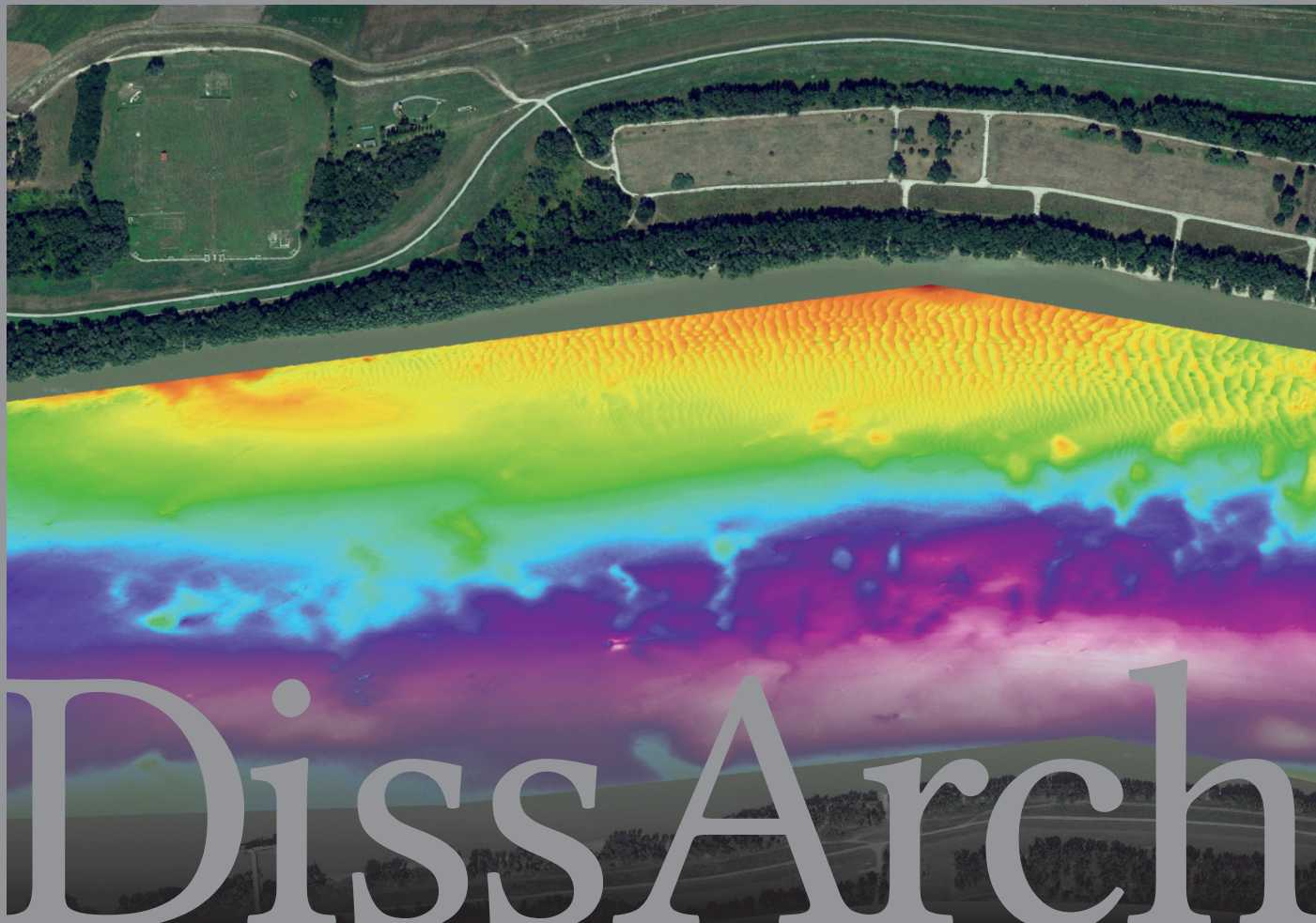


DISSERTATIONES ARCHAEOLOGICAE

ex Instituto Archaeologico

Universitatis de Rolando Eötvös nominatae



DissArch

Ser. 3. No. 13. | 2025

Dissertationes Archaeologicae
ex Instituto Archaeologico
Universitatis de Rolando Eötvös nominatae

Ser. 3. No. 13.

Editor-in-chief

Dávid BARTUS

Editorial board

László BARTOSIEWICZ (Stockholm University, Stockholm, Sweden)

Ondřej CHVOJKA (University of South Bohemia, České Budějovice, Czech Republic)

Alexandra ANDERS (ELTE Eötvös Loránd University, Budapest, Hungary)

Miroslava DAŇOVÁ (University of Trnava, Trnava, Slovakia)

Mario GAVRANOVIĆ (Austrian Archaeological Institute AAS, Vienna, Austria)

Hajnalka HEROLD (University of Exeter, Exeter, United Kingdom)

Tomáš KÖNIG (Comenius University, Bratislava, Slovakia)

Tina MILAVEC (University of Ljubljana, Ljubljana, Slovenia)

Gábor V. SZABÓ (ELTE Eötvös Loránd University, Budapest, Hungary)

Tivadar VIDA (ELTE Eötvös Loránd University, Budapest, Hungary)

Technical editor

Gábor VÁCZI

Proofreading

Katalin SEBŐK, Emilia GRANDI, Zsófia GYURKA, Borbála NYÍRI, Julianna REY-BENE

Cover picture

HELICOP s.r.o.

Aviable online at <http://ojs.elte.hu/dissarch>

Contact: dissarch@btk.elte.hu

Support: vaczi.gabor@btk.elte.hu

ISSN 2064-4574 (online)

Publisher

Lénárd DARÁZS

© Author(s)

© Institute of Archaeological Sciences, ELTE Eötvös Loránd University

Budapest 2025



PKP
PUBLIC
KNOWLEDGE
PROJECT



DOAJ

ERIH PLUS
EUROPEAN REFERENCE INDEX FOR THE
HUMANITIES AND SOCIAL SCIENCES



CONTENTS

WATER DIVIDES – WATER CONNECTS: ROMAN MILITARY, COMMERCIAL AND CULTURAL CONTACTS BETWEEN THE MIDDLE DANUBE REGION AND THE BLACK SEA

Lajos JUHÁSZ	7
Water Divides – Water Connects: Roman military, commercial and cultural contacts between the Middle Danube Region and the Black Sea	
Chiara CENATI	9
<i>Aequora Danubii cunctis transnare sub armis</i> : A new interpretation of the poem CLE 427	
Nikola RUSEV	25
Trimammium: The Roman limes fortress and the necropolis	
Miroslava DAŇOVA – Klaudia DAŇOVA – Ján RAJTÁR	51
The Danube riverbed near the Roman fort at Iža-Leányvár: Results of investigations, 2019–2022	
Varbin VARBANOV	63
Evidence of fishing from the excavations of the Roman fortress of Sexaginta Prista (Ruse, Bulgaria)	
Svetlana VELIKOVA	75
Medieval life along the Roman limes at the Danube, Ruse Region	

1ST NATIONAL CONFERENCE OF ARCHAEOLOGY STUDENTS

Dániel HÜMPFNER – Bence PÁRKÁNYI – Rita Helga OLASZ	87
Introduction	
Rita SULIMAN	89
Egyptian influence on Late Bronze Age (1600–1200 BC) ivory artefacts from the kingdoms of Ugarit and Qatna	

Mirtill ÁRVAI	105
Some Thoughts on five Mycenaean Terracotta Figurines from the Collection of the Museum of Fine Arts in Budapest	
Bence PÁRKÁNYI	119
Not all Gorgons are Greek: A red-figure kylix fragment in the collection of the Museum of Fine Arts, Budapest	
Virág Veronika SZÁNTÓ	131
Representation and object: <i>Pyxis</i> on the sarcophagus of Titus Aelius	
Dániel HÜMPFNER	147
New data on the settlement history of the so-called <i>villa</i> , a Roman period building, at Testvérhegy	
Rita Helga OLASZ	167
Child graves from Brigetio	
Márton SZABÓ	189
Imported ceramics from the Roman camp at Almásfüzitő	
Ferenc BARNA	211
Gestempelte Ziegel aus den Ausgrabungen von Komárom/Szőny-MOL-Kiskertek (Brigetio) im Jahr 2015	
Regina Viktória CSORDÁS	257
From the table to the grave? The question of animal sacrifices in Avar cemeteries on the Little Hungarian Plain	
Kata SZATHMÁRI	279
Possible ways of use of medieval and early modern bone tools based on results of use-wear analysis, experimental archaeology, and ethnographic parallels	

ARTICLES

Attila PÉNTEK – Ferenc CSERPÁK – Krisztián ZANDLER – Szilvia GUBA	297
First Open-Air Mousterian Site in the Mátra Mountains (North Hungary): Preliminary Results from Szurdokpüspöki-Lapos-tanya	

Kristóf István SZEGEDI – Annamária BÁRÁNY – Julia BLUMENRÖTHER – Endre DOBOS – Tibor MARTON – Gergely PÁLL-BARNA – György LENGYEL	321
Szekszárd-Palánk and the postglacial recolonization of the Pannonian Basin	
Eszter SOLNAY – Zita HRABÁK – Péter HORNOK – Péter KISS – Zsuzsanna M. VIRÁG – Zsuzsanna SIKLÓSI	353
Pottery technological analysis of the Copper Age Transdanubia (Western Hungary)	
Gábor SÁNTA	381
Ceramic Depositions, Ritual Features, and Irregular Burials of the Tumulus Culture in Hungary	
Ákos MENGYÁN – Ferenc KRISTÁLY	413
Pots for a purpose? Interdisciplinary analysis of small amphorae from the Late Bronze Age cemeteries of Maklár (Northeast Hungary)	
Attila MRENKA	447
A peculiar Late Bronze Age find from Sopron-Warischberg	
János Gábor TARBAJ	459
Late Bronze Age Arrowheads from Transdanubia and Beyond: Distribution, Chronology, Bronze Technology, and Use-Wear	
Ábel GARCZIK	543
New data on base marks of Late La Tène <i>situlae</i>	
Máté Róbert MERKL – Gábor CSÜLLÖG – Gabriella DARABOS – Ilona PÁL – Maria HAJNALOVA – Enikő Katalin MAGYARI	563
The vegetation of the Roman province of Pannonia based on wood charcoal, pollen, anthracological and carpological studies (1st–5th century AD)	
Dávid BARTUS	611
Roman Bronze Figurines Depicting Iuppiter from Brigetio	
Radu PETCU – Ingrid PETCU-LEVEI	633
A bronze statuette of the Héros Horseman (Thracian Rider) discovered near Tomis (Palazu Mare), Moesia Inferior	
Kata DÉVAI – István FÓRIZS	645
On the functionality of <i>vasa diatreta</i> : The case of the cage cup fragments from Gorsium	

Linda DOBOSI	663
Pieces of gaming equipment from Roman Pannonia: The Collection of the Kuny Domokos Museum in Tata (Hungary)	
Bence GULYÁS – Tamás CZUPPON	699
A stirrup type with Byzantine provenience in Central and Eastern Europe	
Alin FRÎNCULEASA – Daniel GARVĂN – George TROHANI – Elena RENȚA – Mirela MIHON – Cristian MANAILESCU – Oana GAZA – Doru PACESILA – Alexandru PETRE – Erwin GÁLL	713
Absolute dating of the Early/Pre-state Medieval date burial features in Muntenia (the 7th–14th century AD)	
Attila TÜRK – Flórián HARANGI	743
A 13th-century headwear fragment with metal threads from southeastern Hungary and the Bulgarian connections of Árpád Age headdresses	

FIELD REPORTS

Dávid BARTUS – Melinda SZABÓ – Rita Helga OLASZ – Ákos MÜLLER – Bence SIMON – Szilvia JOHÁCZI – Lajos JUHÁSZ – Tibor NÉGYÖKRŰ – Kitti IVANCSICS – László BORHY – Emese SZÁMADÓ	763
Excavations in the legionary fortress of Brigetio in 2025	
Bence SIMON – Szilvia JOHÁCZI – Ákos MÜLLER – Bence PÁRKÁNYI – Lőrinc TIMÁR	781
Pilisszentiván-Hárs-erdő 2025: New buildings and finds from a Roman village in the northwestern hinterland of Aquincum	
Attila Botond SZILASI – Attila TURI – Rita RAKONCZAY	791
2000 years of settlement horizons in the area of the second inner courtyard of the <i>Neue Residenz</i> in Salzburg	

THESIS REVIEW ARTICLES

Nóra SZABÓ	827
Change and transformation during the transition from the Middle to the Late Bronze Age along the capital region of the Danube: Settlement structure analyses based on particular sites from the Vátya III – Koszider Period and the Early Tumulus Culture	

The Danube riverbed near the Roman fort at Iža-Leányvár

Results of investigations, 2019–2022

Miroslava DAŇOVA  

Department of Classical Archaeology, Faculty of Philosophy and Arts, Trnava University,
Trnava, Slovakia
miroslava.danova@truni.sk

Klaudia DAŇOVA 

Institute of Archaeology, Slovak Academy of Sciences, Nitra, Slovakia
klaudia.danova@gmail.com

Ján RAJTÁR 

Institute of Archaeology, Slovak Academy of Sciences, Nitra, Slovakia
jan.rajtar@savba.sk

Received 2 July 2025 | Accepted 10 August 2025 | Published 30 January 2026

Abstract: This paper presents the results of investigations carried out in the Danube riverbed between Brigetio and the northern shore at today's Iža-Leányvár. It begins with a concise overview of previous research—undertaken mainly on the north bank—which prompted the Slovak team to examine the river itself and ultimately led to the discovery of the piers of a Roman bridge. It then reports the aim, methods, and results of the most recent underwater work conducted in December 2022. The survey confirms that the structure was erected between the 3rd and 4th centuries AD. The paper concludes by outlining future avenues of inquiry to improve our understanding of the hitherto unknown Roman bridge across the Danube, its construction, and the reasons for its erection.

Keywords: Kelemantia, Iža-Leányvár, Brigetio, underwater archaeology, Danube

Introduction

The Romans were in contact with the Central Danube region before the turn of the century through trade routes and, during the reign of Augustus, through ambitions to extend the empire's frontiers to the Danube. In the 1st century AD,¹ efforts by the Julio-Claudian dynasty and its successors to secure full control of the southern bank in this area intensified. These developments are associated with the establishment by the Danube of an auxiliary camp, a civil settlement and, subsequently, the legionary base at Brigetio (present-day Komárom/Szöny, H) at the end of the 1st century AD. Later incursions by Germanic groups into this part of Pannonia in AD 166–167 and 170 compelled Marcus Aurelius to seek suitable forward positions from which to defend the area and take the offensive. One such position was Brigetio, the base of *Legio I Adiutrix*; opposite the civil town, an

1 BORHY *et al.* 2011, 46.

earth-and-timber camp was erected on the northern bank in AD 175 (Fig. 1).² Earlier researchers mistakenly identified the site with *Κελαμαντία/Kelamantia/Kelemantia*, known from Claudius Ptolemy;³ it is now better known by its modern name, Iža-Leányvár. This earth-and-timber camp was destroyed in a sudden attack in AD 179 and was rebuilt in stone during the reign of Commodus.⁴ Archaeological excavation has revealed construction works dating to the reigns of the Constantine II and Emperor Valentinian I. In this phase, a new linear structure was erected between the Danube bank and the south-western corner of the camp.⁵ Even after the death of Emperor Valentinian I in Brigetio on 17 November AD 375, the Romans appear to have continued to resist the raids of barbarians launched from the northern bank, abandoning the stone fort only in the last decades of the 4th century AD.

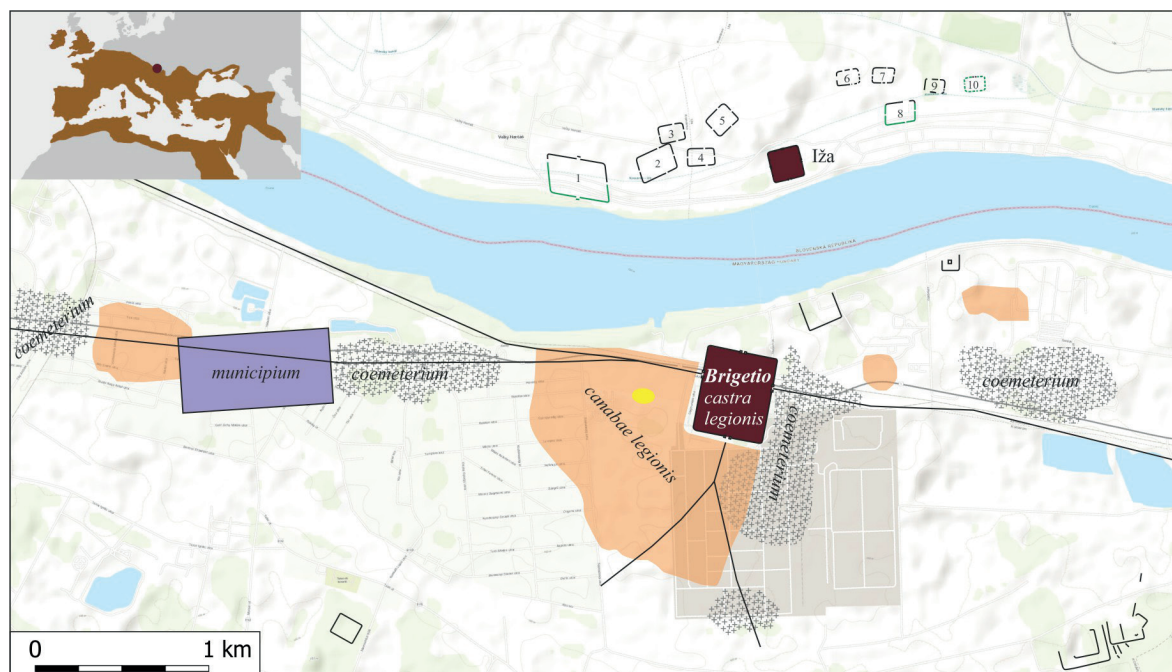


Fig. 1. Map of Brigetio and its surroundings (source: IA SAS).

Following the Roman withdrawal, the fort became a convenient quarry for building material used in nearby villages and churches and in the fortress at Komárno (SK).⁶ Despite the gradual dismantling of the walls, the site continued to attract travellers and scholars, who sketched it in their diaries⁷ (Fig. 2) or described it,⁸ thereby recording information no longer available today. The first archaeological excavations in the area were undertaken by János Tóth-Kurucz, a native of Iža, in 1906–1909 and 1912–1913.⁹ Between the two World Wars, Jaroslav Böhm,¹⁰ an archaeologist from Prague, continued work at the site. In 1955–56, research was carried out jointly by the archaeologi-

2 KUZMOVÁ – RAJTÁR 2010, 15.

3 Clau., *Geogr. L.* II. C. 10; RAJTÁR *et al.* 2017, 187.

4 RAJTÁR 2009, 127.

5 TÓTH-KURUCZ 1907, 57.

6 KURUCZ 1914, 21–22; CHRASTINA 2003, 12.

7 PRIORATO 1670, 470; MARSIGLI 1726, Sectio III; POCOCKE 1743, 245; KUBITSCHKE 1931, 203.

8 MARSIGLI 1700, 18; BÉL 1735 (2016), 479, with S. Mikoviny's maps (after LOBOTKA 1971, 33).

9 TÓTH-KURUCZ 1907, 40–68; TÓTH-KURUCZ 1908, 42–56; TÓTH-KURUCZ 1909, 46–55; TÓTH-KURUCZ 1910, 90–94; KURUCZ 1914.

10 Nálezová správa AÚ SAV č. 11340/35 (J. Böhm); ONDROUCH 1938, 30–32.

cal institutes of Prague and Nitra under Bedřich Svoboda,¹¹ followed by campaigns by the Institute of Archaeology of the Slovak Academy of Sciences (SAS), first in 1957 (led by Mária Schmiedlová)¹² and, after a longer interval, in 1978 (led by Klára Kuzmová and Ján Rajtár).¹³ The planned construction of the Gabčíkovo–Nagymaros hydroelectric works prompted further investigations in the 1970s. After the dam on the Danube had been built, the area of the camp remained protected for scientific and documentary research, which continues to be conducted by the Institute of Archaeology of the Slovak Academy of Sciences, now in co-operation with the University of Trnava. Wider landscape exploration by a team from the Institute identified ten temporary Roman field camps from the period of the Marcomannic Wars in the vicinity of the fort through aerial survey and imagery.¹⁴ A ditch, named ‘Camp 11’, was traced to the north and north-east of the stone fort on the aerial images.¹⁵ Its precise date of construction and purpose remain uncertain.

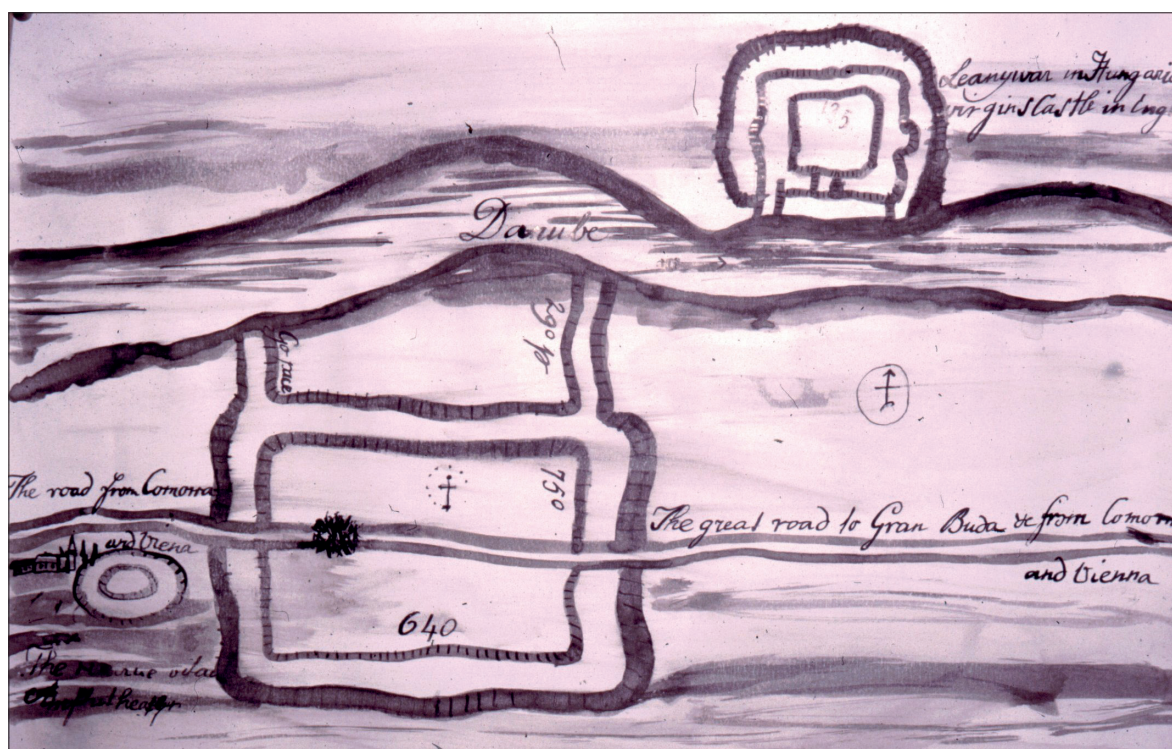


Fig. 2. Brigetio and its northern surroundings on an 18th-century map by J. Pococke (after KUBITSCHKE 1931, 203).

Since the 1970s, archaeologists have saved several important artefacts recovered from the Danube riverbed during modifications to the fairway and gravel extraction between the Roman fort and the village of Iža. Titus Kolník identified these objects as two Roman anchors (Fig. 3), two Roman decorative stone architectural elements (*cippi*), and a votive inscription.¹⁶ These finds, together with the discovery of a linear feature near the south-western corner of the stone fort—which J. Tóth-Kurucz termed a “*cloaca*” owing to a covered channel nearby¹⁷—directed the current research team’s attention to the riverbed, which was investigated in 2019.

11 SVOBODA 1962, 397–424.

12 SCHMIEDLOVÁ 1958, 543–548.

13 BURANSKÁ *et al.* 1980, 74–75.

14 RAJTÁR 2019, 449–450.

15 DAŇOVÁ *et al.* 2022, 322, Fig. 5.

16 KOLNÍK 1977, 170–171; KOLNÍK 1978, 165–171.

17 TÓTH-KURUCZ 1908, 45–46, Fig. 3.

Exploration of the riverbed near the Roman military camp at Iža-Leányvár

From the outset, research in the Danube off the Roman camp at Iža-Leányvár focused on identifying a harbour that would have provided suitable conditions for delivering building materials and supplies to soldiers stationed on the northern bank. As no substantial structures had been recorded in the riverbed between the military camp at present-day Iža-Leányvár and Roman Brigetio, some scholars inferred that the northern bank was supplied by boats and by wooden or pontoon bridges,¹⁸ while others doubted that a bridge stood here at all.¹⁹ Zsolt Visy deduced the existence of stone piers²⁰ from a description of architectural remains at Brigetio written by Rudolf Gyulai at the end of the 19th century; however, our re-reading showed that the passage cited in fact refers to the remains of a Roman aqueduct.²¹

The first surveys of the riverbed off Iža-Leányvár were undertaken by the Slovak team in autumn 2019. Given a limited budget, we worked with volunteers and employed the methods then available (LiDAR, several types of sonar surveys, and geological surveys of the riverbed). Technical details of these pilot surveys and the hardware used have been published elsewhere.²² A major breakthrough came with the bathymetric map (river km 1690–1692) produced by HELICOP in June 2021. Comparison with Roman Period features on land made it clear that a line of structures lay on the riverbed (Fig. 4), which we labelled Pillars 1 to 5 from north to south. These were documented again in summer 2022 using similar methods at higher resolution, yielding further information on their dimensions and forms.

More detailed sonar examination of Pillars 3 and 5 revealed a characteristic Roman bridge-pier plan: a pentagonal outline with a pointed upstream end. Both piers stood several decimetres above the surrounding bed, with extensive debris



Fig. 3. Anchor found in the Danube during dredging works; currently in the Danube Region Museum in Komárno (source: IA SAS).

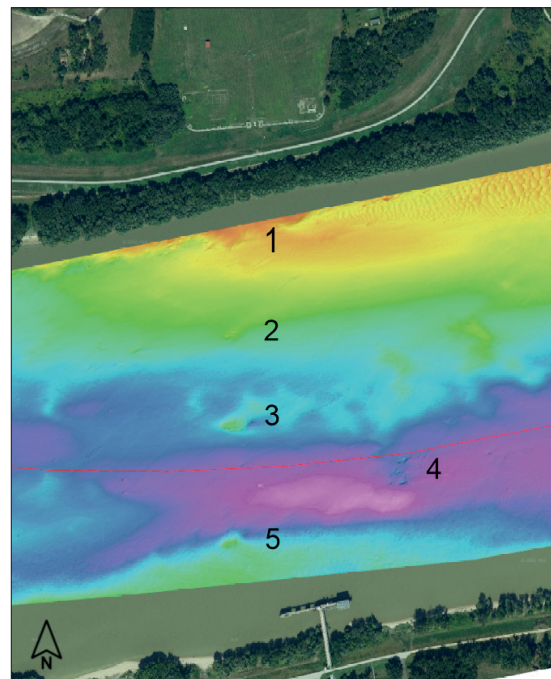


Fig. 4. Bathymetric map of the Danube near Iža, featuring Pillars 1–5 (by HELICOP, base map: Google Earth, © Maxar Technologies).

18 BORHY 2012, 41; MÓCSY 1974, 110.

19 MRÁV 2002, 37 Abb. 13.

20 VISY 1988, 57.

21 GYULAI 1885; GYULAI 1886.

22 DAŇOVÁ *et al.* 2022, 319–328.

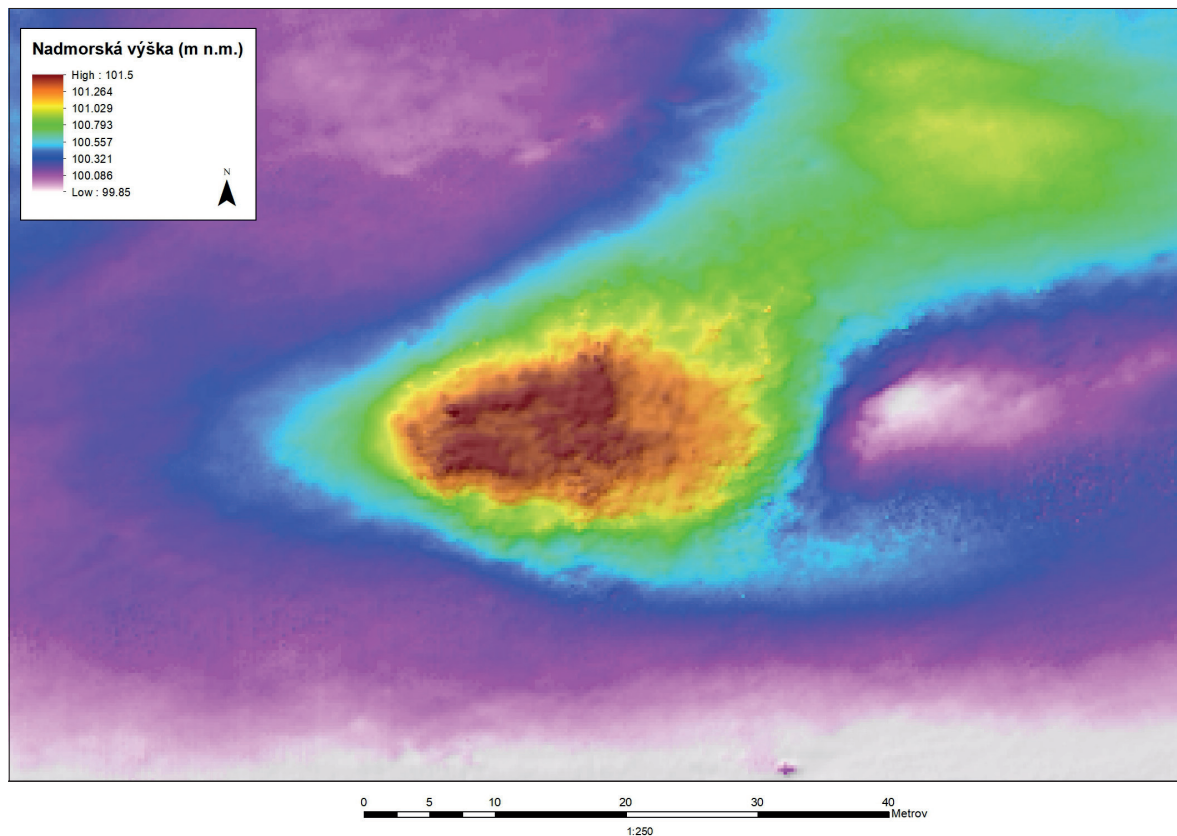


Fig. 5. Pillar 3 and the debris around it (by HELICOP).

around them—especially downstream—apparently consisting of stones and wooden piles (Fig. 5). Both lie within the Danube channel, at the edge of the international fairway, in a section thoroughly dredged repeatedly in the past, most recently in the 1970s.²³ On this basis, the feature identified as Pillar 4 may be the remains of one or more destroyed piers originally aligned with the bridge. Today it lies roughly 200 m downstream from the line of the other piers and appears on multibeam elevation survey images as a heterogeneous structure about 33 m wide (north–south) and up to 1 m higher than the surrounding riverbed. The features named Pillar 1 and Pillar 2 are the least prominent. Pillar 1 was reportedly filled with gravel by units of the Czechoslovak People’s Army in the 1970s. At lower water levels, it is accessible on dry ground and has been the subject of GPR surveys since 2022.

According to the bathymetric map, Pillar 2 rose no more than 40 cm above the bed, and its sides were less clearly defined than those of Pillars 3 and 5. In summer 2021, archaeologists and diving instructors concluded that this area offered the best starting point for diving, documentation, and sampling on the Slovak side of the Danube. In comparison, Pillar 2 had not been completely filled with gravel, lay in shallower water with gentler currents, and was further from the fairway than Pillar 3. Accordingly, in December 2022, a team of archaeologists and divers undertook dives here to document the riverbed (an action planned since August 2022).²⁴ Two consecutive dives were made to depths of 3–3.5 m, with visibility up to 1 m and water temperatures of around 4 °C; the diver was line-tended from the main boat. During the dives, the pillar area was clearly distinguishable from the surrounding bed and was recorded using a GoPro™ camera. Beneath accumulated river sand,

²³ KOLNÍK 1977, 170–171.

²⁴ During the winter months when temperatures are low, rivers in the area generally have better visibility and lower water levels.

worked stone blocks were identified and—crucially—dozens of wooden piles driven into the riverbed and projecting about 20–40 cm above their surroundings. These piles could not be differentiated from stone debris in the bathymetric survey, so their presence was unexpected. Their discovery led to a further successful dive on 2 December 2022 to collect timber samples: the whole upper part of a post (Fig. 6) and two smaller fragments.

Dendrochronological analysis proved inconclusive because the recovered timber sections contained too few growth rings. The species was identified as summer oak (*Quercus robur*). Radiocarbon dating places the wood in the 3rd or 4th century AD (Fig. 7), confirming our hypothesis that the structure is Roman and formed part of a bridge. The precise positions of the piles were not recorded during the dive, and the video footage was unsuitable for photogrammetry; further work at this pillar will therefore be required when conditions permit.



Fig. 6. Wood sample from Pillar 2 (by P. Dragonides).

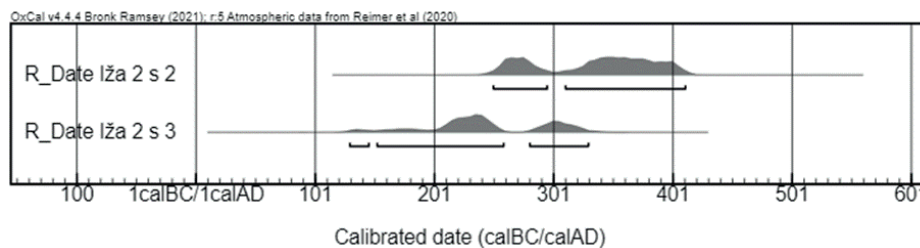


Fig. 7. Radiocarbon data. The sample from Pillar 2 is labelled “2s2” (Poznań Radiocarbon Laboratory).

The bridge construction

The available evidence does not yet allow for a reliable reconstruction of the bridge or a determination of its precise type. The pentagonal form of the piers—with a pointed upstream end—accords with Roman practice, including the Trajan (Apollodorus) Bridge across the Danube, whose construction is described by Cassius Dio.²⁵

The distances between the centres of adjacent features are c. 105 m (Pillars 1–2), 97 m (Pillars 2–3), and 127 m (Pillars 3–5). Fragments of the feature marked Pillar 4—probably the remains of one or more piers—were found 200 m downstream. The current bathymetric survey has revealed no further features between the identified points. Assuming a structure comparable to the Bridge of Apollodorus—combining stone, timber and concrete—and that the maximum span of the arches could have reached 55 m at best,²⁶ at least four piers are missing from the line (one each between Pillars 1–2 and 2–3 and two between Pillars 3–5).

Based on a reconstruction by Dorel Bondoc,²⁷ the Danube bridge between present-day Dolni Vadin (Bulgaria) and Grojdibodu (Romania), probably built in the 3rd century AD, represents an alter-

25 Cass. Dio, *Hist.* LXVIII.13.1. See Bjelić 2020, 24 for more details.

26 Bjelić 2020, 33.

27 BONDOR 2018, 54.

native structural solution. Although smaller than the Bridge of Apollodorus, this bridge was an important link between the banks; its deck was at least 4–5 m wide to accommodate traffic. Given the character of the riverbed there (which included a river island) and the report of the traveller L. F. Marsigli, Bondoc suggested that some piers were constructed wholly of wood.²⁸ Although Marsigli mentions “huge wooden piers stuck in the riverbed”, these may equally have formed part of timber frameworks like those documented elsewhere in the empire—for instance, near modern Cuijk,²⁹ Köln,³⁰ and Mainz.³¹ Future underwater work may provide definitive evidence; the use of such piers in the relatively milder flow on the northern side of the river at Iža-Leányvár remains plausible.

Another Roman bridge built entirely of wooden beams stood on the upper Danube near present-day Stepperg. Although its reconstructed length of about 500 m³² is comparable to the situation at Brigetio, the river there is shallower and slower-flowing, with gentler currents. The foundations of the bridge piers were built on a compact wooden structure, representing a technological solution different from that of the Bridge of Apollodorus.³³ It cannot presently be determined whether this solution would have suited the conditions at Brigetio.

Discussion

In building bridges at the frontiers, the Romans appear to have attached great importance to strong, well-protected entrances in the form of paired fortified bridgeheads, smaller than the military camp at Iža-Leányvár. Several examples are known along the Danube, including at present-day Drobeta³⁴ and Sucidava,³⁵ as well as probable instances opposite Roman Aquincum³⁶ and Carnuntum.³⁷

Today, the Danube is approximately 530–540 m wide between Brigetio and the north bank, depending on water level. The bridge line runs at a slight angle to the river’s perpendicular, so the span must have been at least 570 m (based on current measurements). The bridge facilities on the northern bank can still be located approximately within the coastal zone of the camp at Iža. The area south of this zone formed the principal line of communication between the troops and the Roman heartlands. The piers do not align exactly with the centre of the camp but point slightly westwards, upstream, leaving space for a harbour to the east. Such a harbour would have been required throughout the lifespan of the camp on the north bank, serving for unloading, for longer-term storage of commodities such as wine and olive oil, and as a base for military vessels. The coastal zone of the camp was defended by a wall on the west and, on the east, by at least a line of pit traps (*lilia*), probably established in the Constantinian Period.³⁸ The existence of a wall at the south-eastern corner remains to be confirmed; a great part of the area south of the camp was heavily disturbed by military exercises in the 1970s.

28 MARSIGLI 1726, 38–39.

29 GOUDSWAARD *et al.* 2001.

30 KRAUS 1925, 235.

31 BAUER 2007, 85.

32 PRELL 2018, 28.

33 PRELL 2018, 42.

34 BONDOR 2022, 733; CONDURĂȚEANU 2017, 63–64.

35 BONDOR 2022, 738; CONDURĂȚEANU 2017, 66.

36 ZSIDI 1999, 263–264; NÉMETH 1999, 142–144.

37 GROLLER-MILDENSEE 1900, 87–92.

38 KUZMOVÁ – RAJTÁR 1986, 143.

The feature referred to as Pillar 1 may have had a different, more segmented ground plan, as observed near the shore at, for example, the Bridge of Apollodorus,³⁹ where the deck had to negotiate the height difference down to the lower-lying level of the camp.

The size and form of the bridgehead facilities adjacent to the legionary camp at Brigetio cannot yet be determined with precision, as any associated structures on the southern bank remain to be identified. Based on the shape of Pillar 5 and observations by Attila Tóth,⁴⁰ other structures (reinforced or double piers) probably carried the deck south of Pillar 5 to create suitable entrance conditions. Although the right (Hungarian) bank has also experienced military disturbance,⁴¹ its impact appears to have been less severe than at Iža-Leányvár. A future geophysical survey of this area could reveal further information about this part of the bridge. Documenting and investigating the entire structure underwater and on both banks of the Danube requires a unified approach; we therefore hope that recent co-operation with our Hungarian colleagues will continue.

On present evidence, the construction of the piers is best linked to Roman efforts to strengthen the Danube frontier, particularly the rebuilding and refortification of the camp at Iža-Leányvár under Constantius II and later in the reign of Valentinian I. Although radiocarbon results indicate a 3rd–4th-century AD date for the bridge, they do not yet allow the structure to be associated securely with either building phase. Further methods and additional samples will be required to refine the dating and to connect the construction either with activities under Constantius II or with renewed ambitions under Valentinian I to extend Roman influence beyond the northern bank.

Additional information could be sought through historical-philological analysis of the work of Ammianus Marcellinus,⁴² based on which it was almost certainly Valentinian I who ordered the construction of a bridge between Brigetio and the camp on the northern bank as part of his ambitious programme to fortify the frontier. The ancient text, however, does not add technical detail about the structure itself.⁴³

Constructing a bridge with stone piers was an expensive undertaking, but the result would consolidate and conspicuously proclaim Rome's position in the region. Consequently, the discovery of this bridge is significant for our understanding of the geopolitical situation along this stretch of the Danube.

Selecting the best methods and timing for further investigations to confirm or refute the existence of additional piers on the bridge line remains a major challenge. Local conditions—water level, current, visibility, water and air temperature, international navigation, diving regulations, and team availability—place strict limits on progress. We will therefore continue to prioritise surveys in the already examined area and to undertake non-destructive investigation of the riverbed and banks while awaiting conditions suitable for diving on a better-preserved pier. We will also seek further information about construction details, as these are key to interpretation.

39 [BJELIĆ 2020](#), 24, Fig. 2; [BJELIĆ 2022](#), 53, Fig. 4.

40 [TÓTH 2020](#), 40.

41 [VISY 2012](#), 171–172.

42 [Amm. Marc.](#), *Res Gestae*, XXX.

43 “...avulso ponte, quem compaginarat ante necessitas invadens terras hostiles.” We can deduce that Valentinian I had ordered the building of a bridge there, apparently with an eye on facilitating a planned expansion into barbarian territory (“cum ab urbe praedicta tenderet ad procinctum,” §17). Whether this bridge was a pontoon, as the one mentioned in §13, or a permanent bridge, is unknown. See [BOEFT *et. al.* 2015](#), 132–133.

Funding

This contribution was created with the support of grants *The Roman camp in Iža – part of the UNESCO World Heritage Site* (VEGA 1/0051/22) and *Fords, bridges, long-distance roads. Ancient roads and settlements in Požítavie and Pohronie with the use of underwater archaeology* (VEGA 2/0025/22).

Acknowledgements

We thank all team members who took part in the underwater work under the demanding conditions of the cold December 2022, including officers of the River Police of the Slovak Republic, the team from the Archaeological Institute of the Slovak Republic, staff and students of the University of Trnava, and the Municipality of Iža with its mayor, István Domin. We are also deeply grateful to volunteers from AKITO Diving, the staff of Midland Adventure, HELICOP, and Tibor Lieskovský for their active engagement in protecting Slovakia's underwater cultural heritage.

Sources

- Ammianus Marcellinus: *Res Gestae, libri XXX*.
- BÉL, M. 1735: *Notitia Hungariae novae historico-geographica*. Vienna.
- Cassius Dio: *Historia Romana*. Loeb Classical Library edition. Cambridge, MA, 1925.
- Claudius Ptolemaios: *Geographiae Libri Octo. Graece et Latine ad codicum manu scriptorum fidem*. Edited by F. G. Wilberg. Essendiae, 1838.
- MARSIGLI, A. I. F. 1700: *Danubialis operis prodromus ad Regiam Societatem Anglicanam*. Norimbergae.
- MARSIGLI, A. I. F. 1726: *Danubius Pannonico-Mysicus: observationibus geographicis, astronomicis, hydrographicis, historicis, physicis, perlustratus et in sex tomos digestus*. Hagæ Comitum: Apud P. Gosse, R. Chr. Alberts, P. de Hondt; Amstelodami: Apud Harm. Uytwerf & Franç. Changuion.
- POCOCKE, R. 1743: *A Description of the East, and Some Other Countries. Vol. II: Observations on the islands of the Archipelago, Asia Minor, Thrace, Greece and some other parts of Europe*. London.
- PRIORATO, G. G. 1670: *Esplicatione dell'Esercito volante col quale il Generale Conte di Souches ha battuto i Turchi nel contorno di Commora, vicino al Villaggio di Szony l'Anno MDCLXI adi 25. d'Agosto*. Historia di Leopoldo Cesare, Wien, Fig. 420.

References

- BAUER, S. 2007: Spundwände der Mainzer Römerbrücke und ihr Nachleben – Aussagemöglichkeiten wiederverwendeter Bauhölzer. In: Ohlig, Ch. (ed.): *Von der cura aquarum bis zur EU-Wasserrahmenrichtlinie – Fünf Jahre DWhG*. Schriften der Deutschen Wasserhistorischen Gesellschaft (DWhG) 11. Siegburg, 79–86.
- BJELIĆ, I. 2020: Trajan's Bridge – Analysis of Apollodorus' Design Concept. In: Popović, I. – Petković, S. (eds): *Illyricum Romanum. Studiola in honorem Miloje Vasić*. Beograd, 22–39.
- BJELIĆ, I. 2022: Use of building materials during the construction of Trajan's bridge on the Danube. *Archaeology and Science* 18, 4–58. https://doi.org/10.18485/arhe_apn.2022.18.4
- BOEFT, J. DEN – DRIJVERS, J. W. – DEN HENGST, D. – TEITLER, H. C. 2015: *Philological and Historical Commentary on Ammianus Marcellinus XXX. Philological and Historical Commentaries on Ammianus Marcellinus*. Leiden–Boston.
- BONDOC, D. 2018: *The Roman Bridge between Dolni Vadin (Bulgaria) and Grojdibodu (Romania)*. Oxford. <https://doi.org/10.2307/j.ctvxxrq17d>
- BONDOC, D. 2022: Fortified towns to the north of the Lower Danube in the late Roman period: Drobeta and Sucidava. In: Morillo, Á. – Hanel, N. – Esperanza, M. (eds): *Limes XX. Estudios sobre la frontera romana, Vol. 2*. León, 731–740.

- BORHY, L. 2012: Hinweise auf Schifffahrt und Fernhandel in Brigetio, Komárno/Szöny, Ungarn. *Histria Antiqua* 21, 37–48.
- BORHY, L. – BARTUS, D. – CZAJLIK, Z. – RUPNIK, L. – SZÁMADÓ, E. 2011: Brigetio (Komárom/Szöny): Fortress/City next to the Danube. In: Visy, Zs. (ed.): *Rómaiak a Dunánál. A Ripa Pannonica Magyarországon mint világörökségi helyszín – Romans on the Danube. The Ripa Pannonica in Hungary as a World Heritage Site*. Pécs, 42–51.
- BURANSKÁ, K. – KOLNÍK, T. – RAJTÁR, J. 1980: Prvá sezóna revízneho výskumu rímskeho kastela v Iži – akcia Dunaj. *AVANS Archeologické výskumy a nálezy na Slovensku v roku 1979*, 71–79.
- CONDURĂȚEANU, B. 2017: Roman Fortresses and Sites along the Lower Danube: Reconsidering a Nineteenth Century Source in the Light of Modern Cartography and Satellite Imagery. In: De Sena, E. C. – Timoc, C. (eds): *Romans in the Middle and Lower Danube Valley, 1st century BC–5th century AD*. British Archaeological Reports – International Series 2282, Oxford, 61–82.
- CHRISTINA, P. 2003: *Petrografická analýza kamenárskych artefaktov rímskeho kastela v Iži pri Komárne (lokality Leányvár)*. Nitra.
- DAŇOVÁ, M. – DAŇOVÁ, K. – HALINÁR, M. – HOFFMAN, M. – LIESKOVSKÝ, T. – KOPRIVŇANSKÝ, A. – SOČUVKA, V. 2022: Hľadanie rímskeho prístavu. O počiatkoch systematického prieskumu riečneho dna Dunaja pri Iži. *Zborník Slovenského národného múzea* 116: Archeológia 32, 319–328. <https://doi.org/10.55015/WNMK8399>
- GOUDSWAARD, B. – KROES, R. A. C. – VAN DER BEEK, H. S. M. 2001: The Late Roman Bridge at Cuijk. *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 44, 439–560.
- GROLLER-MILDENSEE, M. VON 1900: Das „Öde Schloss“ an der Donau. *Der Römische Limes in Österreich* 1, 87–92.
- GYULAI, R. 1885: A Bregetiumi vízvezetékéről. *Archaeologiai Értesítő* 5, 332–335.
- GYULAI, R. 1886: Második levele a bregetiumi vízvezetékéről. *Archaeologiai Értesítő* 6, 348–350.
- KOLNÍK, T. 1977: Rímske nálezy z Dunaja pri Iži. *AVANS Archeologické výskumy a nálezy na Slovensku v roku 1976*, 170–172, 380.
- KOLNÍK, T. 1978: Nález rímskych predmetov v Dunaji pri Iži. *Archeologické rozhledy* 20, 165–171, 239.
- KRAUS, O. 1925: Die römische Rheinbrücke zu Köln und die Stadtmauer der Südseite. *Bonner Jahrbücher* 130, 232–252. <https://doi.org/10.11588/bjb.1925.0.45236>.
- KUBITSCHKE, W. 1931: Ältere Berichte über den römischen Limes in Pannonien. *Sitzungsberichte* 209:1. Wien–Leipzig.
- KURUCZ, J. 1914: *Római nyomok a pannoniai Duna-limes balpartján*. Komárom.
- KUZMOVÁ, K. – RAJTÁR, J. 1986: Ôsma sezóna revízneho výskumu rímskeho kastela v Iži. *AVANS Archeologické výskumy a nálezy na Slovensku v roku 1985*, 140–143.
- LOBOTKA, V. 1971: Samuel Mikovíni a Brigetio. *Vlastivedný časopis (Pamiatky a múzeá)* 20/1, 32–34.
- MÓCSY, A. 1974: *Pannonia and Upper Moesia*. London–Boston.
- MRÁV, Zs. 2002: Die Brückenbauinschrift Hadrians aus Poetovio. *Communicationes Archaeologicae Hungariae*, 15–57. <https://doi.org/10.54640/CAH.2002.15>
- NÉMETH, M. 1999: A rákospataki híd és az aquincumi Dunaszakaszc védelmének kérdései. In: Gaál, A. (ed.): *Pannoniai kutatások. A Soproni Sándor emlékkonferencia előadásai (Bölcske, 1998. október 7.)*. Szekszárd, 141–159.
- ONDROUCH, V. 1938: *Limes Romanus na Slovensku*. Bratislava.
- PRELL, M. 2018: *Die römische Donaubrücke bei Stepperg. Von der Entdeckung bis zur Schautafel*. Neuburg a. d. Donau.
- RAJTÁR, J. 2009: Im Handstreich genommen. Der Fall des Römerlagers von Iža. In: Museum und Park Kalkriese (eds): *2000 Jahre Varusschlacht – Konflikt – Varusschlacht im Osnabrücker Land*. Stuttgart, 126–127, 409.
- RAJTÁR, J. 2019: Die römischen Feldlager in Iža. In: Farkas, G. I. – Neményi, R. – Szabó, M. (eds): *Visy 75. Artificem Commendat Opus. Studia in honorem Zsolt Visy*. Pécs, 446–456.

- RAJTÁR, J. – KOLNÍKOVÁ, E. – KUZMOVÁ, K. 2017: K osídlení Chotína v době římské. In: Pažinová, N. – Borzová, Z. (eds): *Sedem decénií Petra Romsauera*. Studia Historica Nitriensia 21. Supplementum. Nitra, 173–193. <https://doi.org/10.17846/SHN.2017.21.S.173-193>
- SCHMIEDLOVÁ, M. 1958: Výskum v Iži-Leányvári roku 1957. *Archeologické rozhledy* 10, 543–548.
- SVOBODA, B. 1962: K dějinám římského kastelu na Leányváru u Iže, okres Komárno. *Slovenská archeológia* X/2, 397–424.
- TÓTH, J. A. 2020: Underwater and “islandological” data and observations related to the Ripa Pannonica. In: In: Farkas, G. I. – Neményi, R. – Szabó, M. (eds): *The Danube Limes in Hungary. Archaeological Research Conducted in 2015–2020*. Pécs, 39–46. <https://doi.org/10.15170/CLIR.2020.02>
- TÓTH-KURUCZ, J. 1907: Leányvár. *A komáromvármegyei és városi múzeum Egyesület 1906-évi értesítője* 20(12), 40–68.
- TÓTH-KURUCZ, J. 1908: A leányvári ásatások folytatása 1907-ben. *A komáromvármegyei és városi múzeum Egyesület 1907-évi értesítője* 21(13), 42–56.
- TÓTH-KURUCZ, J. 1909: A leányvári ásatások folytatása 1908-ben. *A komáromvármegyei és városi múzeum Egyesület 1908-évi értesítője* 22(14), 46–55.
- TÓTH-KURUCZ, J. 1910: A leányvári ásatások folytatása 1909-ben. *A komáromvármegyei és városi múzeum Egyesület 1909-évi értesítője* 23(15), 90–94.
- VISY, Zs. 1988: *Der pannonische Limes in Ungarn*. Stuttgart.
- VISY, Zs. 2012: The Value and Significance of Historical Air Photographs for Archaeological Research: Some Examples from Central and Eastern Europe. In: Hanson, W. – Oltean, I. (eds): *Archaeology from Historical Aerial and Satellite Archives*. New York, 165–177. https://doi.org/10.1007/978-1-4614-4505-0_10
- ZSIDI, P. 1999: Hídfőállás az aquincumi polgár város és katonaváros között (Ein Brückenkopf zwischen der Zivilstadt und den Canabae von Aquincum). In: Gaál, A. (ed.): *Pannoniai kutatások. A Soproni Sándor emlékkonferencia előadásai (Bölcske, 1998. október 7.)*. Szekszárd, 257–274.



