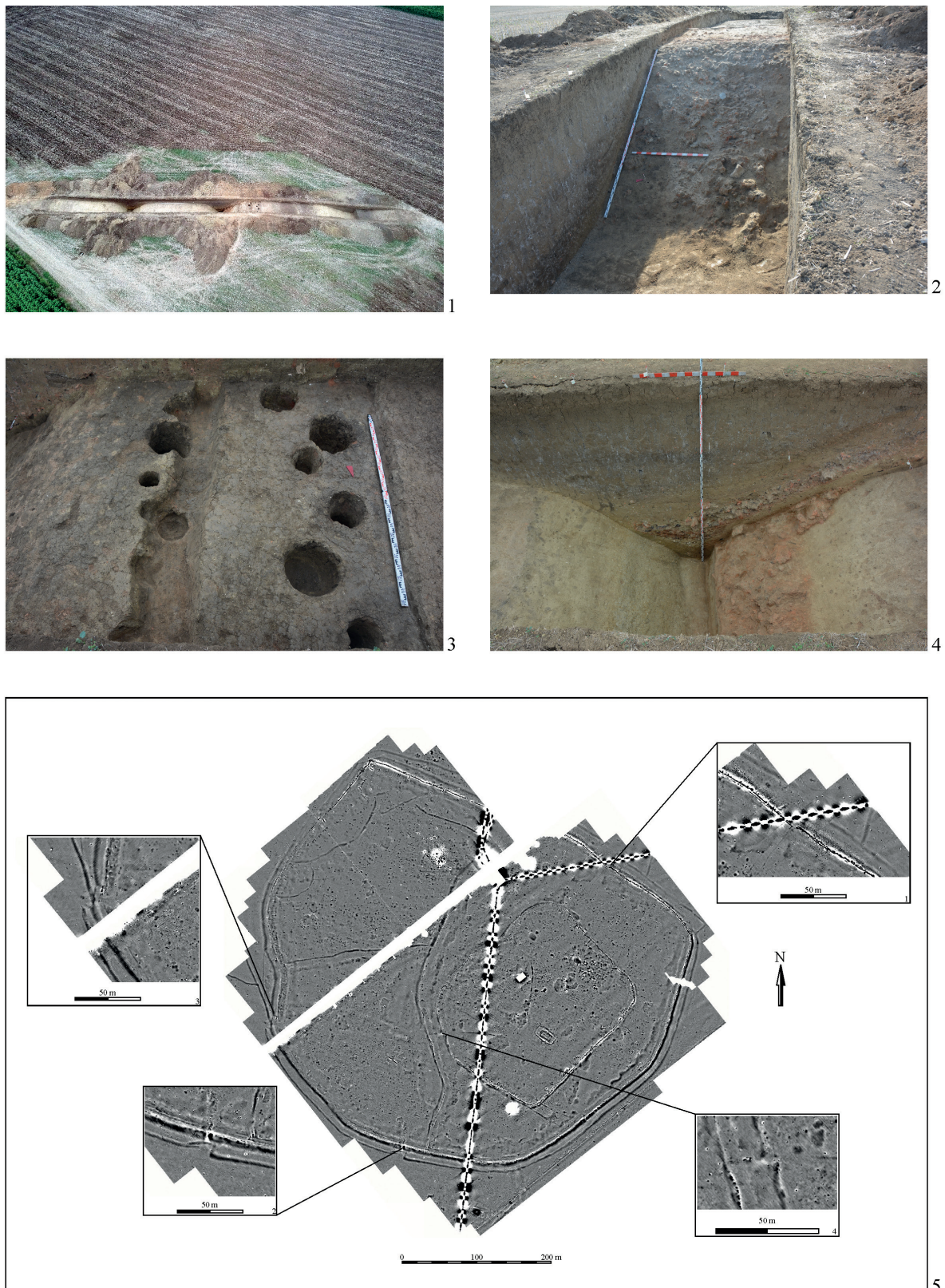


Fig. 18. Sântana-Cetatea Veche, third fortification system. 1: Aerial photograph of Trench S5/2018; 2: burned remains of the palisade; 3: the postholes of the palisade; 4: the first defence ditch; 5: the results of geophysical measurements, with details for the construction systems of the gates (source: the authors)

18. kép. Sântana-Cetatea Veche, harmadik erődítési rendszer. 1: Az S5/2018 szelvény légifotója; 2: a palánk égett maradványai; 3: a palánk oszlophelyei; 4: az első védelmi árok; 5: a geofizikai mérések eredményei, a kapuk építési rendszerének részletei kiemelve (forrás: a szerzők)

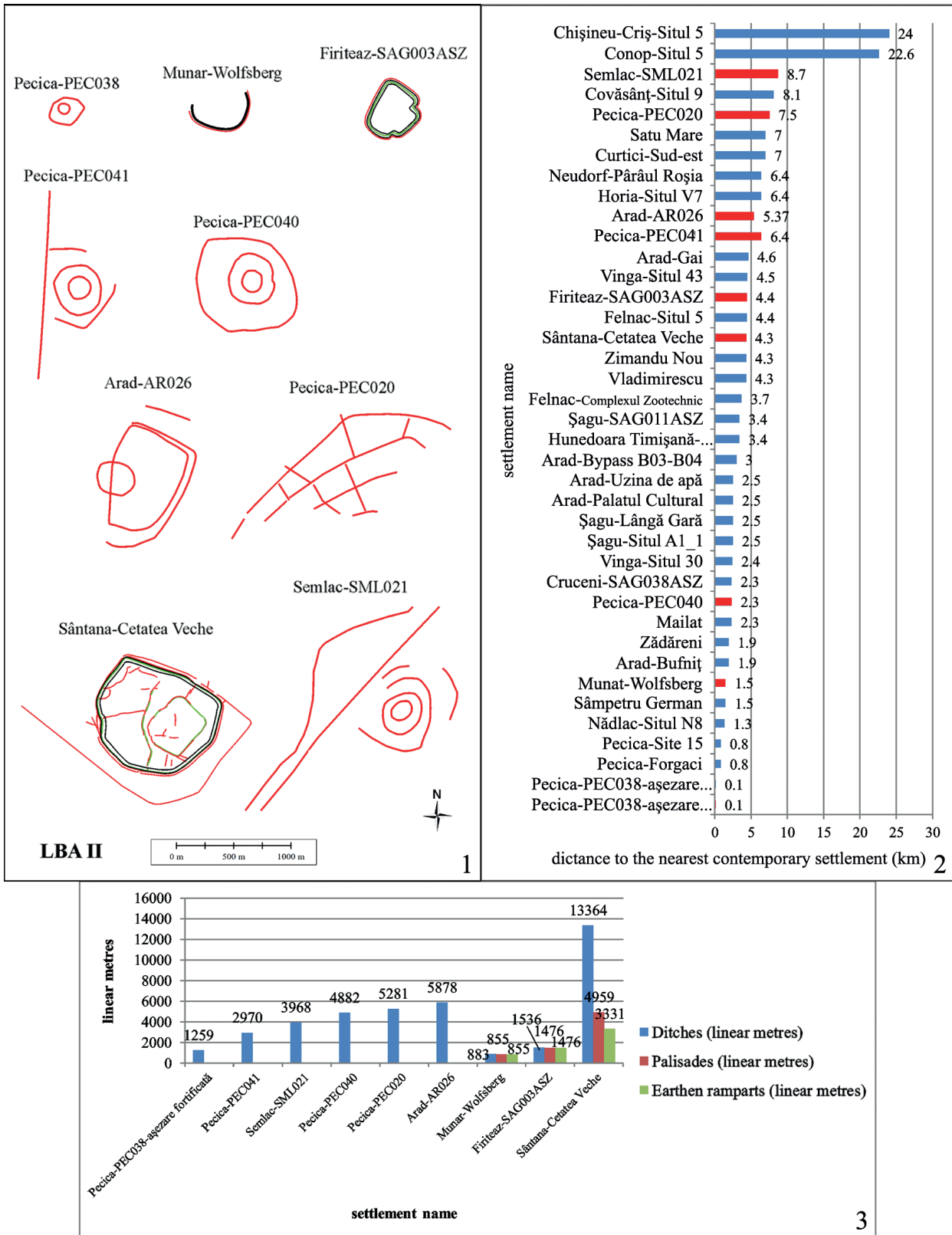


Fig. 19. 1: Plans of LBA II enclosure systems (red: ditches; black: earthen ramparts; green: palisades); 2: distance to the nearest contemporary LBA II settlement (red: enclosed sites); 3: chart showing the linear extent of LBA II ditches, palisades, and earthen ramparts (source: the authors)

19. kép. 1: LBA II erődítérendszeretek alaprajzai (piros: árkok; fekete: földsáncok; zöld: palánkok); 2: a legközelebbi egykorú LBA II településtől való távolság (piros: erődített települések); 3: az LBA II árkok, palánkok és földsáncok lineáris kiterjedését bemutató diagram (forrás: a szerzők)

Discussion

Our sustained focus on studying MBA and LBA settlements over the past 15 years has led to a radical change in our understanding of 2nd millennium BCE settlement dynamics in the LMR. As a result, the number of MBA settlements attributed to the Cornești-Crvenka communities has doubled (Gogâltan 1999, Fig. 15; Sava, Gogâltan 2022, Fig. 30–31; Stăvilă, Gogâltan 2024, Pl. 1). Very little was known about cultural developments during the 1600/1500–900/800 BC period, except for the older excavations at Sântana-Cetatea Veche (Rusu et al. 1999; Gogâltan, Sava 2010) and some LBA bronze hoards.

Based on what we know today, the most numerous sites belong to the MBA. The MBA period lasted approx. 500 years, which is as long as the other chronological stages combined (LBA I, LBA II and

LBA III). Taking into account that LBA II settlements span no more than 200 years, it can be noted that the ratio is more favorable to the latter: 8.8 MBA settlements/100 years vs 19.5 LBA II settlements/100 years. LBA I lasted a short period of time, as evidenced by the low number of sites. It is also a transitional period between MBA and LBA II. It should also be noted that the archaeological material found on the surface is difficult to date to either of these periods. A similar situation occurs in other microregions of the Carpathian Basin that have been more thoroughly investigated regarding the MBA-LBA transition (Artursson 2010, 100–114; Duffy et al. 2019; Gävan et al. 2021; Melis et al. 2022; Gävan et al. 2023; Melis 2023; Pardička, Duffy 2023; Gävan et al. 2024). The low number of settlements during LBA III is due to the destruction of the LBA II power centers, events which caused social, economic, political, and probably demographic decline in the region (Fig. 23. 1).

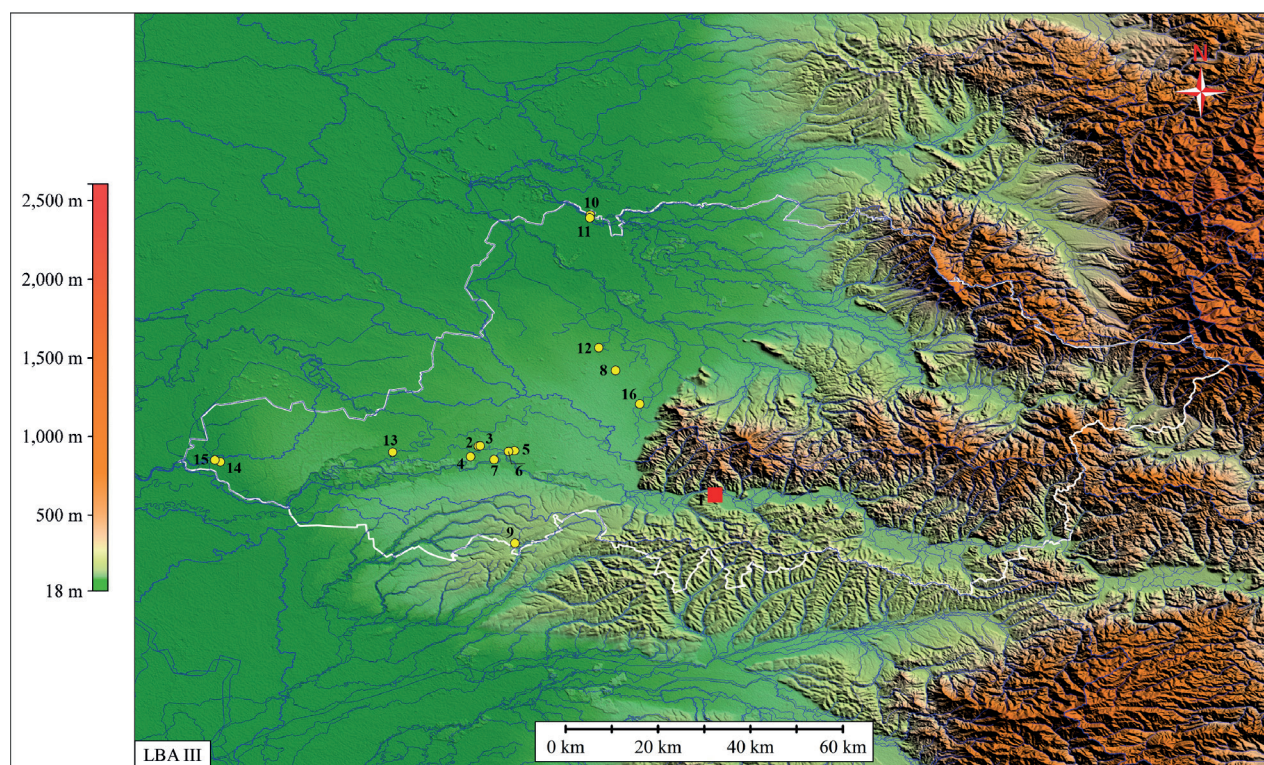


Fig. 20. LBA III settlements in Arad County: Enclosed settlements (red square). 1. Lipova-Coasta Rea/Lipovița; Unenclosed settlements (yellow circle): 2. Arad-Bujac = Str. Tiberiu nr.5 = str. Progresului nr. 34 = str. Ghiocelilor nr. 75; 3. Arad-Silvaș (Bujac); 4. Arad-Aeroport; 5. Arad-Micălaca-Deluț; 6. Arad-Autogara veche; 7. Arad-Centru; 8. Caporal Alexa; 9. Firiteaz- SAG004ASZ = Dealul Golumb; 10. Iermata Neagră-Situl 1; 11. Iermata Neagră-Situl 7; 12. Olari-Situl 1; 13. Pecica-PEC011 și PEC012; 14. Nădlac-Situl N28; 15. Nădlac-Situl N33; 16. Șiria

20. kép. Arad megyei LBA III települések: erődített települések (piros négyzet). 1. Lipova-Coasta Rea/Lipovița; erődítetlen települések (sárga kör): 2. Arad-Bujac = Str. Tiberiu nr.5 = str. Progresului nr. 34 = str. Ghiocelilor nr. 75; 3. Arad-Silvaș (Bujac); 4. Arad-Aeroport; 5. Arad-Micălaca-Deluț; 6. Arad-Autogara veche; 7. Arad-Centru; 8. Caporal Alexa; 9. Firiteaz- SAG004ASZ = Dealul Golumb; 10. Iermata Neagră-Situl 1; 11. Iermata Neagră-Situl 7; 12. Olari-Situl 1; 13. Pecica-PEC011 și PEC012; 14. Nădlac-Situl N28; 15. Nădlac-Situl N33; 16. Șiria

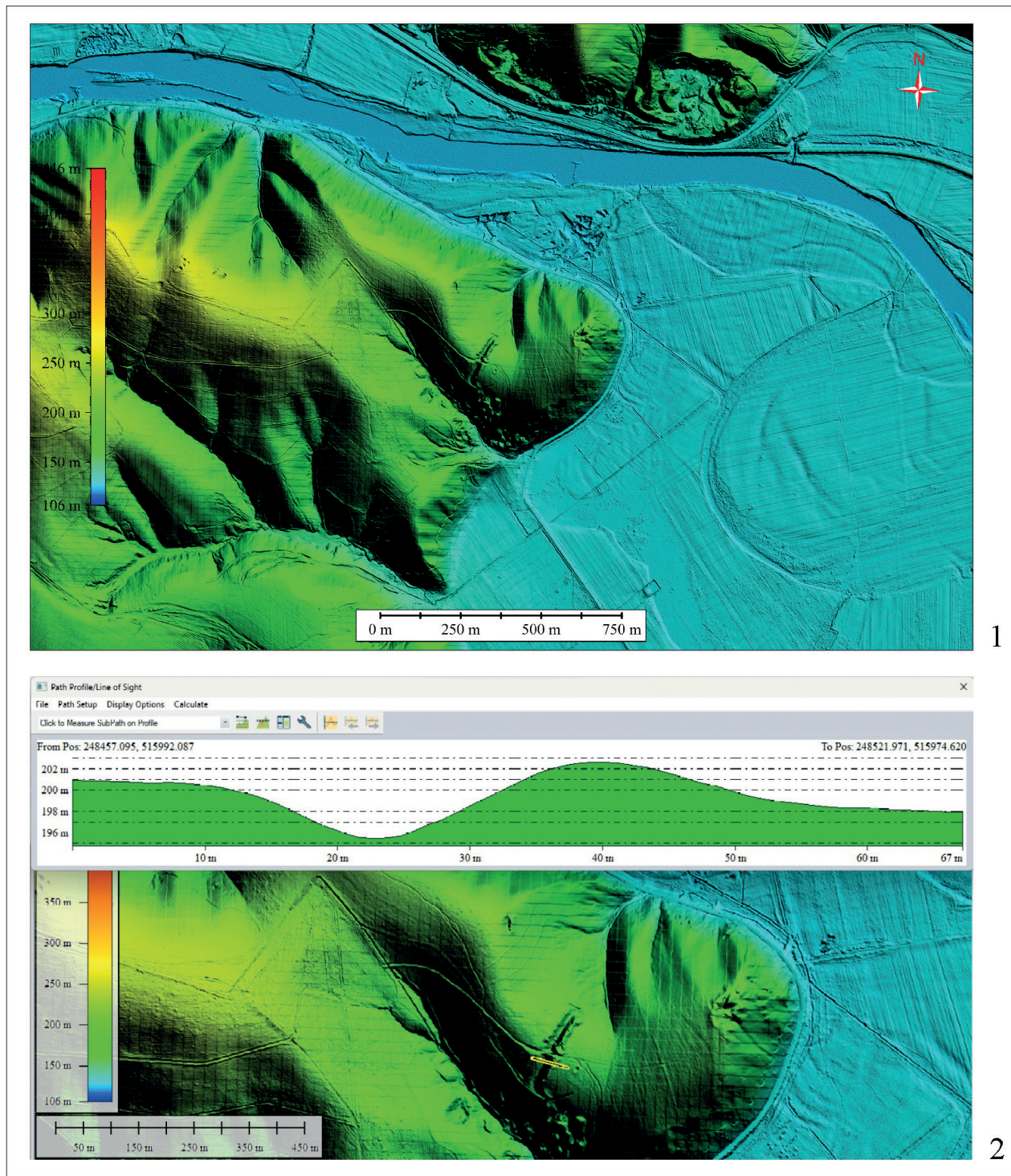


Fig. 21. The LBA III fortification of Lipova-Coasta Rea/Lipovița. 1: DEM of the fortification; 2: DEM of the fortification with a cross-section of the fortification system (source: the authors)

21. kép. Lipova-Coasta Rea/Lipovița, LBA III erődítés. 1: DEM; 2: DEM és az erődítmény keresztmetszete (forrás: a szerzők)

Throughout the MBA, three cultural circles (Mureș, Vatina—through Cornești-Crvenka, its northern part—and Otomani) intersected in the area bounded by the Lower Mureș and Crișul Alb rivers. Settlements are distinguished primarily by

the presence or absence of fortification elements, independent of the cultural circle to which they belong. The fortified settlements, which are also multilayered (*tells* and *tell*-like settlements), represent almost half of the total number of identified settle-

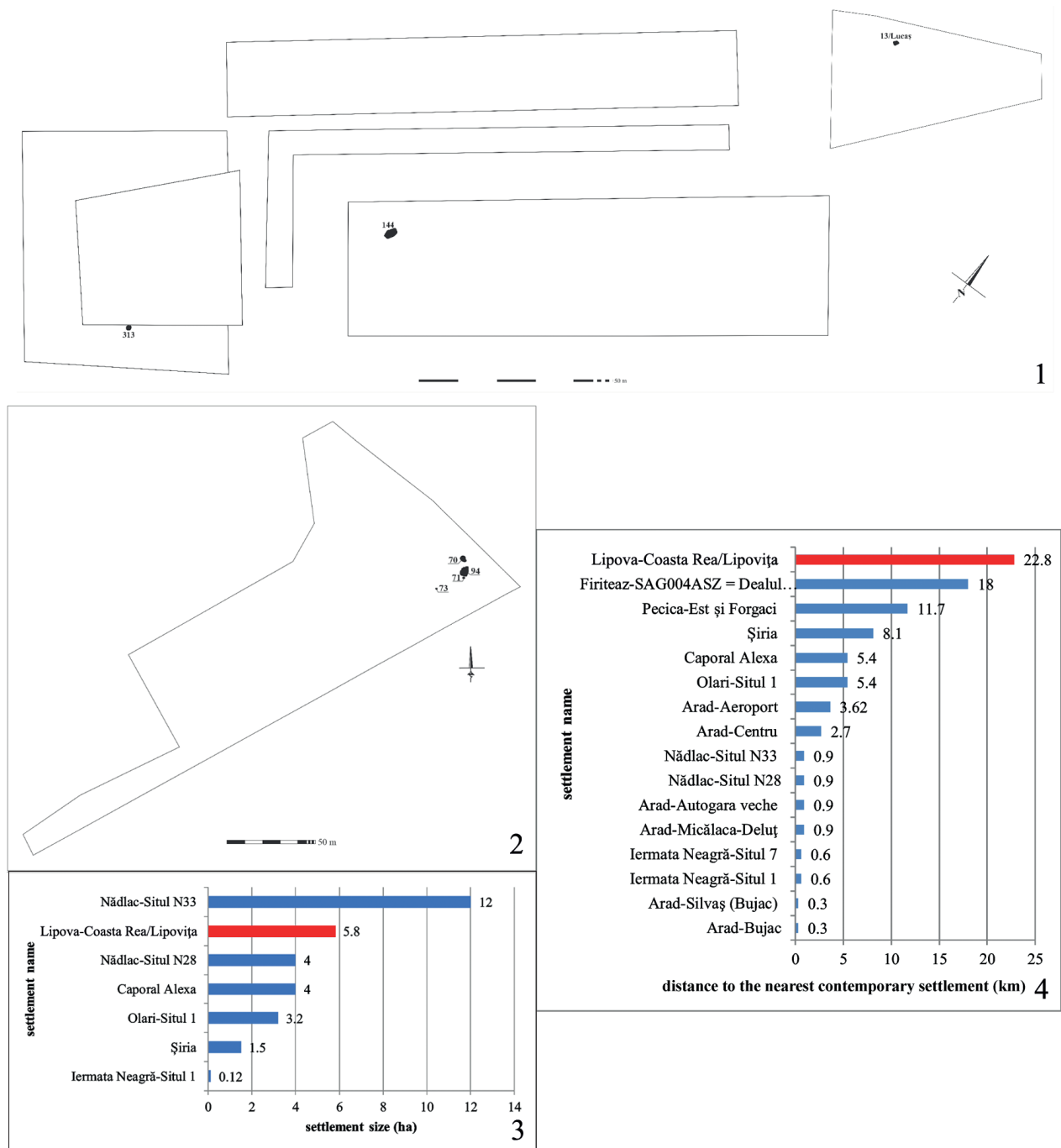


Fig. 22. 1–2: LBA III unenclosed settlements. Excavation plans of Pecica-PEC011 (1) and Pecica-PEC012 (2); 3: LBA III settlement size (red: enclosed sites); 4: distance to the nearest contemporary LBA III settlement (red: enclosed sites) (source: the authors)

22. kép. 1–2: LBA III erődítetlen települések. Pecica-PEC011 (1) és Pecica-PEC012 (2) feltárási tervrajzai; 3: LBA III települések mérete (piros: erődített települések); 4: a legközelebbi egykorú LBA III településtől való távolság (piros: erődített települések) (forrás: a szerzők)

ments. In Toboliu-Dâmbul Zănăcanului (Lie et al. 2024) and Emőd-Nagyhalom (Kienlin et al. 2019), where stratigraphic coring was carried out, it was proven that the ditches were dug at the beginning of the occupation, essentially contributing to the process of building multilayered settlements. Further

south from our study area, in Cornești-Cornet, it is known only that the ditches were functional during the occupation of the site (Heeb, Bălărie 2020). In most cases, there was documented habitation outside of the ditches surrounding the core of the settlement.

It is difficult to determine the nature of economic and political relations between *tell/tell*-like settlements and the unfortified settlements surrounding them (Găvan, Gogâltan 2014; Kienlin 2020; Sava, Gogâltan 2022, 140). During the MBA, lower intensity of violent conflicts (Sava, Gogâltan 2023) and the continuous habitation of the same space for several hundred years may indicate socio-economic stability. The layout of multilayered settlements varies from one area to another. For example, the Munar-Wolfsberg settlement in the high terrace area of the Mureş has a series of semicircular ditches that clearly separate the inhabited area from the rest of the terrace (Fig. 2. 4; Fig. 8. 2). In contrast, the Sântana-La Nord de Oraş settlement did not require protection for its residential area (Fig. 6). This suggests a peaceful coexistence based on collaborative relations between MBA settlements.

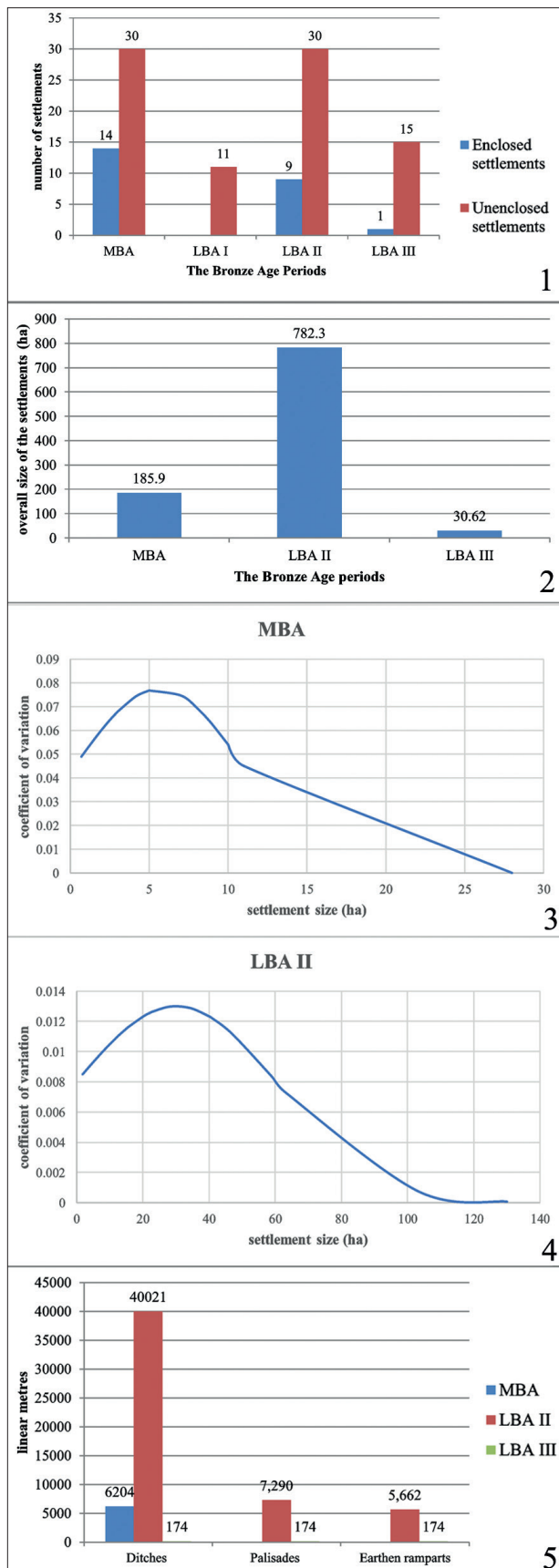
The megaforts were built after the gradual abandonment of multilayered settlements towards the mid-2nd millennium BC. During the LBA II, there was an unprecedented increase in inhabited and exploited areas (Fig. 23. 2). While most MBA settlements ranged in size from 2 to 8 ha (average 5.63 ha), most LBA II settlements ranged from 10 to 40 ha (average approx. 30 ha) (Fig. 23. 3–4). An identical situation was observed for the LBA TSG in the Serbian Banat and eastern Bačka (Molloy et al. 2023a, Fig. 8). At the same time, the communities' efforts to build fortifications also increased (Fig. 23. 5). Monumental buildings, such as those in Sântana-Cetatea Veche (Krause et al. 2022a; Krause et al. 2022b), are the exception.

The LBA megaforts were built at the confluence of the Mureş and Tisza rivers. This area is characterized by low plains with numerous streams. Notably, such fortifications are absent from higher, more naturally defensible terrains. This contrasts with fortifications found in other regions between the Taunus and Carpathian Mountains (Hansen, Krause 2018; Hansen, Krause 2019a; Hansen, Krause 2019b; Hansen, Krause 2022). How can this distribution be explained? As previously noted, there is a long-standing tradition of habitation in this region. The evidence shows a continuation of important material culture elements from the MBA to the LBA (Sava, Gogâltan 2022). This also proves a continuity of the local MBA population, which played a decisive role in creating the new world of LBA II megaforts in the same geographic location. An additional argument is the fact that in the same area where one of the important

MBA centres, the one around Pecica, functioned, an impressive number of megaforts were built during LBA II. We can conclude that the Pecica area maintained its importance throughout LBA I and II.

Due to their size, the complexity of their fortification systems, and the social efforts invested in their construction, the position of the megaforts in the LBA settlement network in the LMR and the LTR was interpreted differently by those who studied them. The Corneşti site was considered "a defended site of urban character" (Szentmiklosi et al. 2011, 834), the one from Csanádpalota was "a fortified ritual centre where a large community gathered from time to time to carry out various rituals" (Szeverényi et al. 2015, 101), or "a place of congregation for large groups of people" (Gaydarska, Chapman 2022, 75). Barry Molloy considers them 'agro-agglomerative' settlements, which are "a product of a form of social complexity that was fundamentally distinct to urbanism – specifically that of the contemporary Aegean societies – but with a broadly equivalent level of organisational, military and political sophistication" (Molloy 2025, 200). Starting from the hierarchical principle established for the TSG (size, complexity and density of activity) then "the largest and most complex sites served as administratively dominant centres and that the role of other sites within the network was defined relationally with these centres and each other" (Molloy 2025, 212). Molloy also notes that there are both similarities and differences between the sites. The Sântana-Cetatea Veche megafort differs from the TSG network due to its internal organisation and fortification system. Instead, the megafort from Corneşti-Iarcuri would fit into the TSG organisational pattern (Molloy 2025, 212).

The internal organisation of the Sântana-Cetatea Veche megafort does not indicate an urbanistic plan like that of the Aegean region (Branigan 2001), and the term proto-urban has a meaning that cannot be clearly defined (Harding 2018; Gaydarska 2019). Large, enclosed spaces that are suitable for regular exchange activities and structures of considerable size that can accommodate a large number of people might indicate a place of congregation for local communities within a larger or smaller area. The largest structure from Sântana may have served a function similar to that of a *megaron* in the Mycenaean world (Krause et al. 2022b). The character of commemorative ritual can be suggested by the likely funerary monument integrated into the fourth fortification (Gogâltan et al. 2023; Gogâltan et al. 2024). Parts within the megafort, separated from residential



spaces through ditches, with low intensity, reflected in small amounts of artifacts at the surface, could suggest that agro-pastoral economic activities were carried out here (Figs. 15–16). Livestock, for example, could be kept safely in this way, suggesting different ownership relations to those seen in the MBA (Kanne et al. 2024, 17; Molloy 2025, 216). However, the abundance of bronze and gold finds (Gogâltan et al. 2013), as well as blue and green glass beads likely originating from the eastern Mediterranean (Krause et al. 2022a, 82–83, Abb. 26), suggest that the site was engaged in complex economic activities and was truly a central site for its catchment area.

This prosperous society came to a violent end in the 13th century BC, when the megaforts were burned and destroyed (Gogâltan, Sava 2012, 68–69; Gogâltan, Sava 2018; Sava, Gogâltan 2023, 101–106). Following these events, during LBA III, there was a significant population decline in the LMR, as evidenced by the dramatic decrease in settlements and the near-total absence of fortifications. An illustrative example of this is the ratio of inhabited space in LBA II and LBA III, which is 391.15 ha/100 years in LBA II versus 6.65 ha/100 years in LBA III. This proves a decrease in inhabited space by approx. 59 times. Power centres in the LMR and the lower Tisza were gradually replaced by those formed in Transylvania during the 12th–11th centuries BC (Bălan 2013; Becker 2022; Uhnér et al. 2022).

Conclusions

The diachronic analysis of settlements from the 2nd millennium BC in the LMR and the LTR reflects a situation also found in other areas of Bronze Age Europe. Access to resources, climate and environment

◀ Fig. 23. 1: MBA and LBA settlements classified by relative chronology; 2: overall size of MBA, LBA II and LBA III settlements; 3–4: illustration of the coefficient of variation in the size of MBA (3) and LBA II (4) settlements; 5: chart showing the linear extents of MBA and LBA II ditches, palisades, and earthen ramparts (source: the authors)

23. kép. 1: MBA és LBA települések relatív kronológiai sorrend alapján rendezve; 2: az MBA, LBA II és LBA III települések teljes területe; 3–4: az MBA (3) és LBA II települések (4) méret szerinti variációs együtthatóinak grafikonja; 5: az MBA és LBA II árkok, palánkok és földsáncok lineáris kiterjedését bemutató diagram (forrás: a szerzők)

directly impacted the different evolutionary paths that these settlements followed (Molloy 2023; Quinn 2024).

Thus, at the beginning of the 2nd millennium BC, favorable climate conditions allowed MBA settlements to slowly emerge in the plains near important water sources (Fig. 1. 5). In the LMR, high terraces along the Mureş River or some paleochannels were preferred, the settlements being separated from the rest of the terrace by semicircular ditches. In the case of low plain settlements, the central area was enclosed with circular ditches (Fig. 3; Fig. 4; Fig. 9. 1). The ditches surrounding the fortified settlements range in length from 271 m to 1,019 m and enclose areas ranging from 0.26 to 5.5 ha (Fig. 9. 3). Combined with the unfortified sites, the average distance between MBA settlements is approx. 3.6 km. The archaeological discoveries make it possible to reconstruct the subsistence patterns of the MBA communities, which were oriented towards agriculture and animal husbandry. A series of craft activities were also practiced, including metalwork, bone and stonework, pottery and textile production (Sava, Gogăltan 2022, 117–121). This lifestyle was specific to the first half of the 2nd millennium BC and was characterized by relative social, economic and political stability.

After 1600 BC, a gradual change in lifestyle was documented in both the LMR and the rest of the Carpathian Basin. The new settlements are located either close to former *tell* and *tell*-like settlements or to slightly more distant locations. While there are multiple factors behind this phenomenon, it cannot be defined as the disappearance of communities; rather, it is a reorganization of settlement networks, and thus of socio-economic and political relations. As there was a relatively short period of time between the end of the multilayered settlements of the MBA and the emergence of the megaforts, it is difficult to date some settlements solely on the basis of surface-collected assemblages. It is therefore possible that our assessment of the average distance between two contemporary settlements, 10.7 km apart, might prove to be inaccurate (Fig. 10).

Notes

- 1 LiDAR support made available by the Romanian Government.

Megaforts first appeared in the LMR in the 15th century BC, which is a phenomenon characteristic of the LBA II phase. These enclose areas ranging from 6.8 to 130 ha (Fig. 13. 5). Alongside the megaforts, there are also non-fortified settlements, either small settlements of up to 4.5 ha, or larger ones of over 30–40 ha. The average distance between settlements is about 3.7 km (Fig. 19. 2). Out of the 39 known settlements, fortification systems of various complexity were found in only 9 sites (25.7%) (Fig. 19. 1). The community's effort to build these defensive systems was considerable (Fig. 19. 3). Undoubtedly, the construction of such complex and large-scale defensive systems serves as an indication for the urgent need for self-protection felt by the LBA II communities. In addition to the defensive character of the fortifications, the monumental size of the megaforts suggests both the prosperity of the community and the leadership and power of the ruling elite.

Violent events during the 13th century BC, possibly local uprisings or external attacks, have led to the collapse of the social, economic and political system specific to the megaforts. A massive decrease of about 59 times of the settlement size suggests a depopulation of the LMR at the end of the LBA.

Acknowledgements

We would like to express our deepest gratitude to the colleagues who helped us during the countless field surveys and excavations. We would like to mention the following people in particular: Florin Mărginean, George Pascu Hurezan†, Ioan Cristian Cireap, Daniel Preda, Andrei Mărincean, and Vlad Murgu. Funding for our fieldwork was provided by the Arad County Council, the Ministry of Education and the Ministry of Culture. The management of the Arad Museum has always supported our research through kindness and active involvement. We would like to express our gratitude to our friends and colleagues Marian Lie, Alexandra Găvan, and Dragoş Diaconescu who read the manuscript and provided us with welcome suggestions.

Table 1. List of MBA and LBA settlements from LMR (Arad County), indicating their main features and qualitative results of the investigations. Abbreviations: MBA: Middle Bronze Age; LBA I: Late Bronze Age I; LBA II: Late Bronze Age II; LBA III: Late Bronze Age III; ES: enclosed settlement; US: unenclosed settlement; SF: stray find; FS: field survey; TT: test trenches; PE: preventive archaeological excavation; SE: systematic archaeological excavation; LI: lacunar information;

PR: partial excavation report; FR: excavation report; I: unpublished

I. táblázat. Az AMM (Arad megye) területén található MBA és LBA települések listája, főbb jellemzőik feltüntetésével, valamint a kutatások mennyiségi és minőségi eredményeinek bemutatásával. Rövidítések: MBA: középső bronzkor; LBA I: késő bronzkor I; LBA II: késő bronzkor II; LBA III: késő bronzkor III; ES: erődített település; US: erődítetlen település; SF: terepbejárás; TT: próbafeltárás; PE: megelőző régészeti feltárás; SE: szisztematikus régészeti feltárás; LI: hiányos információ; PR: részleges ásataási jelentés; FR: ásataási jelentés; I: nem publikált

Nr.	Site	MBA	LBA I	LBA II	LBA III	ES	US	FS	TT	PE	SE	LI	PR	FR	I	GPS coordinates	References
1	Aluniş-Dealul molizilor	x				x		x	x			x				46° 6'21.49"N 21°28'56.35"E	Pădureanu 1973, 395–397, Fig. 1
2	Arad-Aeroport				x	x		x				x				46°10'21.09"N 21°16'18.26"E	Sava, Pădurean 2009, 37
3	Arad-AR026			x		x		x				x				46°15'16.08"N 21°12'23.61"E	Sava et al. 2023, 270, Fig. 34, 35, 36/no. 6
4	Arad-Autogara veche				x	x		x							x	46°10'56.47"N 21°20'44.25"E	Sava, Pădurean 2009, 37–38
5	Arad-Bufniţi	x		x		x		x				x				46° 8'43.34"N 21°14'41.97"E	Pădureanu 1985, 27–28; Sava, Matei 2013, 94–95, Pl. 4. 9–11, Pl. 8. 1–12
6	Arad-Bujac = Str. Tiberiu nr.5 = Str. Progresului nr. 34 = Str. Ghiocelilor nr. 75				x	x		x				x				46°11'32.82"N 21°17'14.76"E	Sava, Pădurean 2009, 36, Pl. IX
7	Arad-Bypass B03-B04			x		x				x						46° 9'23.30"N 21°17'26.02"E	Cociş et al. 2011
8	Arad-Centru				x	x		x							x	46° 9'59.09"N 21°19'4.24"E	Sava, Pădurean 2009, 38–39
9	Arad-Gai I	x		x		x		x				x				46°11'59.42"N 21°16'18.91"E	Sava, Pădurean 2009, 36–37
10	Arad-Grădişte-Sere	x		x		x		x				x				46°12'5.72"N 21°20'59.58"E	Pădureanu 1985, 28
11	Arad-Micălaça-Deluţ				x	x		x				x				46° 9'34.29"N 21°21'59.85"E	Sava, Pădurean 2009, 37
12	Arad-Palatul cultural	x		x		x		x							x	46°10'26.73"N 21°19'13.92"E	Unpublished (pottery in the collection of Arad Museum)
13	Arad-Silvaş (Bujac)				x	x		x				x				46°11'37.03"N 21°17'27.59"E	Sava, Pădurean 2009, 36

Nr.	Site	MBA	LBA I	LBA II	LBA III	ES	US	FS	TT	PE	SE	LI	PR	FR	I	GPS coordinates	References
14	Arad-Uzina de apă	x		x			x	x				x				46°11'15.79"N 21°20'52.94"E	Pădureanu 1985, 29
15	Bodrogu Nou-La Hodaie = Către Vale		x				x	x				x				46°7'56.64"N 21°11'32.20"E	Pădureanu 1985, 30–31
16	Caporal Alexa				x		x	x						x		46°20'23.81"N 21°33'15.33"E	Unpublished (pottery in the collection of Arad Museum)
17	Chişindia-Podul Vechi	x					x	x	x				x			46°17'55.95"N 22°5'55.72"E	Dudaş 1975
18	Chişineu-Criş-CHC005ASZ	x				x		x					x			46°26'15.84"N 21°30'9.37"E	Sava et al. 2024a
19	Chişineu-Criş-CHC012ASZ = Situl 5						x	x				x				46°31'37.25"N 21°30'10.35"E	Sava 2024b
20	Cicir-Spinul lui Stanca	x					x	x				x				46°8'13.57"N 21°29'0.69"E	Pădureanu 1973, 399–400, Fig. 3
21	Conop-Situl 5						x		x						x	46°5'57.59"N 21°52'36.87"E	Unpublished (pottery in the collection of Arad Museum)
22	Covăşant-Site 6						x	x							x	46°12'22.16"N 21°34'1.28"E	Unpublished (pottery in the collection of Arad Museum)
23	Covăşant-Situl 9						x	x							x	46°12'33.49"N 21°33'48.44"E	Unpublished (pottery in the collection of Arad Museum)
24	Cruceni-SAG037ASZ	x					x	x							x	46°4'17.85"N 21°20'30.83"E	Unpublished (pottery in the collection of Arad Museum)
25	Cruceni-SAG038ASZ						x	x							x	46°4'32.09"N 21°19'38.85"E	Unpublished (pottery in the collection of Arad Museum)
26	Curtici-Sud-est						x	x							x	46°19'36.85"N 21°19'32.78"E	Unpublished (pottery in the collection of Arad Museum)
27	Cuvin-Valea Danciului	x					x	x				x				46°10'29.75"N 21°36'7.50"E	Pădureanu 1988, 510, Pl. VI. 9–12
28	Felnac-Complexul Zootehnic						x	x		x			x			46°7'45.69"N 21°10'5.17"E	Sava 2016
29	Felnac-Situl 5						x	x							x	46°6'49.28"N 21°6'55.70"E	Unpublished (pottery in the collection of Arad Museum)
30	Firiteaz-SAG003ASZ						x	x				x				45°59'58.23"N 21°21'43.60"E	Micle et al. 2006, 297

Nr.	Site	MBA	LBA I	LBA II	LBA III	ES	US	FS	TT	PE	SE	LI	PR	FR	I	GPS coordinates	References
49	Munar-Site 1	x				x	x	x							x	46° 6'2.37"N 21° 0'22.11"E	Unpublished (pottery in the collection of Arad Museum)
50	Munar-Wolfsberg	x		x		x		x	x				x			46° 6'15.17"N 21° 2'10.73"E	Sava, Gogăltan 2017
51	Nădlac-Situl N8			x		x	x	x							x	46° 12'1.74"N 20° 45'35.77"E	Unpublished (pottery in the collection of Arad Museum)
52	Nădlac-Situl N28				x	x	x	x							x	46° 9'42.62"N 20° 47'8.20"E	Unpublished (pottery in the collection of Arad Museum)
53	Nădlac-Situl N33				x	x	x	x							x	46° 9'56.29"N 20° 46'28.86"E	Unpublished (pottery in the collection of Arad Museum)
54	Neudorf-Părăul Roșia			x		x	x	x				x				46° 4'15.64"N 21° 35'16.17"E	Pădureanu 1993, 23
55	Neudorf-Vest	x				x	x	x					x			46° 4'21.31"N 21° 36'4.90"E	Cireap et al. 2019
56	Olari-Holomb	x				x	x	x	x			x				46° 24'4.21"N 21° 29'38.63"E	Ordentlich 1971, 25
57	Olari-Situl 1				x	x	x	x							x	46° 23'1.34"N 21° 31'17.63"E	Unpublished (pottery in the collection of Arad Museum)
58	Păuliș-Dealul Bătrân		x			x	x	x				x				46° 6'41.14"N 21° 36'14.60"E	Pădureanu 1990
59	Pâncota-Site 16		x			x	x	x							x	46° 21'7.61"N 21° 42'54.37"E	Unpublished (pottery in the collection of Arad Museum)
60	Pecica-PEC007 = Situl 15			x		x	x	x	x			x				46° 10'37.63"N 21° 7'15.89"E	Marta et al. 2012
61	Pecica-PEC011 = Est = Smart Diesel				x	x	x	x	x				x			46° 10'50.38"N 21° 7'12.59"E	Sava, Ursuțiu 2021
62	Pecica-PEC012 = Forgaci 1			x		x	x	x				x	x			46° 10'56.32"N 21° 7'43.76"E	Sava, Ursuțiu 2021
63	Pecica-PEC014 = Pecica-Fosta cărmidărie C.A.P. Ogorul	x				x	x	x	x		x	x				46° 11'23.65"N 21° 3'18.12"E	Sava 2010
64	Pecica-PEC019 = Șanțul Mare	x						x					x			46° 9'8.99"N 20° 59'9.60"E	Soroceanu 1991
65	Pecica-PEC020 = Pecica-Șanțul Mic = Între Vii = Fostul sălaș Donat	x		x		x	x	x	x			x				46° 10'29.92"N 21° 0'42.85"E	Sava et al. 2022c

Nr.	Site	MBA	LBA I	LBA II	LBA III	ES	US	FS	TT	PE	SE	LI	PR	FR	I	GPS coordinates	References
84	Semlac-Situl 5	x				x	x	x							x	46° 6'10.37"N 20°56'0.01"E	Unpublished (pottery in the collection of Arad Mu-seum)
85	Semlac-SML021		x			x	x	x				x				46° 9'23.84"N 20°52'52.05"E	Sava et al. 2023, 268–270, Fig. 33
86	Socodor-Căvăjdia	x				x		x	x				x			46°28'46.90"N 21°27'36.68"E	Popescu 1956a
87	Şagu-Lângă Gară			x		x	x	x							x	46° 4'52.49"N 21°18'1.77"E	Unpublished (pottery in the collection of Arad Mu-seum)
88	Şagu-SAG011ASZ			x		x	x	x							x	46° 4'0.04"N 21°15'52.20"E	Unpublished (pottery in the collection of Arad Mu-seum)
89	Şagu-Site A1_1		x			x	x	x	x				x			46° 3'33.31"N 21°18'28.23"E	Sava et al. 2011
90	Şeitin-Tăietura	x				x	x	x				x				46° 5'36.37"N 20°50'7.62"E	Blăjan et al. 1976, 423–425
91	Şimand-SMD001	x				x		x							x	46°26'18.96"N 21°28'13.57"E	Unpublished (pottery in the collection of Arad Mu-seum)
92	Şiria				x	x	x	x							x	46°16'29.59"N 21°36'5.16"E	Unpublished (pottery in the collection of Arad Mu-seum)
93	Vârşand-Movila dintre vii = PIL030ASZ	x				x		x			x					46°36'41.31"N 21°20'0.10"E	Sava et al. 2024g
94	Vinga-Izvor/Site 6	x				x		x				x				45°59'53.80"N 21°11'14.71"E	Pădureanu 1985, 41
95	Vinga-Site 19	x				x	x	x							x	46° 0'7.04"N 21°12'26.02"E	Unpublished (pottery in the collection of Arad Mu-seum)
96	Vinga-Site 30					x	x	x							x	46° 1'13.69"N 21° 6'12.36"E	Unpublished (pottery in the collection of Arad Mu-seum)
97	Vinga-Site 43					x	x	x							x	46° 3'17.57"N 21° 9'33.93"E	Unpublished (pottery in the collection of Arad Mu-seum)
98	Vladimirescu			x		x	x	x				x				46°10'5.14"N 21°24'12.17"E	Pădureanu 1985, Pl. VII. 2
99	Zădăreni					x	x	x					x			46° 8'0.06"N 21°12'59.92"E	Sava, Grumeza 2018
100	Zimandu Nou					x	x	x				x				46°16'58.80"N 21°23'40.02"E	Unpublished (pottery in the collection of Arad Mu-seum)

REFERENCES

- Agapiou, A., Hegyi, A., Gogăltan, F., Staviľă, A., Sava, V., Sarris, A., Floca, C., Dorogostaisky, L. 2023a: Exploring the Largest Known Bronze Age Earthworks in Europe through Medium Resolution Multispectral Satellite Images. *International Journal of Applied Earth Observatn and Geoinformation* 118, 103239. <https://doi.org/10.1016/j.jag.2023.103239>
- Agapiou, A., Hegyi, A., Staviľă, A. 2023b: Observations of Archaeological Proxies through Phenological Analysis over the Megafort of Csanádpalota–Juhász T. tanya in Hungary Using Sentinel–2 Images. *Remote Sensing* 15, 2023, 464. <https://doi.org/10.3390/rs150204>
- Artursson, M. 2010: Settlement Structure and Organisation. In: Earle, T., Kristiansen, K. (eds.), *Organizing Bronze Age Societies. The Mediterranean, Central Europe and Scandinavia Compared*. Cambridge, 87–121. <https://doi.org/10.1017/CBO9780511779282.005>
- Barbu, M., Hügel, P., Hurezan, G. P., Pădureanu, E. D. (eds.), 1999: *Repertoriul arheologic al Mureşului Inferior. Judeţul Arad. Timişoara*.
- Bălan, G. 2013: Aşezăřile fortificate din aria culturii Gáva din România. In: Ailincăi, S. C., Ţărlea, A., Micu, C. (eds.), *Low Danube Prehistory. 50 years of excavations at Babadag (1962–2012)*. Proceedings of “Lower Danube Prehistory. 50 years of excavations at Babadag” Conference, Tulcea, September 20th–22th. Brăila, 265–310.
- Becker, F. 2022: Die befestigten Siedlungen im östlichen Karpatenbecken zwischen 1100 und 800 v. Chr. – Eine Einführung. In: Hansen, S., Krause, R. (eds.), *Die Frühgeschichte von Krieg und Konflikt Beiträge der Vierten Internationalen LOEWE–Konferenz vom 7. bis 9. Oktober 2019 in Frankfurt/M. The Early History of War and Conflict Proceedings of the Fourth International LOEWE Conference, 7–9 October 2019 in Frankfurt/M. Bonn*, 243–284.
- Blăjan, M., Bozian, Ş., Şiclovian, C. 1976: Descoperiri arheologice la Şetin (jud. Arad). *Apulum* XIV, 423–432.
- Bóka, G. 2020: Transformation of settlement history in the Körös Region in the period between the Late Bronze Age and the end of Iron Age. *Dissertationes Archaeologicae* 3/8, 243–262. <https://doi.org/10.17204/dissarch.2020.243>.
- Bóka, G., Molnár, M., Pető, Á., Stibrányi, M. 2017: New Results in the Study of the Late Bronze Age and Iron Age Körös Region (Southeastern Hungary). In: Kulcsár, G., V. Szabó, G., Kiss, V., Váczi, G. (eds.), *State of the Hungarian Bronze Age Research. Proceedings of the conference held between 17th and 18th of December 2014. Ősrégészeti Tanulmányok – Prehistoric Studies II*. Budapest, 161–175.
- Bóka, G., Mihály, P., Gábor, S. 2022: Az újkígyósi késő bronzkori földvár geofizikai kutatása. A BIKÁ projekt 2022. évi eredményei. In: Barna, J., Szalontai, Cs. (eds.), *NRInfo 2022 A Magyar Nemzeti Múzeum Nemzeti Régészeti Intézetének 2022. évi tevékenysége*. Budapest, 16–17.
- Branigan, K. (ed.) 2001: *Urbanism in the Aegean Bronze Age*. London.
- Bruyère, C., Molloy, B., Jovanović, D., Birclin, M., Pendić, J., Topić, G., Milašinović, L., Mirković-Marić, N., Šalamon, A. 2024: Integrating and Dividing in a Late Bronze Age Society: Internal Organization of Settlements of the Tisza Site Group in the Southern Carpathian Basin, 1600–1200 b.c. *Journal of Field Archaeology* 49/7, 547–572. <https://doi.org/10.1080/00934690.2024.2372161>
- Cavazzuti, C., Horváth, A., Gémes, A., Fülöp, K., Szeniczey, T., Tarbay, J. G., McCall, A., Rubio, B. G., Vicze, M., Bárány, A., Pető, Á., Magyar, E. K., Darabos, G., Futó, I., Lisztes–Szabó, Z., Molnár, E., Novak, M., Gál, E., Fischl, K. P., Kulcsár, G., Szeverényi, V., Szabó, G., Mester, E., Dani, J., Palcsu, L., Kiss, V., Major, I., Hajdu, T. 2025: Isotope and archaeobotanical analysis reveal radical changes in mobility, diet and inequalities around 1500 BCE at the core of Europe. *Scientific Reports* 15:17494. <https://doi.org/10.1038/s41598-025-01113-z>.
- Cireap, I. C., Preda, D., Sava, V. 2019: Aşezarea apartinând epocii bronzului de la Neudorf - Vest, judeţul Arad. *Patrimonium Banaticum* IX, 35–54.

- Cireap, I. C., Tănăsache, R., Preda, D., Sava, V., Mărincean, A. 2024a: GRA056ASZ. In: Sava, V. (ed.), Sub semnul apelor. Noi situri arheologice în Câmpia joasă a Crișului Alb. Cluj-Napoca, 181–182.
- Cireap, I. C., Tănăsache, R., Preda, D., Sava, V., Mărincean, A. 2024b: GRA057ASZ. In: Sava, V. (ed.), Sub semnul apelor. Noi situri arheologice în Câmpia joasă a Crișului Alb. Cluj-Napoca, 183–184.
- Cociș, S., Ursuțiu, A., Bârcă, V., Onofrei, C., Stâncescu, R., Ardeleanu, M., Țuțuianu, C., Dobos, A., Ferencz, S. 2011: Arad, jud. Arad, Punct: Grădinile CAP - Centura ocolitoare Arad, km 8+050 - 8+250; 8+540 - 8+840, Cod sit: 9271.17. Cronica cercetărilor arheologice. Campania 2010. XLV-a Sesiune Națională de rapoarte arheologice, Sibiu, 26-29 Mai 2011. București, 161.
- Crișan, I. H. 1978: Ziridava. Săpăturile de la “Șanțul Mare” din anii 1960, 1961, 1962, 1964 – Ziridava. Die Ausgrabung der Jahre 1960, 1961, 1962 und 1964 vom “Șanțul Mare”. Arad.
- Czukur, P., Priskin, A., Szalontai, Cs., Szeverényi, V. 2017: Késő bronzkori földvárak a Dél-Alföldön. In: Szabó, V. G., Bálint, M., Váczi, G. (eds.), A második hajdúböszörményi szitula és kapcsolatrendszer. Budapest–Hajdúböszörmény, 211–230.
- Dietrich, O. 2025: Bronze and Iron Age axe–hafting techniques in Central and South–Eastern Europe. A study of the archaeological visibility of prehistoric technological innovations. In: Risch, R., Pernicka, E., Meller, H. (eds.), Der soziale Wert prähistorischer Beile: neue archäologische und archäometrische Ansätze /The social value of prehistoric axes –new archaeological and archaeometric approaches: 16. Mitteldeutscher Archäologentag vom 5. bis 7. Oktober 2023 in Halle (Saale) – 16th Archaeological Conference of Central German October 5–7, 2023 in Halle (Saale). Heidelberg, 659–676. <https://doi.org/10.11588/propylaeum.1474.c21039>
- Dorogostaisky, L. 2018: Iarcuri 2018 – O imagine a marilor așezări fortificate de la sfârșitul Epocii Bronzului din sud-estul Câmpiei Panonice. In: S. Forțiu, S. (ed.), Arheovest VI₂. In memoriam Marian Gumă. Interdisciplinaritate în Arheologie. Timișoara, 24 noiembrie 2018. Szeged, 649–666.
- Dorogostaisky, L., Hegyi, A. 2017: Noi ipoteze de lucru pentru cercetarea epocii bronzului în Banat (II). Un posibil complex de fortificații și așezări în arealul localităților Varia – Satchinez (jud. Timiș). In: Forțiu, S. (ed.), Arheovest V₂. In honorem Doina Benea. Interdisciplinaritate în Arheologie și Istorie. Timișoara, 25 noiembrie 2017. Szeged, 747–770.
- Dorogostaisky, L., Micle, D. 2016: Noi ipoteze de lucru pentru cercetarea epocii bronzului în Banat. Un posibil complex de fortificații și așezări în arealul localității Cenei, Bobda, Beregsău Mic, Cărpiniș și Checea (jud. Timiș). In: Micle, D., Stăvilă, A., Oprean, C., Forțiu, S. (eds.), Arheovest IV_s. In honorem Adrian Bejan. Interdisciplinaritate în Arheologie și Istorie. Timișoara, 26 noiembrie 2016. Szeged, 601–629.
- Dörner, E. 1970: Cercetări și săpături arheologice în județul Arad. Materiale și Cercetări Arheologice IX, 445–466. <https://doi.org/10.3406/mcarh.1970.1381>
- Dudaș, F. 1975: Așezarea de tip Otomani de la Chișindia. Crisia 5, 245–249.
- Duffy, P. R., Parditka, G. M., Giblin, J. I., Paja, L. 2019: The problem with tells: lessons learned from absolute dating of Bronze Age mortuary ceramics in Hungary. *Antiquity* 93/367, 63–79. <https://doi.org/10.15184/aqy.2018.179>
- Estanqueiro, M., Šalamon, A., Lewis, H., Molloy, B., Jovanović, D. 2023: Sentinel–2 imagery analyses for archaeological site detection: an application to Late Bronze Age settlements in Serbian Banat, southern Carpathian Basin. *Journal of Archaeological Science: Reports* 51, 104188. <https://doi.org/10.1016/j.jasrep.2023.104188>.
- Fazecaș, G., Gogăltan, F., Kátocz, Z. 2024: The time of the Bronze Age tell settlement from Sântion Movila Mănăstirii. In: Sava, V., Gogăltan, F. (eds.), The Bronze Age on both sides of the Carpathians. Studies in Honor of Tudor Soroceanu at 80 years. Cluj-Napoca, 253–270.
- Fischl, K. P. 2023 (ed.): Bronze Age Landscape at Gelej. Archaeological researches at Gelej-Pincehát, Gelej-Kanális dűlő and Gelej-Beltelek dűlő. Universitätsforschungen zur prähistorischen Archäologie 391. Bonn.

- Gaydarska, B. 2019: Trypillia megasites: The first cities in Europe? In: Gyucha, A. (ed.), *Comparative Approaches to Population Aggregation and Early Urbanization*. New York, 165–189.
- Gaydarska, B., Chapman, J. 2022: *Megasites in Prehistoric Europe: Where Strangers and Kinsfolk Met*. Cambridge. <https://doi.org/10.1017/9781009099837>
- Găvan, A., Gogâltan, F. 2014: “Zentrum und Peripherie?” Der bronzezeitliche Tell von Pecica “Şanţul Mare” (Kreis Arad, Rumänien). In: Nessel, B., Heske, I., Brandherm, D. (eds.), *Ressourcen und Rohstoffe in der Bronzezeit. Nutzung – Distribution – Kontrolle*. Wünsdorf, 28–40.
- Găvan, A., Kienlin, T. L., Röpke, A., Nolde, N., Zerl, T., Zickel, M., Lie, M. A., Fazecaş, G., Gogâltan, F. 2021: Living together or apart? Unravelling the development, internal organization and social structure of a complex Bronze Age tell settlement at Toboliu, western Romania. *Crisia LI*, 59–76.
- Găvan, A., Lie, M. A., Kienlin, T. L. 2023: The 2022 gridded surface collection on the outer settlement of the Toboliu tell. *Ziridava. Studia Archaeologica* 37, 283–310.
- Găvan, A., Lie, M. A., Kienlin, T. L. 2024: Off-tell Houses at the Bronze Age Multi-component Settlement in Toboliu (Romania). In: Kienlin, T. L. (ed.), *Household Practices and Houses – Current Approaches from Archaeology and the Sciences. Universitätsforschungen zur prähistorischen Archäologie* 399. Bonn, 329–350.
- Gogâltan, F. 1999: The Southern Border of the Otomani Culture. A Móra Ferenc Múzeum Évkönyve. *Studia Archaeologica* 5, 51–76.
- Gogâltan, F. 2008: Fortified Bronze Age Tell Settlements in the Carpathian Basin. A General Overview. In: Czebreszuk, J., Kadrow, S., Müller, J. (eds.), *Defensive Structures from Central Europe to the Aegean in the 3rd and 2nd millennia BC*. Poznań–Bonn, 39–56.
- Gogâltan, F. 2010: Die Tells und der Urbanisierungsprozess. In: Horejs, B., Kienlin, T. L. (eds.), *Siedlung und Handwerk. Studien zu sozialen Kontexten in der Bronzezeit. Beiträge zu den Sitzungen der Arbeitsgemeinschaft Bronzezeit auf der Jahrestagung des Nordwestdeutschen Verbandes für Altertumsforschung in Schleswig 2007 und auf dem Deutschen Archäologenkongress in Mannheim 2008* Universitätsforschungen zur prähistorischen Archäologie 194. Bonn, 13–46.
- Gogâltan, F. 2014a: Satu Mare “Weingarten”, Timiş County. In: Gogâltan, F., Cordoş, C., Ignat, A. (eds.), *Bronze Age tells and tell-like settlements on the eastern frontier of the Carpathian Basin History of research*. Cluj-Napoca, 196–199.
- Gogâltan, F. 2014b: Semlac “Livada lui Onea”, Arad County. In: Gogâltan, F., Cordoş, C., Ignat, A. (eds.), *Bronze Age tells and tell-like settlements on the eastern frontier of the Carpathian Basin History of research*. Cluj-Napoca, 242–246.
- Gogâltan, F. 2016: Building power without power? Bronze Age fortified settlements on the Lower Mureş Basin. In: Gogâltan, F., Cordoş, C. (eds.), *Prehistoric settlements: social, economic and cultural aspects. Seven studies in the Carpathian area*. Cluj-Napoca, 87–113.
- Gogâltan, F. 2017: The Bronze Age Multilayered Settlements in the Carpathian Basin (cca. 2500–1600/1500 BC). An old catalogue and some chronological problems. *Journal of Ancient History and Archaeology* 4/4, 28–63. <https://doi.org/10.14795/j.v4i4.284>
- Gogâltan, F. 2019: The Chronology of the Bronze Age Tell and Tell-like Settlements in the Carpathian Basin: Revisited after 15 Years. *Studia Hercynia XXIII/2*, 198–214.
- Gogâltan, F. 2021: Bronzul timpuriu și mijlociu la frontiera estică a Bazinului Carpatic (cca. 2700/2600–1600/1500 BC). I. Despre mediul ambiant și istoricul cercetărilor. *Terra Sebus. Acta Musei Sabesiensis* 13, 9–43.
- Gogâltan, F., Borş, C. 2022: Peace and War in the Bronze Age on the Eastern Frontier of the Carpathian Basin. In: Gyucha, A., Parkinson, W. A. (eds.), *First Kings of Europe. From Farmers to Rulers in Prehistoric Southeastern Europe*. Los Angeles, 108–123.

- Gogâltan, F., Sava, V. 2010: Sântana Cetatea Veche. O fortificație de pământ a epocii bronzului la Mureșul de jos – Sântana Cetatea Veche. A Bronze Age earthwork on the lower Mureș. Arad.
- Gogâltan, F., Sava, V. 2012: War and Warriors during the Late Bronze Age within the Lower Mureș Valley. Ziridava. *Studia Archaeologica* 26/1, 61–81.
- Gogâltan, F., Sava, V. 2018: A Violent End. An Attack with Clay Sling Projectiles against the Late Bronze Age Fortification in Sântana (South-Western Romania). In: Hansen, S., Krause, R. (eds.), *Bronzezeitliche Burgen zwischen Taunus und Karpaten – Bronze Age Hillforts between Taunus and Carpathian Mountains*. *Universitätsforschungen zur prähistorischen Archäologie* 319. Bonn, 349–370.
- Gogâltan, F., Sava, V. 2019: Înainte de apariția mega-forturilor bronzului târziu de la Mureșul de Jos (2000/1900-1600/1500 BC). *Crisia XLIX*, 65–94.
- Gogâltan, F., Sava, V., Mercea, L. 2013: Sântana “Cetatea Veche”. Metal and power. Ziridava. *Studia Archaeologica* 27, 21–72.
- Gogâltan, F., Sava, V., Krause, R. 2019: Sântana-Cetatea Veche. A Late Bronze Age Mega-fort in the Lower Mureș Basin in Southwestern Romania. In: Hansen, S., Krause, R. (eds.), *Materialisation of Conflicts. Proceedings of the Third International LOEWE Conference, 24th–27th September 2018 in Fulda (Hesse, Germany)*. *Universitätsforschungen zur prähistorischen Archäologie* 346. Bonn, 191–221.
- Gogâltan, F., Găvan, A., Lie, M. A., Fazecaș, G., Cordoș, C., Kienlin, T. L. 2020: Exploring the Bronze Age tells and tell-like settlements from the eastern Carpathian Basin. Results of a research project. In: Blanco-González, A., Kienlin, T. L. (eds.), *Current approaches to tells in the prehistoric Old World. A cross-cultural comparison from Early Neolithic to the Iron Age*. Oxford, 73–95. <https://doi.org/10.2307/j.ctv13pk5j9.8>
- Gogâltan, F., Sava, V., Diaconescu, D., Krause, R., Hegyi, A., Cireap, C. I., Preda, D., Murgu V., Mărincean, A., Dolog, O., Reiss, I., Scheinberger, K., Mereuță, D., Negoescu, M., Micu, A., Stache, A., Călin, T. 2023: Sântana. Jud. Arad. Punct: Cetatea Veche. *Cronica cercetărilor arheologice din România. Campania 2022. A LVII-a Sesiune națională de rapoarte arheologice*. Târgoviște, 329–332.
- Gogâltan, F., Sava, V., Murgu, V., Mărincean, A., Cireap, C. I., Preda, D., Diaconescu, D., Felea, S., Rusu, M., Dolog, O., Călin, T., Crețu, A., Mariuțac, H., Mereuță, D., Micu, A., Negoescu, M., Stache, A. 2024: Sântana, jud. Arad. Punct: Cetatea Veche. *Cronica cercetărilor arheologice din România. Campania 2023. A LVIII-a Sesiune Națională de Rapoarte Arheologice, 29–31 mai 2024, Târgu Mureș, București*, 334–335.
- Gumnior, M., Stobbe, A. 2019: Palaeoenvironmental reconstructions at Cornești-Iarcuri (SW Romania) – preliminary results from geomorphological, pedological and palynological on-site studies. In: Hansen, S., Krause, R. (eds.), *Bronze Age Fortresses in Europe. Proceedings of the Second International LOEWE Conference, 9–13 October 2017 in Alba Julia*. *Universitätsforschungen zur prähistorischen Archäologie* 335. Bonn, 237–250.
- Hansen, S., Krause, R. (eds.) 2018: *Bronzezeitliche Burgen zwischen Taunus und Karpaten – Bronze Age Hillforts between Taunus and Carpathian Mountains*. *Universitätsforschungen zur prähistorischen Archäologie* 319. Bonn.
- Hansen, S., Krause, R. (eds.) 2019a: *Bronze Age Fortresses in Europe. Proceedings of the Second International LOEWE Conference, 9–13 October 2017 in Alba Julia*. *Universitätsforschungen zur prähistorischen Archäologie* 335. Bonn. <https://doi.org/10.21248/gups.50959>
- Hansen, S., Krause, R. 2019b (eds.): *Materialisation of Conflicts. Proceedings of the Third International LOEWE Conference, 24th–27th September 2018 in Fulda (Hesse, Germany)*. *Universitätsforschungen zur prähistorischen Archäologie* 346. Bonn.
- Hansen, S., Krause, R. 2022 (eds.): *Die Frühgeschichte von Krieg und Konflikt. Beiträge der Vierten Internationalen LOEWE-Konferenz vom 7. bis 9. Oktober 2019 in Frankfurt/M. The Early History of War and Conflict Proceedings of the Fourth International LOEWE Conference, 7–9 October 2019 in Frank-*

- furt/M. *Universitätsforschungen zur prähistorischen Archäologie* 383. Bonn. <https://doi.org/10.21248/gups.70670>
- Harding, A. 2017: Corneşti–Iarcuri and the rise of mega-forts in Bronze Age Europe. In: Heeb, B. S., Szentmiklosi, A., Krause, R., Wemhoff, M. (eds.), *Fortifications, The Rise And Fall Of Defended Sites In Late Bronze Age And Early Iron Age Of South–East Europe*. International Conference in Timișoara, Romania from November 11th to 13th, 2015. Berlin, 9–14.
- Harding, A. 2018: The question of “proto-urban” sites in later prehistoric Europe. *Origini* 42, 317–338.
- Hänsel, B. 2003: Stationen der Bronzezeit zwischen Griechenland und Mitteleuropa. *Bericht der Römisch-Germanischen Kommission* 83, 69–97.
- Heeb, B. S., Bălărie, A. 2020: Corneşti-Cornet – Zur Wiederaufnahme archäologischer Forschungen an einer Siedlung der Mittelbronzezeit im rumänischen Banat (Jud. Timiș). *Acta Praehistorica et Archaeologica* 52, 25–47.
- Heeb, B. S., Szentmiklosi, A., Bălărie, A., Lehmpuhl, R., Krause, R. 2017: Corneşti-Iarcuri – 10 years of research (2007–2016). Some important preliminary results. In: Heeb, B. S., Szentmiklosi, A., Krause, R., Wemhoff, M. (eds.), *Fortifications, The Rise And Fall Of Defended Sites In Late Bronze Age And Early Iron Age Of South–East Europe*. International Conference in Timișoara, Romania from November 11th to 13th, 2015. Berlin, 217–228.
- Heeb, B., Lehmpuhl, R., Szentmiklosi, A., Bălărie, A., Krause, R. 2018: Corneşti-Iarcuri im rumänischen Banat und sein bronzezeitlicher Kontext. In: Hansen, S., Krause, R. (eds.), *Bronzezeitliche Burgen zwischen Taunus und Karpaten – Bronze Age Hillforts between Taunus and Carpathian Mountains*. *Universitätsforschungen zur prähistorischen Archäologie* 319. Bonn, 395–406.
- Jaeger, M., Staniuk, R., Filatova, S., Kulcsar, G. 2022: Kakucs-Turján: a multi-layered settlement in Central Hungary. In: Żurkiewicz, D. (ed.), *Treasures of Time. Research of the Faculty of Archaeology of Adam Mickiewicz University in Poznań*. Poznań, 197–217. <https://doi.org/10.14746/WA.2021.10.978-83-946591-9-6>
- Kadrow, S. 2001: *U progu nowej epoki. Gospodarka i społeczeństwo wczesnego okresu epoki brązu w Europie*. Kraków.
- Kanne, K., Houghton, M., Lash, R. 2024: Common animals: sedentary pastoralism and the emergence of the commons as an institution. *Frontiers in Human Dynamics* 6, 10.3389/fhumd.2024.1389009. <https://doi.org/10.3389/fhumd.2024.1389009>
- Kienlin, T. L. 2020: *Bronze Age Tell Communities in Context. An Exploration into Culture, Society and the Study of European Prehistory. Part 2*. Oxford. <https://doi.org/10.2307/jj.15135935>
- Kienlin, T. L. 2021: Diversity rather than Uniformity: Bronze Age Tell Settlement in North-Western Romania Part I. In: Kienlin, T. L., Gävan, A. (eds.), *Bronze Age Tell Settlements in North-Western Romania Current Approaches and Recent Investigations*. Bonn, 21–78.
- Kienlin, T. L. 2022: The Tell Plenum of Practices. A Case Study from Early Bronze Age North-Eastern Hungary. In: Kienlin, T. L., Bußmann, R. (eds.), *Sociality–Materiality–Practice. Sozialität–Materialität–Praxis*. *Universitätsforschungen zur prähistorischen Archäologie* 377. Bonn, 225–266.
- Kienlin, T. L. (ed.) 2024: *Household Practices and Houses – Current Approaches from Archaeology and the Sciences*. *Universitätsforschungen zur prähistorischen Archäologie* 399. Bonn.
- Kienlin, T. L., Gävan, A. (eds.) 2021: *Bronze Age Tell Settlements in North-Western Romania Current Approaches and Recent Investigations*. Bonn.
- Kienlin, T. L., Lie, M. A., P. Fischl, K. 2019: Emőd-Nagyhalom. A Non-invasive Approach to the Multi-phase Enclosure and Outer Settlement of a Bronze Age Tell Site in North-eastern Hungary. In: P. Fischl, K., Kienlin, T. L. (eds.), *Beyond Divides – The Otomani-Füzesabony Phenomenon Current Approaches to Settlement and Burial in the North-eastern Carpathian Basin and Adjacent Areas*. *Universitätsforschungen zur prähistorischen Archäologie* 345. Bonn, 195–229.

- Krause, R., Szentmiklosi, A., Heeb, B., Lehmphul, R., Teinz, K., Bălărie, A., Herbig, C., Stobbe, A., Schmid, J., Schäffler, D., Wemhoff, M. 2019: Cornești-Iarcuri. Die Ausgrabungen 2013 und 2014 in der befestigten Gorfßsiedlung der späten Bronzezeit. *Eurasia Antiqua* 22, 133–184.
- Krause, R., Sava, V., Stobbe, A., Gogâltan, F. 2022a: Sântana – Cetatea Veche am Unterlauf des Mureș in Rumänien. Zur Topographie, Umwelt und Geschichte der Befestigungen und ihres zentralen Großkomplexes. *Eurasia Antiqua* 24, 67–89.
- Krause, R., Sava, V., Stobbe, A., Gogâltan, F. 2022b: Zentrale Grossbauten der spätbronzezeitlichen Mega-Site von Sântana im rumänischen Kreischland. In: Kaiser, E., Meyer, M., Scharl, S., Suhrbier, S. (eds.), *Wissenschichten. Festschrift für Wolfram Schier zu seinem 65. Geburtstag*. Rahden/Westf., 411–426.
- Kristiansen, K. 2000: The emergence of European Communities: household, settlement and territory in Later Prehistory (2300–300 BC). A comparative project based on: Monte Polizzo, Sicily, Százhalombatta, Hungary and Tanum, Sweden. In: Poroszlai, I., Vicze, M. (eds.), *SAX. Százhalombatta Archaeological Expedition. Annual Report 1 – Field Season 1998*. Százhalombatta, 7–11.
- Kristiansen, K., Suchowska-Ducke, P. 2015: Connected histories. The dynamics of Bronze Age interaction and trade 1500–1100 BC. *Proceedings of the Prehistoric Society* 81, 361–392. <https://doi.org/10.1017/ppr.2015.17>
- Lehmphul, R., Heeb, B., Szentmiklosi, A., Stobbe, A., Krause, R. 2019: The Genesis of the Fortification of Cornești-Iarcuri near the Mureș Lower Course (Romanian Banat) – A Phase Model on the Chronology of the Settlement and Fortification Structures. In: Hansen, S., Krause, R. (eds.), *Bronze Age Fortresses in Europe. Proceedings of the Second International LOEWE Conference, 9–13 October 2017 in Alba Julia*. *Universitätsforschungen zur prähistorischen Archäologie* 335. Bonn, 253–278.
- Lie, M., Găvan, A., Cordoș, C., Kienlin, T. L., Fazecaș, G., Gogâltan, F. 2019: The Bronze Age tell settlement at Toboliu (Bihar County, Romania). A brief outline of recent investigations. In: P. Fischl, K., Kienlin, T. L. (eds.), *Beyond Divides – The Otomani-Füzesabony Phenomenon. Current Approaches to Settlement and Burial in the North-Eastern Carpathian Basin and Adjacent Areas*. *Universitätsforschungen zur prähistorischen Archäologie* 345. Bonn, 351–368.
- Lie, M. A., Gavan, A., Kienlin, T. L., Röpke, A., Zickel, M., Zerl, T. 2024: Exploring the chronostratigraphy of a Bronze Age settlement through core drilling. *Praehistorische Zeitschrift* 99/2, 702–733. <https://doi.org/10.1515/pz-2023-2026>
- Marta, L., Astaloș, C., Virag, C., Hágó, A. N., Kádas, Z., Iegar, D. 2012: Pecica, jud. Arad. Punct: Sit 15, km 28+600 – 29+100. *Cronica cercetărilor arheologice. Campania 2011. XLVI-a Sesiune Națională de rapoarte arheologice, Târgu Mureș, 23–26 mai 2012*. București, 288–290.
- Măruia, L. 2011: Cercetări interdisciplinare vizând reconstituirea geografiei istorice a Dealurilor Lipovei. Timișoara.
- Melis, E. 2023: Observations about the settlement network in the period between the end of the Early and the start of the Late Bronze Age in northwestern Hungary (Győr-Moson-Sopron County, Hungary). *Anteus* 39, 13–51. https://doi.org/10.62149/Antaeus.39.2023_01
- Melis, E., Kiss, V., Kulcsár, G. 2022: Hódmezővásárhely északi határának bronzkora és vaskora. In: Benkő, E., Berta, A., Bondár, M. (eds.), *Magyarország Régészeti Topográfiája 12. Hódmezővásárhely északi határa*. Budapest, 117–134.
- Micle, D., Măruia, L., Dorogostaisky, L. 2006: The earth works from Cornești-Iarcuri (Orțișoara village, Timiș county) in the light of recent field research. *Analele Banatului S.N. XIV/1*, 283–306. <https://doi.org/10.55201/TIDG6280>
- Molloy, B. 2023: Was There a 3.2 ka Crisis in Europe? A Critical Comparison of Climatic, Environmental, and Archaeological Evidence for Radical Change during the Bronze Age–Iron Age Transition. *Journal of Archaeological Research* 31, 331–394. <https://doi.org/10.1007/s10814-022-09176-6>

- Molloy, B. 2025: Approaching societal complexity in 2nd millennium BC Europe through the lens of mega-forts and related settlements of the Carpathian Basin. In: Kapuran, A., Gajić Kvaščev, M., Ljuština, M., Filipović, V., Milojević, P., Mladenović, O., Milić, B. (eds.), *The Flow. Interactions-Transmission-Transformation. Long-distance Connections in the Metal Ages of Southeastern Europe*. Belgrade, 199–226.
- Molloy, B., Jovanović, D., Mirković-Marić, N., Marić, M., Mertl, P., Milašinović, L. 2017: The Late Bronze Age fortification of Gradište Idjoš in its regional context. In: Heeb, B. S., Szentmiklosi, A., Krause, R., Wemhoff, M. (eds.), *Fortifications, The Rise And Fall Of Defended Sites In Late Bronze Age And Early Iron Age Of South–East Europe*. International Conference in Timișoara, Romania from November 11th to 13th, 2015. Berlin, 161–172.
- Molloy, B., Jovanović, D., Bruyère, C., Marić, M., Bulatović, J., Mertl, P., Horn, C., Milašinović, L., Mirković-Marić, N. 2020: A New Bronze Age Mega-fort in Southeastern Europe: Recent Archaeological Investigations at Gradište Idoš and their Regional Significance. *Journal of Field Archaeology* 45. <https://doi.org/10.1080/00934690.2020.1734899>
- Molloy, B. P. C., Bruyère, C., Jovanović, D. 2022: Social Topographies of Later Bronze Age Mega-Forts of the Southeast Carpathian Basin: The Case of Serbian Banat. In: Krause, R., Hansen, S. (eds.), *Die Frühgeschichte von Krieg Und Konflikt – The Early History of War and Conflict*, Proceedings of the Fourth International LOEWE Conference, 7–9 October 2019 in Frankfurt. Bonn, 303–320.
- Molloy, B., Jovanović, D., Bruyère, C., Estanqueiro, M., Birclin, M., Milašinović, L., Šalamon, A., Penezić, K., Ramsey, C. B., Grosman, D. 2023a: Resilience, innovation and collapse of settlement networks in later Bronze Age Europe: New survey data from the southern Carpathian Basin. *PLoS ONE* 18/11, e0288750. <https://doi.org/10.1371/journal.pone.0288750>
- Molloy, B., Bruyère, C., Jovanović, D. 2023b: Rethinking Material Culture Markers for Mobility and Migration in the Globalising European Later Bronze Age: A Comparative View from the Po Valley and Pannonian Plain. *Proceedings of the British Academy* 254, 142–169. <https://doi.org/10.5871/bacad/9780197267356.003.0007>
- Orfanou, V., Amicone, S., Sava, V., O'Neill, B., Brown, L. E. F., Bruyère, C., Molloy, B. P. C. 2022: Forging a New World Order? Interdisciplinary Perspectives on the Management of Metalworking and Ideological Change in the Late Bronze Age Carpathian Basin. *Journal of Archaeological Method and Theory* 30, 565–610. <https://doi.org/10.1007/s10816-022-09566-6>
- Ordentlich, I. 1971: Aria de răspândire a culturii Otomani de pe teritoriul. *Marmația II*, 19–35.
- Parditka, Gy., Duffly, P. R. 2023: From the ashes of Bronze Age fires: A framework for comparison across body treatments. *Journal of Anthropological Archaeology* 71, 101525. <https://doi.org/10.1016/j.jaa.2023.101525>
- Pădureanu, E. D. 1973: Descoperiri neolitice și din epoca bronzului în județul Arad. *Banatica II*, 395–402.
- Pădureanu, E. D. 1985: Contribuții la repertoriul arheologic de pe valea Mureșului inferior și a Crișului Alb. *Crisia XV*, 27–52.
- Pădureanu, E. D. 1988: Noi așezări din epoca bronzului în județul Arad. *Acta Musei Napocensis XXIV–XXV*, 507–528.
- Pădureanu, E. D. 1990: Noi descoperiri arheologice în așezarea fortificată de la Păuliș-Dealul Bătrân, jud. Arad. *Thraco-Dacica XI*, 157–192.
- Pădureanu, E. D. 1993: Noi descoperiri hallstattiene pe teritoriul județului Arad. *Ziridava XVIII*, 21–34.
- Popescu, D. 1956a: Cercetări arheologice în Transilvania (I). Sondajele de la Socodor -1948-. *Materiale II*, 43–88.
- Popescu, D. 1956b: Cercetări arheologice în Transilvania (I). Săpăturile de la Vărșand -1949-. *Materiale II*, 108–152.

- Priskin, A. 2022: The analysis of Bronze Age macrolithic tools: a case study from Csanádpalota-Földvár (Southeastern Hungary). *Anteus* 38, 251–271. https://doi.org/10.62149/Antaeus.38.2022_08
- Quinn, C. P. 2024: Settlement ecology of Bronze Age Transylvania. *Frontiers in Human Dynamics* 6, 1360479. <https://doi.org/10.3389/fhumd.2024.1360479>
- Roska, M. 1941: A gyulavarsándi (Arad M.) laposhalom rétegtani viszonyai. *Folia Archaeologica* 3–4, 45–61.
- Rusu, M., Dörner, E., Ordentlich, I. 1999: Die Erdburg von Sântana–Arad in dem zeitgleichen archäologischen Kontext. In: Boroffka, N., Soroceanu, T. (eds.), *Transsilvanica. Archäologische Untersuchungen zur älteren Geschichte des südöstlichen Mitteleuropa. Gedenkschrift für Kurt Horedt. Rahden/Westf.*, 143–165.
- Sava, V. 2009: Descoperiri ale culturii Baden și din prima epocă a fierului de pe teritoriul actual al municipiului Arad. *Brukenthal Acta Musei* IV/1, 31–55.
- Sava, V. 2010: Spătura lui Egon Dörner de la Pecica „Cărămidăria C.A.P. Ogorul”, județul Arad. *Descoperirile preistorice. Brukenthal Acta Musei* V/1, 53–81.
- Sava, V. 2014a: Sântana “La nord de oraș”, Arad County. In: Gogâltan, F., Cordoș, C., Ignat, A. (eds.), *Bronze Age tells and tell-like settlements on the eastern frontier of the Carpathian Basin History of research. Cluj-Napoca*, 233–234.
- Sava, V. 2014b: Un vas de tip butoi descoperit în așezarea aparținând epocii bronzului de la Șagu „Sit A1_1”. *Terra Sebus. Acta Musei Sabesiensis* 6, 127–146.
- Sava, V. 2016: The Archaeological Site of Felnac “Complexul Zootehnic” (Arad County). *Discussions on the Late Bronze Age Settlement and Cemetery. Ziridava. Studia Archaeologica* 30, 69–108.
- Sava, V. 2019: The Late Bronze Age settlement at Șagu and the early use of the channeled pottery. *Analele Banatului S. N.* 27, 109–145. <https://doi.org/10.55201/TXYW4742>
- Sava, V. 2020: The Late Bronze Age pottery in the South-Eastern Carpathian Basin. *Slovenská archeológia LXVIII-2*, 253–296. <https://doi.org/10.31577/slovarch.2020.68.12>
- Sava, V. (ed.) 2024a: *Sub semnul apelor. Noi situri arheologice în Câmpia joasă a Crișului Alb. Cluj-Napoca.*
- Sava, V. 2024b: CHC012ASZ = Sit 5. In: Sava, V. (ed.), *Sub semnul apelor. Noi situri arheologice în Câmpia joasă a Crișului Alb. Cluj-Napoca*, 58–59.
- Sava, V., Pădureanu, E. D. 2009: Descoperiri ale culturii Baden și din prima epocă a fierului de pe teritoriul actual al municipiului Arad. *Brukenthal Acta Musei* IV/1, 31–55.
- Sava, V., Matei, D. 2013: Prehistoric and Second-fourth-century Discoveries on the Present-day Territory of Aradu Nou District, in the City of Arad. *Ziridava. Studia Archaeologica* 27, 89–122.
- Sava, V., Gogâltan, F. 2014: Munar “Weingarten = Wolfsberg”, Arad County. In: Gogâltan, F., Cordoș, C., Ignat, A. (eds.), *Bronze Age tells and tell-like settlements on the eastern frontier of the Carpathian Basin History of research. Cluj-Napoca*, 123–128.
- Sava, V., Ignat, A. 2016: The Beginning of the Late Bronze Age in the Lower Mureș Basin. In: Gogâltan, F., Cordoș, C. (eds.), *Prehistoric settlements: social, economic and cultural aspects. Seven studies in the Carpathian area. Cluj-Napoca*, 181–199.
- Sava, V., Gogâltan, F. 2017: The Bronze Age Fortifications in Munar “Wolfsberg”, Arad County. The 2014 and 2017 Archaeological Researches. *Analecta Archaeologica Ressoviensia* 12, 75–100. <https://doi.org/10.15584/anarres.2017.12.6>
- Sava, V., Grumeza, L., 2018: The Archaeological Site in Zădăreni, Arad County. *History of Research and the Bronze Age Discoveries. Ziridava. Studia Archaeologica* 32, 41–76.
- Sava, V., Gogâltan, F. 2019: Bazinul Mureșului de Jos la începutul bronzului târziu (1600/1500–1400 BC). In: Teodorescu, R. M., Chituță, A. C., Georgescu, A., Tudorie, A. (eds.), *In honorem prof. univ. dr. Sabin Adrian Luca: Istorie și destin. Sibiu*, 223–234.

- Sava, V., Ursuțiu, A. 2021: The Late Bronze Age Gáva pottery from the Lower Mureș. *Journal of Ancient History and Archaeology* 8/2, 84–127. <https://doi.org/10.14795/j.v8i2.642>
- Sava, V., Gogâltan, F. 2022: Before the Rise of the Late Bronze Age Mega Sites/Forts in the Lower Mureș Basin (20th–15th centuries BC). *Ziridava. Studia Archaeologica* 36, 85–164.
- Sava, V., Gogâltan, F. 2023: Material evidence of violent armed conflicts in the Bronze Age of the Lower Mureș. In: Moisa, G., Chiriac, A. (eds.), 150 de ani de mueografie orădeană, Crisia LII, Supliment nr. 1. Oradea, 92–120.
- Sava, V., Mărginean, F. 2024: PIL036ASZ. In: Sava, V. (ed.), Sub semnul apelor. Noi situri arheologice în Câmpia joasă a Crișului Alb. Cluj-Napoca, 569.
- Sava, V., Hurezan, G. P., Mărginean, F. 2011: Șagu “Sit A1_1” o așezare a epocii finale a bronzului la Mureșul de jos – A Late Bronze Age Settlement on the Lower Mureș. Cluj-Napoca.
- Sava, V., Hurezan, G. P., Mărginean, F. 2012: Late Bronze Age Metal Artifacts Discovered in Șagu, Site “A1_1”, Arad – Timișoara Highway (km 0+19.900 – 0+20.620). *Ziridava Studia Archaeologica* 26/1, 83–107.
- Sava, V., Gogâltan, F., Krause, R. 2019: First Steps in the Dating of the Bronze Age Mega-Fort in Sântana-Cetatea Veche (Southwestern Romania). In: Hansen, S., Krause, R. (eds.), *Bronze Age Fortresses in Europe. Proceedings of the Second International LOEWE Conference, 9–13 October 2017 in Alba Iulia. Universitätsforschungen zur prähistorischen Archäologie 335, Prähistorische Konfliktforschung 3.* Verlag Dr. Rudolf Habelt GmbH. Bonn, 161–176.
- Sava, V., Mărginean, F., Cireap, I. C., Găvan, A., Gogâltan, F. 2022a: PEC019 = Șanțul Mare = Rovine = Pruniște. In: Bulboacă, S., Colta, E. R., Sava, V. (eds.), *Pecica. Monografie Arheologică și Istorică. Volumul I.* Cluj-Napoca, 175–221.
- Sava, V., Mărginean, F., Cireap, I. C. 2022b: PEC020 = Șanțul Mic = Între VII = Fostul Sălaș Donat. In: Bulboacă, S., Colta, E. R., Sava, V. (eds.), *Pecica. Monografie Arheologică și Istorică. Volumul I.* Cluj-Napoca, 222–229.
- Sava, V., Cireap, I. C., Gogâltan, F., Diaconescu, D., Hegyi, A., Preda, D., Floca, C., Ardelean, A. C., Sărășan, A. 2023: ArheoPecica project. Preliminary results of the 2022 campaign. *Ziridava. Studia Archaeologica* 37, 245–282.
- Sava, V., Cireap, I. C., Tănăsache, R. 2024a: CHC005ASZ. In: Sava, V. (ed.), *Sub semnul apelor. Noi situri arheologice în Câmpia joasă a Crișului Alb.* Cluj-Napoca, 45–49.
- Sava, V., Cireap, I. C., Tănăsache, R. 2024b: GRA033ASZ. In: Sava, V. (ed.), *Sub semnul apelor. Noi situri arheologice în Câmpia joasă a Crișului Alb.* Cluj-Napoca, 129–134.
- Sava, V., Cireap, I. C., Tănăsache, R. 2024c: GRA065ASZ. In: Sava, V. (ed.), *Sub semnul apelor. Noi situri arheologice în Câmpia joasă a Crișului Alb.* Cluj-Napoca, 203–205.
- Sava, V., Cireap, I. C., Tănăsache, R. 2024d: MAC002ASZ. In: Sava, V. (ed.), *Sub semnul apelor. Noi situri arheologice în Câmpia joasă a Crișului Alb.* Cluj-Napoca, 248–252.
- Sava, V., Cireap, I. C., Tănăsache, R. 2024e: MAC062ASZ. In: Sava, V. (ed.), *Sub semnul apelor. Noi situri arheologice în Câmpia joasă a Crișului Alb.* Cluj-Napoca, 374–377.
- Sava, V., Mărginean, F., Tănăsache, R., Cireap, I. C., Preda, D., Mărincean, A. 2024f: PIL001ASZ. In: Sava, V. (ed.), *Sub semnul apelor. Noi situri arheologice în Câmpia joasă a Crișului Alb.* Cluj-Napoca, 477–480.
- Sava, V., Mărginean, F., Tănăsache, R. 2024g: PIL030ASZ = Vârșand-Movila dintre vii = Colina lui Pașca = [Lopóshalom]. In: Sava, V. (ed.), *Sub semnul apelor. Noi situri arheologice în Câmpia joasă a Crișului Alb.* Cluj-Napoca, 536–551.
- Sava, V., Cireap, I. C., Murgu, V., Mărginean, F., Tănăsache, R. 2025: Repertoriul arheologic al comunei Șagu, județul Arad. Cluj-Napoca.
- Sipos, G. (ed.) 2012: A Maros folyó múltja, jelene, jövője. Trecutul, prezentul, viitorul râului Mureș. Past, Present, Future of the Maros/Mureș River. Timișoara.

- Soroceanu, T. 1991: Studien zur Mureş-Kultur. Internationale Archäologie 7. Buch am Erlbach.
- Stavilă, A., Gogâltan, F. 2024: One step further. Discussions on the catalogue of the settlements belonging to the Corneşti–Crvenka group (2000/1900–1600/1500 BC). In: Sava, V., Gogâltan, F. (eds.), *Epoca Bronzului de-o parte și de alta a Carpaților. Studii în onoarea lui Tudor Soroceanu la 80 de ani – The Bronze Age on both sides of the Carpathians. Studies in Honor of Tudor Soroceanu at 80 years*. Cluj-Napoca, 272–290.
- Stavilă, A., Hegyi, A., Craiovan, B. A. 2020: Non-invasive archaeological researches performed in the Middle Bronze Age settlement from Alioș-Valea Alioșu (Timiș County, Romania). Structures, chronology, and perspectives. *Ziridava. Studia Archaeologica* 34, 169–188.
- Szentmiklosi, A., Heeb, B. S., Heeb, J., Harding, A., Krause, R., Becker, H. 2011: Corneşti–Iarcuri – a Bronze Age town in the Romanian Banat? *Antiquity* 85, 819–838. <https://doi.org/10.1017/S0003598X00068332>
- Szeverényi, V., Priskin, A., Czukor, P., Torma, A., Tóth, A. 2015: Settlement and Society in the Late Bronze Age of Southeast Hungary: A Case Study of the Fortified Settlement at Csanádpalota–Földvár. In: Kneisel, J., Dal Corso, M., Kirleis, W., Scholz, H., Taylor, N., Tiedtke, V. (eds.), *The Third Food Revolution? Setting the Bronze Age Table: Common Trends in Economic and Subsistence Strategies in Bronze Age Europe. Proceedings of the International Workshop „Socio-Environmental Dynamics over the Last 12,000 Years: The Creation of Landscapes III (15th – 18th April 2013)”* in Kiel. Bonn, 98–117.
- Szeverényi, V., Czukor, P., Priskin, A., Szalontai, Cs. 2017: Recent work on Late Bronze Age fortified settlements in south-east Hungary. In: Heeb, B. S., Szentmiklosi, A., Krause, R., Wemhoff, M. (eds.), *Fortifications: The Rise and Fall of Defended Sites in the Late Bronze Age and Early Iron Age of South-East Europe. International Conference in Timișoara, Romania from November 11–13, 2015*. Berlin, 135–148.
- Szeverényi, V., Czukor, P., Priskin, A., Szalontai, Cs. 2022: Csanádpalota–Földvár: a Late Bronze Age ‘megafort’ in Southeastern Hungary. *Antaeus* 38, 213–249. https://doi.org/10.62149/Antaeus.38.2022_07
- Teinz, K., Lehmphul, R., Heeb, B., Bălărie, A., Wemhoff, M., Krause, R. 2023: Formen–Stile–Kontext – Ein Grubeninventar aus Corneşti-Iarcuri im Licht der 14C-Datierungen. In: Bălărie, A., Heeb, B., Metzner-Nebelsick, C., Nebelsick, L. (eds.), *Local Traditions, Culture Contact or Migration? The Pottery of Cruceni–Belegiș–Gáva Type as a Cultural Marker in Southeast Europe during the Late Bronze Age*. Cluj Napoca, 235–271.
- Uhnér, C. 2005: Tells and the tell-building tradition in the Carpathian basin during the Middle Bronze Age. In: Goldhahn, J. (ed.), *Mellan sten och järn, II*. Göteborg, 745–753.
- Uhnér, C., Ciugudean, H., Hansen, S., Bălan, G., Burlacu-Timofte, R. 2022: The Teleac Hillfort and Aspects of Warfare in the Eastern Carpathian Basin in the 10th Century BC. In: Hansen, S., Krause, R. (eds.), *Die Frühgeschichte von Krieg und Konflikt. Beiträge der Vierten Internationalen LOEWE-Konferenz vom 7. bis 9. Oktober 2019 in Frankfurt/M. The Early History of War and Conflict Proceedings of the Fourth International LOEWE Conference, 7–9 October 2019 in Frankfurt/M. Universitätsforschungen zur prähistorischen Archäologie* 383. Bonn, 285–301.
- Vicze, M., Stig Sørensen, M. 2023: Living in a Tell: Memory and Abandonment. Százhalombatta–Földvár Phase I (Late Koszider). Budapest.

AZ ALSÓ-MAROS MENTE TELEPÜLÉSTÖRTÉNETI VÁLTOZÁSAI A KR. E. 2. ÉVEZREDBEN

Összefoglalás

A tanulmány több mint tizenöt évnyi szisztematikus kutatás során összegyűjtött, kiterjedt régészeti adatbázis alapján nyújt átfogó rekonstrukciót az Alsó-Maros mente (AMM) településdinamikájáról a Kr. e. 2. évezredben. A Kárpát-medence délkeleti szélén elhelyezkedő régió stratégiai folyosóként működött, összekötve a Balkánt Közép-Európával és Erdélyt a tágabb alföldekkel. Gazdag természeti erőforrásai, változatos geomorfológiája és a távolsági útvonalak menti elhelyezkedése kedvező feltételeket teremtett a folyamatos emberi jelenlétnek a bronzkorban, így a régió Közép-Európa délkeleti részének egyik legjobban dokumentált mikrorégiójává vált.

A tanulmány mintegy száz, Kr. e. 2000/1900 és 900/800 között létesített települést vizsgál, melyeket terepbejárások, véletlenszerű előkerülések, ásások során, légi felvételeken és legújabban LiDAR-vizsgálatokkal fedeztek fel. Ezeket az adatokat egy GIS-adatbázisba integráltuk, hogy a települések elhelyezkedését, méretét, erődítményrendszereit, belső szerveződését és diakronikus változásait elemezzük. Ezen anyagok összefoglalásával árnyalt és kronológiai rekonstrukciót vázolunk fel arról, hogy az AMM közösségei hogyan alkalmazkodtak a bronzkor környezeti, gazdasági és társadalmi átalakulásaihoz.

A középső bronzkorban (MBA), nagyjából Kr. e. 2000/1900 és 1550 között, a jellemzően sűrű településhálózat elsősorban az alföldi területeken koncentrálódott. A többrétegű tell és tell-szerű települések – az MBA központi települései – kizárólag síkságokon, általában a Maros közelében található magasabb folyóteraszokon vagy jól körülhatárolható ősrégi medrekben található. Ezek a települések különféle kulturális hagyományhoz tartoznak, többek között a Maros-, Corneşti-Crvenka- és Ottomány csoportokhoz, amelyek anyagi kultúrái a régióban átfedik egymást. A kulturális sokféleség ellenére az MBA települések szerkezeti hasonlóságokat mutatnak: sokuknak van egy kiemelkedő központi része, amelyet egy vagy több kör vagy félkör alakú árok vesz körül. A 44 MBA lelőhely közül 14 esetben láthatók erődítési árkok, bár a sáncok vagy palánkok nyomai nagyrészt hiányoznak ezen a szinten.

A fejlett dokumentációs technikák, különösen a digitális terep modellek és a geomágneses felmérések, jelentősen finomították az MBA települések építészetről szerzett ismereteinket. A Sântana-La nord

de oraş lelőhely jól szemlélteti ezt a fejlődést. A felmérések és a geofizikai adatok egy árokkal körülvett központi mag köré szerveződő települést tártak fel, amelyet szabványos méretű, téglalap alakú házak sorai vettek körül. Ez a szabályosság szándékos tervezésre utal, és arra enged következtetni, hogy még a közepes méretű bronzkori közösségek is strukturált térbeli szerveződést követtek. Hasonló minták figyelhetők meg Socodor-Căvăjdia és Vârşand-Movila dintre vii településeken is, ami alátámasztja azt az értelmezést, hogy a régió MBA települései, bár viszonylag kis méretűek voltak, belső rendet és hosszú távú stabilitást mutattak.

A Mureş-völgyben található teltek, mint Pecica-Şanţul Mare, Semlac és Munar-Wolfsberg, különböző építészeti jegyeket mutatnak, melyeket nagyrészt a táj formált. A magas teraszon fekvő Pecica mély, félkör alakú árokkal van leválasztva a környező fennsíkától, míg Munar komplex szerkezetét négy félkör alakú árokkal alakították ki. Az MBA erődítések kevésbé védelmi rendszereként, mint inkább térbeli lehatárolásként működtek, hozzájárulva a többrétegű települési halmok kialakulásához. Az MBA gazdasági élete a mezőgazdaságra, az állattenyésztésre, a fazekasságra és a fémművességre támaszkodott, a közösségek közötti kapcsolatok viszonylag békések voltak. A települések közötti átlagos 3,6 km-es távolság sűrű lakottságra és stabil társadalmi-gazdasági kapcsolatokra utal.

A késő bronzkor I (LBA I), körülbelül Kr. e. 1550 és 1450 között, egy átmeneti fázist jelöl, amelyet áttelepülés és átszervezés jellemez, bizonyos MBA hagyományok fennmaradása mellett. Kevés lelőhelyet lehet biztosan ehhez a szakaszhoz sorolni, mivel nehéz megkülönböztetni a késő MBA, az LBA I és a korai LBA II leletegyüttesek kerámiáját. A rendelkezésre álló bizonyítékok azonban arra utalnak, hogy több korábbi tell-település kissé magasabb és szárazabb területekre költözött, valószínűleg a környezeti változásokra, például a síkságok megnövekedett nedvességszintjére reagálva. A tanulmányban olyan lelőhelyeket tárgyalunk, mint a Şagu-Situl A1_1, ahol a tokosbalta gyártására a hagyományosan feltételezett időpontnál korábbi bizonyítékaink vannak, alátámasztva a technológiai innovációt ebben az átmeneti időszakban. Bár kevesebb településről van információnk, az egykorú

lelőhelyek közötti távolságok nyilvánvaló növekedése – átlagosan 10,7 km-re – inkább a szakasz rövidségét és a jelenlegi régészeti láthatóság korlátait tükrözi, mint valódi demográfiai visszaesést.

A késő bronzkor II (LBA II), körülbelül Kr. e. 1450 és 1250 között, az AMM településtörténetének legátformálóbb szakaszát jelenti. Ebben az időszakban jelentek meg a mega-erődítések néven ismert monumentális erődítmények, amelyek a Kárpát-medence egyik legjelentősebb régészeti jelenségét képviselik. E hatalmas erődítmények közé tartozik Sântana-Cetatea Veche (130 ha), Pecica-PEC020 (103 ha), Pecica-PEC041 (63 ha) és Arad-AR026 (59 ha), valamint számos kisebb erődítmény. Megjelenésük egybeesik a többrétegű MBA települések elhagyásával, és jelentős változást jelez a társadalmi-politikai szervezetben, a védelmi stratégiákban és a gazdasági aggregációban egyaránt.

A mega-erődítések általában magas teraszok vagy kiemelkedő síkságok szélén épültek, hatalmas földsáncokkal, palánkokkal és mély védelmi árkokkal. Közülük kiemelkedik Sântana-Cetatea Veche komplexitásával és monumentális méretével. Négy koncentrikus árok, gondosan elhelyezett bejáratokkal összekötve, határozza meg a belső szerkezetet. Az erődítésen belül a geofizikai felmérések nagy, téglalap alakú épületeket azonosítottak, amelyek közül néhány mérete meghaladta az 1000 m²-t, ami közösségi, rituális vagy adminisztratív funkcióra utal. Egy különösen nagy, körülbelül 1700 m²-es építményt társadalmi-politikai jelentőségét tekintve a mükénéi megaronhoz hasonlítottak. További jellemzők, mint például a délkeleti kapu közelében épített halmok, arra utalhatnak, hogy az erődítményen belül megemlékezéseket vagy temetkezési szertartásokat tartottak.

Monumentális megjelenésük ellenére a mega-erődítések nem voltak elszigetelt erődítmények: számos, mezőgazdasági, kézműves és állattenyésztési funkciót betöltő, erődítés nélküli településsel léteztek együtt. A Şagu-Situl A1_1-hez hasonló lelőhelyekről származó gazdasági bizonyítékok olyan speciális tevékenységekről tanúskodnak, mint a fémművesség, a kemencében történő kerámia égetés, a gabonafeldolgozás, valamint a szarvasmarha- és sertésenyésztés. Az erődített és nem erődített települések közötti térbeli kapcsolat integrált hálózatok létezésére utal,

bár nem feltétlenül szigorú hierarchiára. Mindazonáltal az erődítményekbe történő beruházás – amely lineáris árok hosszúságban hatszorosa az MBA korinak – fokozott védelmi aggodalmakra és növekvő társadalmi differenciáltságra utal, valamint olyan központosított vezetés jelenlétére, amely nagy munkaerő szervezésére képes.

Az LBA II virágzó rendszere az Kr. e. 13. században erőszakosan omlott össze. Az olyan óriási erődítmények, mint Sântana és Corneşti-Iarcuri megsemmisülése fordulópontot jelent a régió történelmében. A régészeti leletek tűzvészekre, konfliktusokra és elhagyás olyan mértékére utalnak, amely mélyrehatóan változtatta meg a településszerkezetet. A késő bronzkor III (LBA III) időszaka, körülbelül Kr. e. 1250-től 900/800-ig, jelentős népességcsökkenéssel, a települések számának drasztikus csökkenésével és az erődítmények szinte teljes eltűnésével jellemezhető. Csak egyetlen lehetséges LBA III erődítményt – Lipova-Coasta Rea – azonosítottunk, amely a Maros-szorosra néző dombon található. A legtöbb település ebben a fázisban kis-méretű, rövid életű és kevésbé dokumentált, ami a széttagolt és csökkenő népességet tükrözi. Az LBA II időszakhoz képest az évszázadonként számított teljes lakott terület közel hatvanadjára csökkent, ami a régió bronzkori történelmének egyik legdrámaibb demográfiai visszaesését jelenti.

Összegzésként elmondható, hogy az AMM településeinek diakronikus fejlődése a környezeti feltételek, a rendelkezésre álló erőforrások, a kézműves szakosodás, a társadalmi szerveződés és a régiók közötti dinamika komplex kölcsönhatását tükrözi. A stabil és sűrűn lakott MBA-kori táj helyébe az LBA I-ben az átszerveződés kora következett, amelyet az LBA II-ben egy példátlanul monumentális építkezésekkel és társadalmi-politikai komplexitással jellemezhető szakasz követett. Ennek a rendszernek a katasztrofális összeomlása a Kr. e. 13. században átalakította az egész régiót, ami a LBA III időszakban demográfiai és gazdasági hanyatláshoz vezetett. A szintézis azt mutatja, hogy az AMM kulcsfontosságú terület a Kárpát-medence és Délkelet-Európa bronzkori társadalmait érintő szélesebb körű fejlődési folyamatok megértéséhez.