HUNGARIAN ARCHAEOLOGY
E-JOURNAL • 2026/1 – SPRING
www.hungarianarchaeology.hu

THE EXPANDING SCOPE OF LANDSCAPE ARCHAEOLOGY AND COMMUNITY ARCHAEOLOGY:
An investigation of the land use and field-systems of the medieval village of Kospa

András K. Németh[1] – József Laszlovszky[2] – Máté Szabó[3]
Hungarian Archaeology Vol. 15 (2026) Issue 1, pp. 66–76.

István Torma's study (Torma 1981) on the archaeological features of a wooded area near Tamási was published in 1981 and can rightly be regarded as one of the very first scholarly publications in Hungarian landscape archaeology. Although the article, which mapped and interpreted traces of medieval land use, did not yet employ the concept of landscape archaeology, this study brought Hungarian research into medieval field systems to the attention of the international research community. Over the past decade, research into this area with its unique characteristics has been continued by András K. Németh, taking into account ethnographic studies of the region as well. In this research, community archaeology played an important role alongside landscape archaeological methods. More recently, LiDAR surveying – a remote sensing method that maps the area with great precision – has yielded fundamentally new results in the investigation of a medieval village and its former vineyards and arable fields. In our study, alongside a review of the history of research, we provide an overview of the research potential of an area with unique characteristics and historical development.

Keywords: LiDAR survey, landscape archaeology, community archaeology, Middle Ages, Kospa

THE MEDIEVAL VILLAGE OF KOSPA AND ITS ARABLE FIELDS

The Gyulaj Forest lies in the north-western part of Tolna County, within the loess hills of Outer Somogy. Dozens of deserted medieval villages can be identified within its area, the sites of which have been reclaimed by nature following their abandonment. From the end of the 18th century, this region served as a closed, fenced-off hunting ground for the princely branch of the Esterházy family; since 1951, the area has been managed by Gyulaj Forestry and Hunting Ltd. and its legal predecessors. The forest is one of Hungary's less-visited large woodlands, with no tourist traffic within its boundaries, where more intensive archaeological research has only begun in recent decades.

The best-studied medieval site in the forest is that of the former village of Kospa. The place name of the deserted settlement has survived in the form of 'Kosba', and a vineyard hill on the outskirts of Tamási still bears its name today. Medieval Kospa lay south of Tamási, along a small stream flowing into the Koppány Brook from the south. The village first appears in written sources in 1321, but archaeological finds indicate it existed from the early 12th century at the latest. Its inhabitants were partly single-plot nobles, but in the decades prior to the Otto-

Fig. 1. Wall rubble and brick fragments at the site of the church

[1] Wosinsky Mór Museum; e-mail: knemetha@gmail.com
[2] Central European University; e-mail:laszlovj@ceu.edu
[3] ELTE RCH Institute of Archaeology; Hungarian National Museum National Archaeological Institute; e-mail: szabo.mate@htk.elte.hu

man occupation, a portion of the local estate also belonged to the Tamási castle estate. By 1543, the settlement consisted of only three households, and in 1545, it fell into Ottoman hands along with the surrounding area (Papp 2000, 155; K. Németh 2015b, 158–161). It was then permanently depopulated, as in the Ottoman censuses from 1546 onwards, it appears only in 1565 and 1570, listed as a wasteland (Dávid 1982, 282, 298). Today, the site of the village of Kospa is covered mainly by meadows; this is the only disturbed part of the village, so the locations of the former houses can no longer be identified on the surface.

Of the settlement's archaeological remains, the ruins of the church were the first to be noticed. Its remains are mentioned in several records from the 18th and 19th centuries. In 1722, a third of its tower was still standing; by around 1800, "its bricks had been dismantled to build cellars"; by 1830, "only its site can be shown". Its location is still marked today by a prominent, rubble-strewn mound and earth-covered wall ruins (*Fig. 1*). Its sanctuary had a semicircular apse; a tower was built on its western side, and a brick curtain wall can also be observed around it (K. Németh 2015a, 164).

Kospa's name became known throughout the country thanks to the medieval fields first mapped here in Hungary in the 1970s (*Fig. 2*). It is no coincidence that it was István Torma who first drew attention to these features. He grew up in Tamási, and as a child he used to graze cattle in this wooded area, where he first observed the lynchets – bank of earth or a terrace formed on the side of a hill, primarily resulting from long-term, agricultural practices like plowing (K. Németh 2021, 25). Decades later, as an archaeologist at the Institute of Archaeology of the Hungarian Academy of Sciences, he became one of the key experts in the ongoing topographical survey work there, and subsequently served as its professional director for a long period. The work and the first volumes of the Archaeological Topography of Hungary project covered the forested areas of Veszprém County, and it was here that attention was drawn to those kind of landscape features which we now investigate as phenomena that can be mapped and interpreted through landscape archaeology (Zatykó 2023, 14). Traces of the sites of deserted villages, the remains of former fields and various water management structures (dams, fish ponds) have been better preserved in these areas because the micro-topographical features were not destroyed by large-scale agriculture, centuries of ploughing. These methodological observations of archaeological topography led Gyula Nováki and György Sándorfi to observe and survey numerous fortified sites in similar forested regions across the country, and this is how the internationally renowned, emblematic site of archaeological research into Hungarian medieval villages, Sarvaly, was also identified (Holl & Parádi 1982). Here, too, they observed phenomena of medieval land use that differed fundamentally from the medieval fields at Tamási, just as Gyula Nováki identified an earthwork and fields near the medieval village of Szentmihály in Zala County (Nováki 1990).

The most comprehensive system described to date in Hungarian literature is illustrated by the example of the village of Kospa, where, on the steep hillside, ploughing was carried out for a long time in a single direction using heavy medieval ploughs due to the difficulty of turning them; the soil was turned downwards, resulting in low, 30–100 cm high terraces. Their length varies between 200 and 800 metres, whilst their width ranges from 5 to 50 metres. According to research to date, the village's arable fields lay north of the church in four larger clusters, covering a total area of almost 1 km². Another important observation made by István Torma was that the area had been covered by forest throughout the modern era, according to both written sources and historical maps; thus, the traces of arable land observed must date from an earlier period. Since these were connected and aligned with the site of the deserted village mentioned in medieval texts, it was possible to date the otherwise undatable arable terraces (Torma 1981; 2021). This was of particular significance because monographic studies of medieval Hungarian villages had already been published, but in these, archaeological research – particularly regarding land use – had only been mentioned as a theoretical possibility. István Szabó and Ferenc Maksay, who were the foremost researchers of these studies mainly based on historical sources, were aware of the potential of archaeology, primarily based on international examples (Szabó 1969; Maksay 1971). At the same time, the early and outstanding achievements of Hungarian settlement archaeology, which have already been included in the aforementioned monographs, have yielded results only in the study of settlement forms and vernacular architecture, but not yet in relation to land use. For all these reasons, the traces of medieval fields near Tamási have become one of

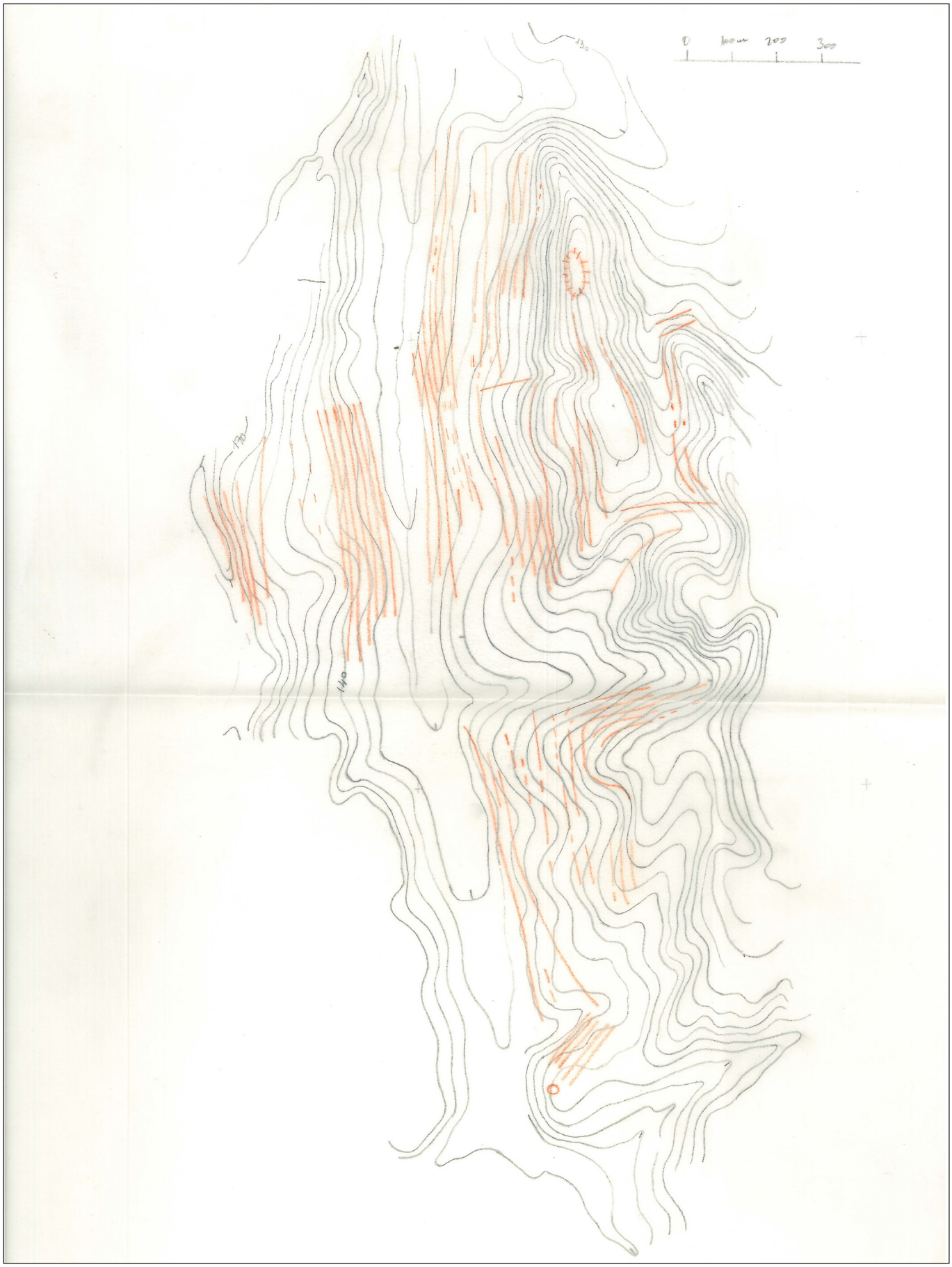

Fig. 2. Traces of fields (lynchets) identified and mapped by István Torma

the most frequently cited examples of Hungarian land-use systems from centuries past, both in Hungarian and foreign-language literature (Laszlovszky 1999; 2008, 4, Fig. 2; 2018, 105–106, Fig. 4.3; Zatykó 2011, 395, Fig. 7). It is therefore of paramount importance that new research has yielded further significant results, which can be partly attributed to the ever-expanding range of archaeological methods.

NEW LANDSCAPE ARCHAEOLOGICAL AND COMMUNITY ARCHAEOLOGICAL RESEARCH

András K. Németh began systematic archaeological research at the village site a decade ago, during which he observed further landscape archaeological traces – including additional fields – on the outskirts of Tamási and collected numerous finds (*Fig. 3*). His fieldwork was continuously supported by the management of Gyulaj Forestry and Hunting Ltd, and his colleagues assisted with field observations. On several occasions, volunteers from the Wosinsky Mór Museum also provided assistance with metal detector surveys.

Fig. 3. Lynchets – medieval fields (the two people are standing on separate terraces)

From the end of the 19th century, several accounts described the multi-branched tunnel system carved into the side of Likas Hill, situated on the hill opposite the church, which, according to folk tradition, was once used as a hiding place from the Tatars and Turks, and was also inhabited by hermits. Its floor plan was recorded as early as 1800 by Pál Farkas, the clerk of Tamási. Its entrance has since collapsed; today, only a narrow opening serves as a reminder of it (*Fig. 4*). The passage was last visited by a person about thirty years ago. At that time, the main underground passage was 18–20 metre long, 1.8 metre wide, and 16 metre high; two further side passages branched off from its sides in opposite directions. To the right of the main passage were four smaller chambers, and to the left a single larger chamber of approximately 12 m². During the excavation of the passage, the earth removed from inside the hill was spread out in front of the entrance, thus forming a huge terrace 8–10 metres wide and over 30 metres long. Numerous medieval archaeological finds were unearthed from the surface of the terrace. Based on the coins, the terrace was certainly inhabited by the second half of the 13th century, so the loess passage must have existed before this. It was probably originally a cellar, which was subsequently used as a hiding place after the destruction of the village during the Ottoman period (K. Németh 2020b, 174–188).

Fig. 4. The entrance to the hideout carved into Likas Hill today

Fig. 5. Traces of two cellar buildings side by side

Fig. 6. A medieval hollow way that has become a gully (on the left-hand side of the image) and a cellar building opening from it (on the right)

Fig. 7. A dried-up stream bed (in the foreground), with the traces of the fish pond built upon it

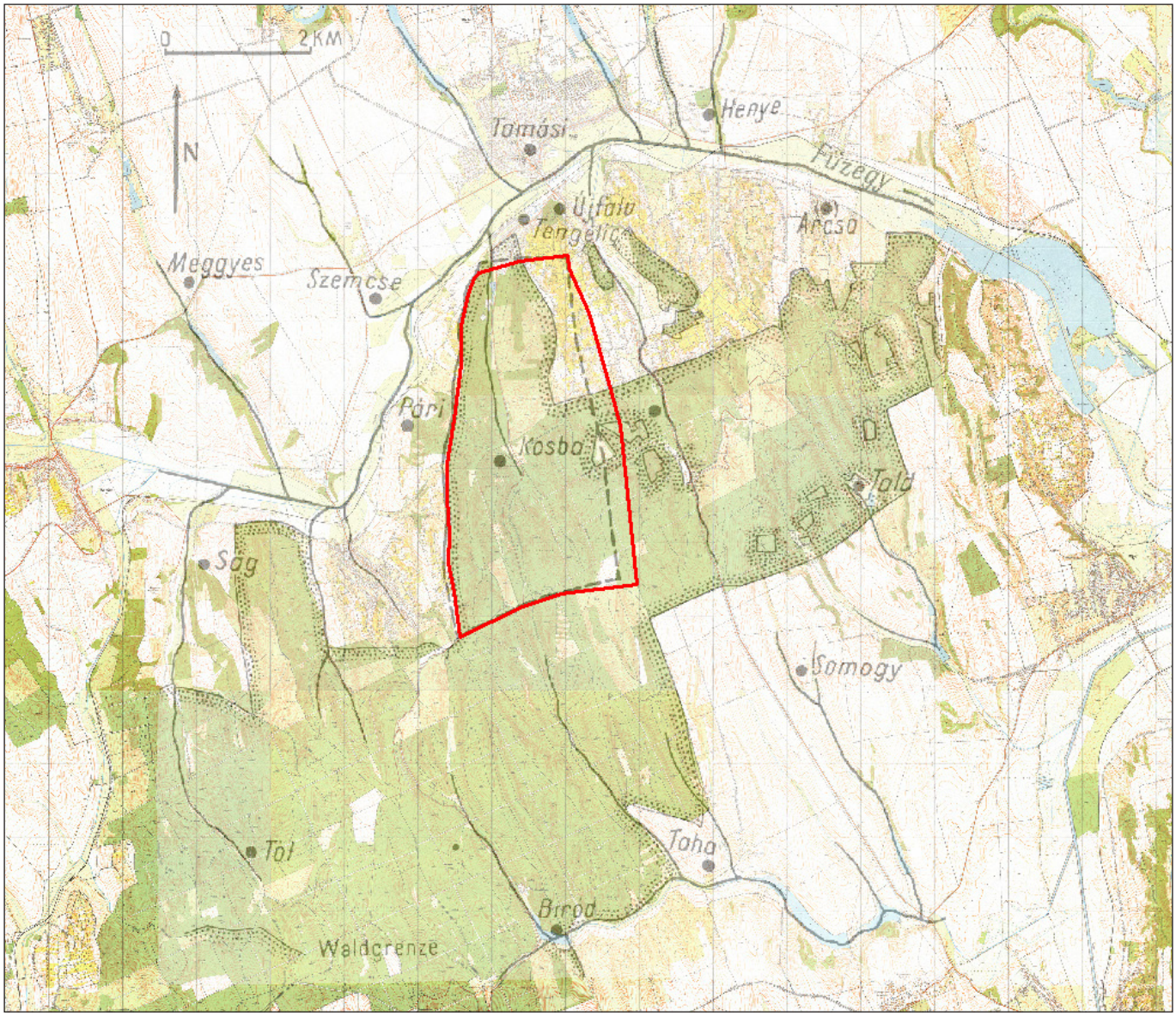

Fig. 8. The reconstructed area of the former Kospa and its wider surroundings (base map: Torma 1981, 274, Fig. 7)

Recently, traces of an entire 15th–16th-century vineyard have been discovered on the hills surrounding the village centre, indicated primarily by the sites of abandoned and collapsed cellar structures – once partially hewn into the hillside (*Fig. 5*) – and the terraces built in front of their entrances, at some fifty locations. One of the cellars was recently excavated as part of a community archaeology programme, with the help of museum staff, ethnography students from the University of Pécs, and local volunteers. The structure, consisting of a single room with an internal area of approximately 4–4.5 × 6.5 metres, had wattle-and-daub walls supported by posts, and two large pits, likely used for storing grain, had been dug into its floor. A hoard of coins hidden in 1541 was discovered at the base of one of the building's posts (K. Németh 2025).

On the outskirts of the medieval village, the remains of former roads (hollow ways) – now disused – can still be seen today, carved to varying degrees into the loess subsoil. It is particularly interesting that not only can the roads crossing the village boundary and leading to neighbouring villages be identified, but also the traces of smaller paths criss-crossing the vineyard hill and leading to individual cellars (*Fig. 6*) (K. Németh 2020a, 50–56).

Among the features of the medieval landscape, mention must be made of the traces of the dried-up bed of a fishpond established on a former tributary of a stream crossing the village site (*Fig. 7*), in the immediate vicinity of which, by widening the stream bed, two smaller ponds, likely used for fish farming, can also be identified.

Within the former boundaries of Kospa, there are not only archaeological remains but also features from the modern era (*Fig. 8*). This is where the brick fence surrounding the Esterházy family's 260-hectare game reserve stood; it was built from 1797 and demolished after the Second World War (Garády 1932, 93), and its immediate vicinity we observed traces of several kilns as well as quarry pits. Archaeological research into the latter is also possible, fitting into an approach in which landscape archaeology can also examine modern-era elements of land use, thereby extending the upper time limit of archaeological research (Laszlovszky 2023).

THE USE OF LIDAR SURVEYS IN THE STUDY OF THE MEDIEVAL VILLAGE AND ITS LAND-USE

In researching natural environment and historical landscapes, which are essential elements of landscape archaeology, detailed and accurate digital elevation models (DEM) created by aerial laser surveys (Airborne LiDAR, ALS – Airborne Laser Scanning) are of crucial importance, which archaeology has been applying for several decades (Crutchley 2010; Opitz & Cowley 2013; Vinci *et al.* 2025). Geoinformatic analyses facilitating DEM-based observation of macro- and micro-topographic features preserved in the landscape soon came to include applications specifically designed for archaeological purposes (Kokalj & Hesse 2017; Kokalj 2025). With the help of these methods, phenomena barely perceptible to the naked eye or difficult to interpret have become investigable in a manner and with a level of detail never seen before; and thanks to technological advances, it is now also possible to use the generated data in the field in real time with the aid of mobile GIS applications. This type of surveys of medieval fortifications, monasteries, villages, and the former road network were carried out at a very early stage even in forested areas of Central Europe, enabling complex analysis (Doneus, Briese & Kühtreiber 2008).

The primary use of digital elevation models generated from airborne laser surveys is found in the performance of basic public services; thus, these data are already available in many countries around the world, in many places even in freely accessible form (see Vinci *et al.* 2025). In Hungary, there is as yet no ALS terrain model covering the entire country that is available as basic government data; however, surveys of various types and scopes (conducted from aeroplanes, helicopters or drones) have been carried out by the private sector or for research purposes. The ALS-DEM model covering the largest area available in Hungary is held by EnviMap – Envirosense Hungary Ltd., whilst surveys covering larger areas have also been carried out specifically for archaeological purposes in recent decades (Bertók & Gáti 2014, 14–15; Belényesy 2023). Despite the availability of such data, its use in archaeology has so far been limited in Hungary due to the high production costs.

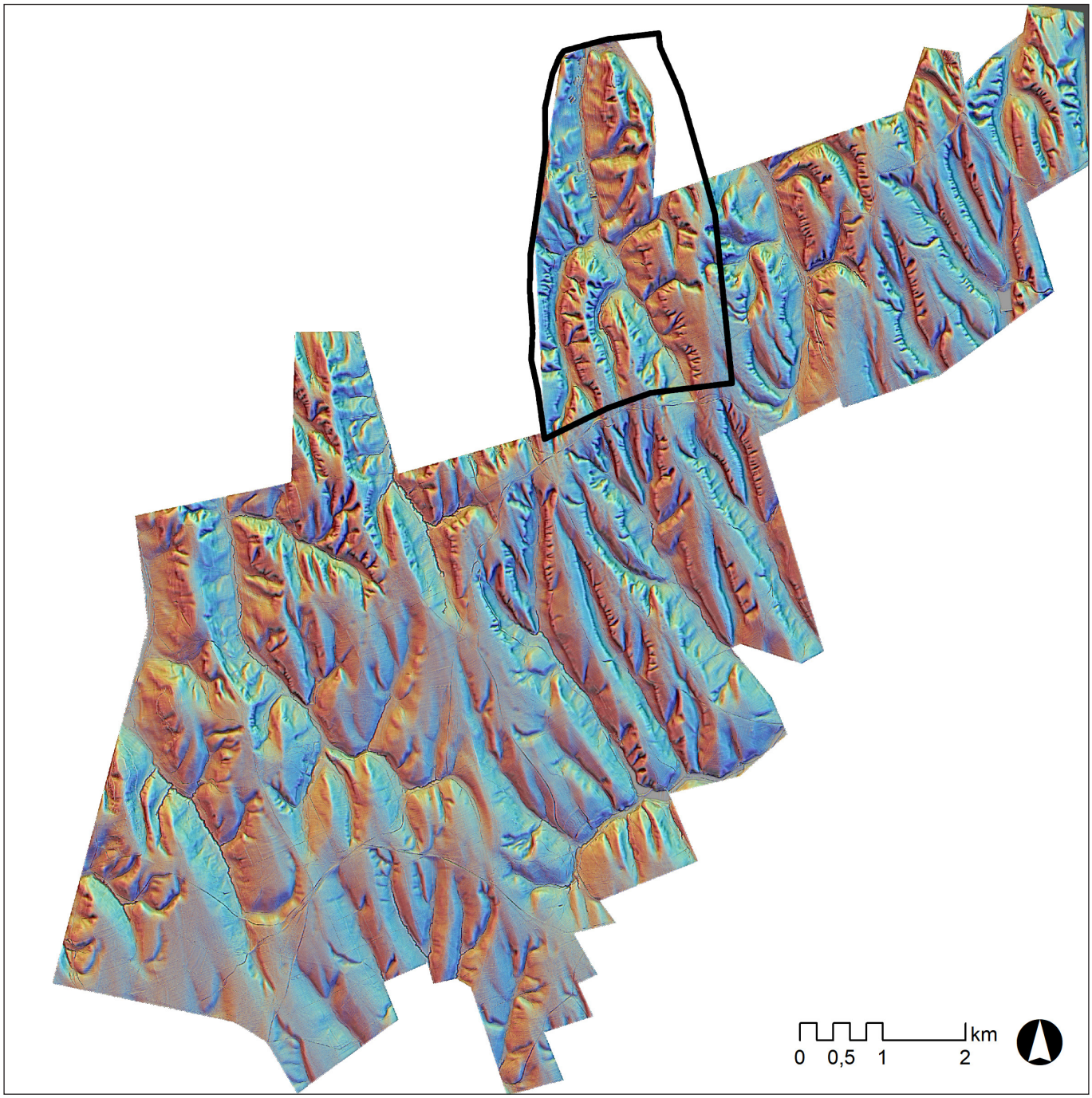

Fig. 9. Microrelief visualisation of the ALS cross-section prepared for archaeological research in the Gyulaj Forest (Ve5×; Multi-HS D16 H35 + SLRM R20). The former boundary of the village of Kospa is marked by a black line (source: EnviMap – Envirosense Ltd, processing: Pazirik Studio, Máté Szabó)

The digital elevation model covering the Gyulaj Forest was made available for landscape archaeological purposes thanks to the collaboration between EnviMap – Envirosense Hungary Ltd and Pazirik Studio. The micro-topographic visualisation of the base data, covering an area of approximately 75 km² and stripped of vegetation and buildings, was carried out using the freely available Relief Visualisation Toolbox (RVT). Taking into account the topographical characteristics of the hilly environment, as well as the findings from archaeological and drone-ALS[4] surveys, we worked with a fivefold relief enhancement to ensure the inter-

[4] In February 2025, János Mészáros (HUN-REN Centre for Agricultural Research, Institute for Soil Sciences, Department of Soil Mapping and Environmental Informatics) carried out a UAV LiDAR survey of the vineyard hills in the medieval village of Kospa; the data is currently being processed.

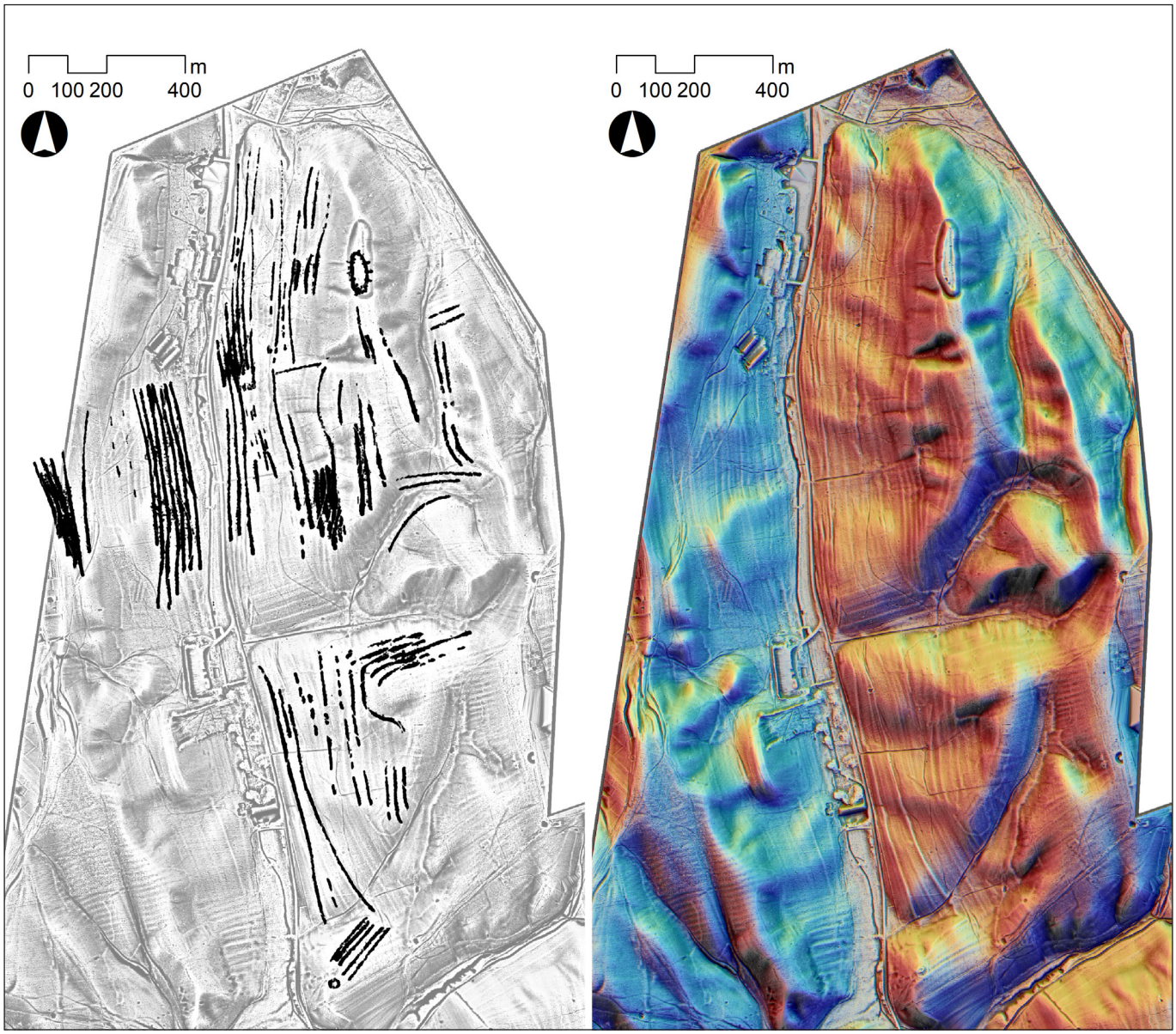

Fig. 10. The location of the lynchets (terraces) surveyed by István Torma in the northern part of the village of Kospa (on the left, marked by black lines), compared with the micro-relief visualisation of the ALS data (on the right): Ve5×, Multi-HS D16 H35 + Prismatic Openness + SLRM R20 + SVF-A R10 D16 A315 Allow Nstrong (source: EnviMap – Envirosense Hungary Ltd. processing: Pazirik Studio, Máté Szabó)

pretability of barely perceptible topographical variations, and examined the overlapping phenomena of the archaeological and historical landscape through the combined application of various visualisation analyses.

The 1-metre ground resolution of the airborne laser survey provided a suitable basis for landscape-scale analysis (e.g., roads, fields, furlongs, field-systems) and for observing smaller features (e.g., wells, cellars, building remains). Our analyses show that, in addition to the identification of archaeological remains and land-use features, traces of modern game and forest management can also be found in the area.

Although a full evaluation of the study area, particularly the field verification of these features – which András K. Németh has been carrying out continuously for several years – much more time and resources are required, it can already be stated that, thanks to the ALS data, not only certain archaeological or historical traces can be detected in the Gyulaj Forest but also the millennia-old, layered remains of a relic landscape of exceptional value hidden here (*Fig. 9*). The medieval field boundaries and landscape features of land use that can still be identified today cover a much larger area than István Torma was able to survey in the 1970s (*Fig. 10*). This makes it possible to investigate a significant portion of the entire medieval village

and its field, and interpret it in terms of land use. From a methodological perspective, therefore, beyond the precise documentation of individual phenomena, we must place primary emphasis on the characterisation of the archaeological and historical landscape, which, in addition to defining research directions, can also assist in sustainable and conservation-oriented forest management.

ACKNOWLEDGEMENTS

We thank EnviMap -- Envirosense Hungary Ltd for providing us with the LiDAR survey of the Gyulaj Forest, and Pazirik Studio for their assistance with data processing. We are also grateful to Gyulaj Forestry and Hunting Ltd. for making this research possible and for its ongoing support.

References

Belényesy, K. (2023). Spaces and shapes. Possibilities of the research of historical landscapes with LiDAR and ALS surveys. *Antaeus. Communicationes ex Instituto Archaeologico* 39, 255–278. https://doi.org/10.62149/Antaeus.39.2023_07

Bertók, G. & Gáti, Cs. (2014). *Régi idők – új módszerek (Old times – nem methods)*. Budapest: Archaeolingua.

Crutchley, S. (2010). *Using airborne lidar in archaeological survey: The light fantastic.* Swindon: English Heritage.

Dávid, G. (1982). *A Simontornyai szandzsák a 16. században [The Sanjak of Simontornya in the 16th Century]*. Budapest: Akadémiai Kiadó.

Doneus, D., Briese, Ch. & Kühtreiber, T. (2008). Flugzeuggetragenes Laserscanning als Werkzeug der archäologischen Kulturlandschaftsforschung das Fallbeispiel »Wüste« bei Mannersdorf am Leithagebirge, Niederösterreich. *Archäologisches Korrespondenzblatt* 38:1, 137–156.

Garády, S. (1932). Mátyás király budai vadaskertje [King Mathias's Game Reserve in Buda]. *História* V:1–4 (*Pestbudai emléklapok. A História melléklete)*, 88–94.

Holl, I. & Parádi, N. (1982). *Das mittelalterliche Dorf Sarvaly.* Fontes Archaeologici Hungariae. Budapest: Akadémiai Kiadó.

K. Németh, A. (2015a). *A középkori Tolna megye templomai (The medieval churches of Tolna county)*. Szekszárd: Wosinsky Mór Megyei Múzeum.

K. Németh, A. (2015b). Tamási és határa a középkorban (Tamási and its town borders in the Middle Ages [11–16. century]). In Torma, I. (szerk.), *Tanulmányok Tamási történetéből. Őskor, római kor, középkor, törökkor.* Tamási: Könnyü László Városi Könyvtár és Helytörténeti Gyűjtemény – Tamási Helytörténeti Alapítvány, 97–184.

K. Németh, A. (2020a). Tolna megye középkori útjainak régészeti kutatása [Archaeological research of the medieval roads of Tolna County]. In K. Németh, A. & Máté, G., *„Horhosok, puszták, búvólikak". Tájtörténeti tanulmányok a 16–18. századi Dél-Dunántúlról.* Studia Ethnologica Hungarica XX. Pécs–Budapest: PTE Néprajz–Kulturális Antropológia Tanszék – L'Harmattan Kiadó, 33–64.

K. Németh, A. (2020b). A tamási Likas-hegy *és* társai. Löszbe vájt, közép- és török kori búvólyukak Külső-Somogyban és környékén [Likas Hill in Tamási and its counterparts. Hiding places carved into loess from the Middle Ages and the Ottoman period in Outer Somogy and the surrounding area]. In K. Németh, A. & Máté, G., *„Horhosok, puszták, búvólikak". Tájtörténeti tanulmányok a 16–18. századi Dél-Dunántúlról.* Studia Ethnologica Hungarica XX. Pécs–Budapest: PTE Néprajz–Kulturális Antropológia Tanszék – L'Harmattan Kiadó, 169–211.

K. Németh, A. (2021). Torma István és Tamási [István Torma and Tamási]. In Torma, I., *Emlékezések és írások Tamásiról.* Tamási Örökség VIII. Szerk. K. Németh, A. Tamási: Tamási Művelődési Központ és Könnyü László Könyvtár, 11–40.

K. Németh, A. (2025). Excavation of a Late Medieval Vineyard Cellar in the Tamási Forest. *Hungarian Archaeology* 14:2, 23–32. http://doi.org/10.36338/ha.2025.2.3

Kokalj, Ž. (2025). Standardizing visualization in ancient Maya lidar research: techniques, challenges and recommendations. *Archaeological Prospection* 32, 967–988. https://doi.org/10.1002/arp.70002

Kokalj, Ž. & Hesse, R. (2017). *Airborne laser scanning raster data visualization: A Guide to Good Practice.* Prostor, kraj, čas 14. Ljubljana: Založba ZRC.

Laszlovszky, J. (1999). Field Sytems in Medieval Hungary. In Nagy, B. & Sebők, M. (eds.) *...The Man of Many Devices, Who Wandered Full Many Ways… Festschrift in Honor of János M. Bak.* Budapest: CEU Press, 432–444.

Laszlovszky, J. (2008). Földművelés a késő középkori Magyarországon [Agriculture in Late Medieval Hungary]. In Kubinyi, A. – Laszlovszky, J. – Szabó, P. (szerk.), *Gazdaság és gazdálkodás a középkori Magyarországon: gazdaságtörténet, anyagi kultúra, régészet.* Budapest: Martin Opitz Kiadó, 49–82.

Laszlovszky, J. (2018). Agriculture in Medieval Hungary. In Laszlovszky, J., Nagy, B., Szabó, P. & Vadas, A. (eds.) *The Economy of Medieval Hungary.* Leiden–Boston: Brill, 81–112.

Laszlovszky, J. (2023). Archaeology of the Modern Era and Contemporary Archaeology in Hungary? *Hungarian Archaeology* 12:1, 37–47. https://doi.org/10.36338/ha.2023.1.6

Maksay, F. (1971). *A magyar falu középkori településrendje* [*The Medieval Settlement Pattern of the Hungarian Village*]. Budapest: Akadémiai Kiadó.

Nováki, Gy. (1990). A középkori Szentmihály falu földvára és szántóföldjei (Der Burgwall und die Äcker des mittelalterlichen Dorfes Szentmihály). *Zalai Múzeum* 2, 209–219.

Opitz, R. S. & Cowley, D. C. (eds.) (2013). *Interpreting archaeological topography. Airborne laser scenning, 3D data and ground observation.* Occasional Publications of the Aerial Archaeology Research Group No. 5. Oxford: Oxbow Books.

Papp, I. (2000). *A Tamási járás évszázadai [The centuries of the Tamási District].* Sajtó alá rendezte és a bevezetőt írta Torma I. Tamási: Tamási Város Önkormányzata.

Szabó, I. (1969). *A középkori magyar falu [The Medieval Hungarian Village].* Budapest: Akadémiai Kiadó.

Torma, I. (1981). Mittelalterliche Ackerfeld-Spuren im Wald von Tamási (Komitat Tolna). *Acta Archaeologica Academiae Scientiarum Hungaricae* 33, 245–256.

Torma, I. (2021). Középkori szántóföldmaradványok a tamási erdőben [Traces of medieval fields in the forest of Tamási]. In Torma, I., *Emlékezések és írások Tamásiról.* Tamási Örökség VIII. Szerk. K. Németh, A. Tamási: Tamási Művelődési Központ és Könnyü László Könyvtár, 121–126.

Vinci, G., Vanzani, F., Fontana, A. & Campana, S. (2025). LiDAR applications in archaeology: a systematic review. *Archaeological Prospection* 32, 81–101. https://doi.org/10.1002/arp.1931

Zatykó, Cs. (2011). Integrált kutatások: a tájrégészet [Integrated research: landscape archaeology]. In Gróf, P., Horváth, F., Kulcsár, V., F. Romhányi, B., Tari, E. & T. Biró, K. (szerk.), *Régészeti kézikönyv.* Budapest: Magyar Régész Szövetség, 388–402.

Zatykó, Cs. (2023). Tájrégészet: tudományterület, módszer, szemlélet vagy divat? (Landscape Archaeology: A Discipline, a Method, an Approach or a Trend?). In Tóth F., M. & Szilas, G. (szerk.), *ΜΩΜΟΣ XI. Őskoros Kutatók Összejövetele.* Budapest: Budapesti Történeti Múzeum – ELTE BTK Régészettudományi Intézet – Őrégészeti Társaság, 11–21.