

SETTLEMENT FORMS IN THE TERRITORY OF MEDIEVAL BÁCS AND BODROG COUNTY

*István Pánya**

Keywords: medieval settlement network, settlement forms, GIS, deserted settlement, row settlement, remote sensing

Cuvinte cheie: rețea de așezări medievale, tipuri de așezări, GIS, așezare pustiită, așezare deschisă/ răslețită, teledetecție

Introduction

The Danube-Tisza Interfluvium was one of the least urbanized regions of the Kingdom of Hungary in the Middle Ages where one could find hardly any walled cities (let alone Szeged in Csongrád County). However, the gap between villages and cities was filled by many market towns/boroughs of different sizes and urban functions. Some of them could not be much bigger than a large village, and only one or two features (fair, ferry, estate center, etc.) made them different from the surrounding settlements. On the other hand, some had become increasingly urban (roles, features, appearance, etc.). Besides the few market towns, the villages accounted for the largest share of the settlement population. In medieval Bács County, there were about 316 villages and 16 market towns, and in Bodrog County there were 213 villages and 12 market towns¹. In the area of app. 8,000 square kilometers, this meant roughly 550 settlements. Partly because of the destruction of the (written and material) sources and partly because of the lack of in-depth academic research, we had very little data on the location, morphology, and spatial structure of these more than half a thousand settlements until 2010.

Around 2010, the idea of thorough research of landscape history and settlement geography of the Danube-Tisza Interfluvium Region mainly based on field research was born. In the beginning it became obvious that the field observations alone (and the databases of the historical-geographical repositories published earlier) are not sufficient enough to draw at least a schematic

* Kecskeméti Katona József Múzeum, Kecskemét Bethlen Boulevard 1., e-mail: panyaistvan@gmail.com

¹ Bács: Csánki 1894, 141, 168; Bodrog: Csánki 1894, 192, 212.

picture of the former settlement network and the localities that existed in it. In the words of geographer Ferenc Fodor at the beginning of the 20th century: „... Reconstruction the past state of the landscape... can only partially rely on nature itself as a source of data, but it also needs old historical sources, diploma and map data”². In the spirit of these ideas, the intensive collection of data on the medieval administrative units that once existed in the Danube-Tisza Interfluvium started interdisciplinary. Nevertheless, the quotation from Ferenc Fodor should only be supplemented with the fact that, besides the sources mentioned by him, the examination of image (remote sensing) data is also essential for better results. The method was used in practice first in Solt County and later in Bodrog County, while an in-depth study of Bács County is currently underway³. The method has been refined a lot in the last 10 years since its inception because of the involvement of the methods and results of the co-sciences, the exploration of settlements, and the spatial evaluation of their data that has become more and more efficient.

The research of the southern part of the Danube-Tisza Interfluvium raised several questions that need to be answered:

- With what efficiency can the available digitized historical sources (medieval diplomas, maps) and modern methods (GIS, remote sensing) be used for the reconstruction of the 14–16th century settlement network of a region which now belongs to two countries (in this case Hungary and Serbia)?

- Does remote sensing make it possible, based on preliminary field surveys, to identify traces of medieval settlements remotely in aerial and satellite images over a large area without field detection?

- What factors can influence the remote sensing of traces of medieval settlements?

- In the case of determining the location of the settlements, is it possible to determine their internal structure, main characteristics, or to classify them among the main types of settlements determined by geography?

In this paper, I intend to formulate answers to the questions above based on the experience of research conducted in recent years. Due to size constraints, it is not possible to present all settlements found in the two (Bács and Bodrog) counties in details. Through a small selection, I try to illustrate the possibilities of a complex research method based on GIS, geography, archeology, ethnography, and history. Most of the selected settlements existed until the 16th-century Turkish expansion, and their area is still under intensive agricultural cultivation. I do not cover the places that have been inhabited continuously with more or

² Fodor 1929, 131.

³ Pánya 2017a, 91; Pánya 2017b, 84.

less interruptions since the Middle Ages (*Baja, Bács/ Bač, Czoborszentmihály/ Sombor, Apáti/ Apatin, Futak/ Futog*). The area of these settlements is still mostly built-in; therefore, the examination of their settlement structure would require more in-depth settlement archeological research (primarily excavations).

Research history

Tibor Mendöl was the first in Hungary who dealt with the shape and structure of settlements, taking the approach of the German school of settlement geography⁴. In his summary work entitled *General Settlement Geography (Általános településföldrajz)*, published in 1963, he presented the basic types of the settlements of the Carpathian Basin, including the so-called row or street villages which consist of rows of ribbon plots. According to the research of István Szabó based on medieval sources, 60–80% of the settlements of the medieval Kingdom of Hungary were row/street villages, and the rest were agglomerated⁵. In 1971, Ferenc Maksay published his monograph on the settlement order of medieval Hungarian villages. In this, he also considered the row/street settlement structure to be the most common. However, compared to the number ratios outlined by István Szabó, he estimated the number of settlements with an agglomerated structure to be much smaller⁶. He outlined his findings based on data preserved in medieval diplomas, which he paralleled with 18th-century maps, including representations from the First Military Survey. According to his observations, the 18th-century plan of the settlements, which can be continuous, essentially preserved the medieval conditions. He pointed out, however, that this was mostly true of the western, northwestern, and northeastern parts of the Carpathian Basin, where the settlement network had suffered little or no destruction during the Turkish occupation in the 16th century. However, in the Great Plain, where the row/street settlement form may also have been dominant, due to the large-scale settlement destruction, this can only be inferred from the sporadic archaeological observations and the medieval diplomas left to us.

Ethnographer János Báth also summarized the main types of settlements in the Carpathian Basin. Referring to the work of his predecessors, he presented the main versions of the row/street settlements and drew attention to the nomenclature problem observed in Hungarian literature. In various research, the row settlements were also called street/row villages, row settlements⁷. In the present study, we will use the name of the row settlement.

⁴ Mendöl 1963, 253; Báth 1996, 128–129; Csapó 2016, 17–26.

⁵ Szabó 1969, 139; Báth 1996, 129.

⁶ Pálóczi 2006, 357; Maksay 1971, 90–93.

⁷ Báth 1996, 128.

The listed research was based on the conclusions drawn from the examination of continuous settlements which inhabited since the Middle Ages, and a certain level of study of the medieval source material. András Pálóczi Horváth published a paper on the morphological picture of the deserted late medieval villages in 2006, referring to archeological data. In this study, he presented the major research launched to explore the location and structure of settlements in the period from the beginning of the 20th century to the end of the century.⁸ It turns out that most of the settlement structure data of the Great Plain became known mainly based on field surveys and excavations with a smaller or larger surface.

In the period since the publication of the study of András Pálóczi Horváth, some large-scale complex archaeological and historical-geographical researches have taken place in Hungary, which resulted in more or less settlement structure data⁹. Máté Stibrányi examined the medieval church sites of Fejér County from an historio-archeological and historio-geographical point of view, using GIS and statistical methods, among others¹⁰. He used numerous diplomas from the material of the Hungarian National Archives to identify the sites¹¹. Even though he drew attention to the medieval diplomas containing the boundary descriptions and the division of estates, in-depth source exploration, mass translation of the diplomas and spatial evaluation of its data did not take place¹². In the database attached to the dissertation, we get valuable archaeological and historical data primarily about churches, the structure of the medieval settlements surrounding them is discussed only in a few cases¹³. Archeologist Szabolcs Rosta carried out targeted field surveys in the central part of the Danube-Tisza Interfluve, in the so-called Sand Ridge. He identified the location of several previously unknown (Cuman) settlements by fieldwork, and in several cases, he observed a long, linear layout in the intensively cultivated fields¹⁴. His work is considered filling a gap, as he was the first to use the 18–19th century manuscript maps for finding church sites and drawing a network of settlements in the Danube-Tisza Interfluve¹⁵. However, in the course of his work, in-depth

⁸ Pálóczi 2006, 357–390.

⁹ Decs – Ete market town, HU see Miklós–Vízi 2003, 399.; Mohi market town, HU see Pusztai 2003, 407; Pusztai 2010, 113.

¹⁰ Stibrányi 2015, 139.

¹¹ Stibrányi 2015, 24–35.

¹² Stibrányi 2015, 27.

¹³ Stibrányi 2015, 41, 64.

¹⁴ Rosta 2014, 138, 152, 258.

¹⁵ Rosta 2014, 14, It is important to note that the manuscript maps were used by several researchers outside the Danube-Tisza area. See in Tolna County, HU K. Németh 2015, Békés County, HU Szatmári 2005

source exploration and critical analysis of medieval documents did not take place, with a few exceptions. This can be partly explained because very few medieval diplomas of the medieval accommodation area of the Cumans have survived. However, most of the Danube-Tisza area belonged to Bodrog, Solt, Pest, Csongrád, and Külső-Szolnok Counties, of which many more medieval written sources have survived. Edit Sárosi examined the settlements of the Sand Ridge between the Danube and the Tisza with Cuman and Hungarian populations, including the market town of Kecskemét in her doctoral dissertation¹⁶. She dealt with the agglomerated internal structure of Kecskemét in detail.

Archaeologist András K. Németh examined the medieval church sites of Tolna county, drawing a very accurate picture of the county's settlement network. In his book, however, he drew attention to the fact that the research, which was mainly based on fieldwork and historical and literature sources, yielded little settlement structure and morphological data¹⁷. Finally, it is worth mentioning the studies of László Szekeres covering the Northeastern Bácska Region (today part of Serbia), which provide a sizeable amount of topographical knowledge for historians and archaeologists. In his database, Szekeres dealt with the geographical position of the medieval settlements he explored and did not cover their structure. This is partly because the sites should have been surveyed with contemporary tools and excavations. His work covered the northern part of the former Bács County and the southern part of Csongrád County, so there is no overlap with the field of the research reported here. However, his results are outstanding from the point of view of the research of the medieval settlement network of Bácska, as the possible future field researches and the remote sensing examinations will be facilitated¹⁸.

Archaeological excavations in Bács-Kiskun County, in the northern part of the Danube-Tisza, in recent years and decades, have confirmed Maksay's claim, in several cases with indirect and direct evidence. András Pálóczi Horváth excavated a loose-structured row (Cuman) settlement on Szentkirály near Kecskemét¹⁹. At the turn of 2021–2022, a volume presenting the medieval settlement network of Nagykunság (eastern Jász-Nagykun-Szolnok County, Hungary) will be published, in which it combines the experiences of the Danube-Tisza Interfluvium with the observations of Nagykunság²⁰. Like András K. Németh Pálóczi used a very large medieval source material, which, supplemented with a field survey, formed an extremely accurate picture of the settlements of the

¹⁶ Sárosi 2013, 117–152.

¹⁷ Németh 2015, 9, 210.

¹⁸ Szekeres 1982, 1–77.

¹⁹ Pálóczi 2006, 365.

²⁰ Pálóczi 2021, 136.

region. In his work, he deals with the morphology of villages known from excavation and fieldwork in the Nagykunság area. He drew attention to the fact that the settlement forms of the Cumans, who are mainly engaged in animal husbandry, differ from the tighter built-in versions of the row settlement. In his book, he calls this a *Cuman-type livestock-farmer settlement* (Hungarian *kunsági típusú állattartó település*), which is also widespread in the Nagykunság (east of the Tisza), and in the Kiskunság (in the center of the Danube-Tisza Interfluve). The excavations of Gábor Wilhelm are of special archaeological significance. Wilhelm examined the medieval market town of Solt in the center of today's Solt, and to the west of it, at the ferry between Solt and Dunaföldvár, he excavated significant details of the medieval Révfalu. In both cases, he observed the row settlement structure outlined by Maksay and Szabó²¹.

Finally, we need to look at the historical and archeological literature in Serbia. Several authors have dealt with the medieval history of Bácska/Backa, but the history and settlement geography of the former Counties of Bács, Bodrog, and Csongrád has not been studied²². There was also a lack of detailed data repositories similar to the works of Dezső Csánki or György Györffy. Serbian historians are primarily focused on the territories of the medieval Serbian and Bosnian states, and to a lesser degree on Szerém/Srem County and the Banat Region (medieval Temes and Torontál Counties). Although there are numerous historical-geographical studies and articles on certain areas²³. The Institute of History in Belgrade applied for the project called Mapping Medieval Serbia, which should create a digital database of all medieval settlements. This project is currently in the planning phase and is expected to start in the future²⁴.

The situation is similar from an archaeological point of view. Many archeological research were carried out in the area of Bácska/ Backa, which affected medieval settlements. However, there was a lack of research that would have examined the spatial location and morphological characteristics of the former medieval settlements at the micro-regional or county level²⁵.

In summary, it can be said that it is generally accepted by archaeological, historical, and geographical researchers that most of the settlements of the Kingdom of Hungary may have been row structured. However, this can only be verified from the modern settlement layout in the settlements of the western, northern, and eastern parts of the Carpathian Basin, inhabited since the Middle Ages. In the central and southern part of the Carpathian Basin, which was

²¹ KJM RA 2015.5157.

²² Krstić 2014.

²³ Mišić 2010; Krstić 2007.

²⁴ Special thanks to dr. Aleksandar Krstić for information about the future project.

²⁵ Stanojev 1996; Nikolić 2013; Nikolić 2014.

destroyed during the Turkish occupation, we know the settlement structure data mainly from the sporadically preserved documents and the archaeological excavations. From the results of the large-scale research having been carried out in Hungary in recent years, it is clear that it is not possible to successfully reconstruct the location and structure of settlements with a purely settlement-geographical, ethnographic, or historical approach. To get a schematic picture of the villages and market towns that once existed, we need to conduct complex research using the results and methods of several disciplines. In this process, not only archeology (fieldwork, metal detecting, aerial archeology, non-destructive research methods), but historical science (medieval, early modern, and modern sources) and also geography (GIS, remote sensing) play an important role.

Morphology of late medieval settlements

In the period following the Mongol invasion (1241), serious social changes took place in the Kingdom of Hungary. The administration was transformed, the former royal counties were slowly changed into noble counties²⁶. The former castle serf system disintegrated, and unified serfdom was formed by the mid-14th century. The serfs were essentially free, they could move from one settlement to another. They had an independent plot, but the owner of their land or plot was the landlord of the time. The basic unit of agricultural production and landlord's salaries in the new social system became the serf plots (*toft* in English), and various taxes were collected on this basis. The emerging plot system also largely defined the image of the settlements, that is, it made them more orderly²⁷. In the late Middle Ages, the most common type of settlement in the Kingdom of Hungary, as discussed above, became the row/street type (French *village-rue*, German *Strassendorf*)²⁸. Its plots were arranged in a row, one or more streets (Latin *ordo*, *linea*, *platea*, *contrata*) and often aligned with some natural formation (stream, hillside, etc.). With the growth of the settlement, the initial main street could be crossed by another street, so the so-called 'cross-street settlement' was created²⁹. The plots were mostly narrow and long. At the end of these, near the street, stood the residential houses and various other buildings (sheds, outbuildings, stables, etc.)³⁰.

Several variants of row settlements have evolved over time [Fig. 1]. One of

²⁶ Piti, C. Tóth, Neumann 2010, 17.

²⁷ Pálóczi 2006, 358.

²⁸ Research has been conducted throughout Europe on the structure of medieval settlements. See Göransson 1978; Krenzlin 1978; Roberts 1978; Roberts 1985; Roberts 1996; Roberts 2006.

²⁹ Bárh 1996, 128, Erre jól példa a középkori Iratos falu (Nagyiratos/*Iratoşu RO*), lásd Hegyi *et alii* 2020, 18.

³⁰ Bárh 1996, 128.

the most common versions is the so-called '*spindle structured row settlement*' (French Village ovale, German *Angersdorf*, Hungarian *Orsós falu*), whose strip plots enclose an oval area (German *Anger*, English *green*). The plots mostly had only a garden, the fields were separated from the interior of the village. The space surrounded by the plots was originally a public area where the cattle could be kept at night. The church of the settlement was often built here, around which the markets and fairs were held³¹.

It was a common form of settlement the so-called '*road settlement*' (German *Strassendorf*), which usually consisted of a single street and one or two rows of plots/houses next to it. Routes connecting localities and regions have often passed through these, and they are mentioned in the literature as '*roadside settlements*' (Hungarian *útmenti falu*)³².

A special group of settlements with strip plots is the so-called '*riverside settlements*', where the location of the plots is determined by the stream and river flowing through the locality. The main street of such settlements can also be a country road, or the plots can be located on one or both sides of the water-course, depending on the topography³³.

It is worth mentioning the agglomerated village, which is also a very ancient type of settlement, and already existed in the period before feudalism, but their number was less than the type of row settlements. Its interior has an irregular layout, its houses and plots are in an irregular mess and shape, its streets are short and zigzagged. Agglomerated villages could have been formed in several ways, for example by merging the parts of a scattered settlement and forming them into a cluster. It may also have been formed during the growth of row settlements when the former regular street and plot order disintegrated because of the new movers³⁴.

The internal units of the settlements were the plots (toft and croft in English literature)³⁵. The size of a whole plot during the Middle Ages in the Kingdom of Hungary was 1 royal acre, ie 12 fathoms (37.51 m) wide and 72 fathoms (225.07 m) long³⁶. It was a narrow and elongated plot of land that opened onto the street of the settlement, but there were also wider and shorter versions. During the excavation of the village of Szentkirály, archaeologist András Pálóczi

³¹ Báth 1996, 129.

³² Báth 1996, 129.

³³ Báth 1996, 130.

³⁴ Maksay 1971, 96.

³⁵ Sárosi 2013, 59–61.

³⁶ királyi öl (Hungarian)/fathom (English)/ Stânjen (Romanian)=3.186 m, 1 square fathom=3,596 m², 1 acre (English)/hold (Hungarian)=864 sq. fathom=0,88 ha=8770 m² see Bogdán-Maksay 1967, 109. and MNL OL E 117 Fasc. 114. No. 1.

Horváth observed 24 m wide and 36 m long plots (also 1 acre in size). The serf plots were divided during sales and inheritances, so there was 7–8 fathom, and narrower half and quarter plots with a width of 3.5 fathoms³⁷. The plots were mostly subdivided lengthwise, perpendicular to the street so that each plot had access to the village street and the gardens at the back. If the plots were divided crosswise, the street and the garden could be accessed through an alley split from the adjacent plot. The internal order of the settlement was broken by such divisions, and groups of plots were developed in the former linear/row system³⁸.

Sample areas

Medieval Bács and Bodrog Counties were in the southern part of the Kingdom of Hungary, in the Danube-Tisza Interfluvium Region. [Fig. 2.]. The 15th century Bodrog County existed in the area between today's settlements Nemesnádudvar (HU) – Bácsalmás (HU) – Nemesmilitics (Svetožar Miletić, SRB) – Apatin (Apatin, SRB) – Baja (HU)³⁹. The 15th-century Bács County was the south-southeastern neighbor of Bodrog County. From the north it was bordered with Bodrog county by Szond (Sonta, SRB) – Pacsér (Pačir, SRB), and between Pacsér and Bácsföldvár (Bačko Gradište, SRB) with Csongrád County. From Bácsföldvár to Titel (Titel, SRB) it was bordered on the east by the Tisza, from Titel to Szond it was separated from the surrounding counties (Valkó, Szerém) by the Danube⁴⁰.

The history of these two neighboring counties from the Árpadian era to the Turkish era was essentially the same. The first, significant destruction of the settlement network took place during the Mongol invasion in the mid-13th century, during which 90–100% destruction can be expected in Bodrog County. Based on historical sources, György Györffy outlined the devastation of around 40–60% in Bács County⁴¹.

Bács and Bodrog Counties revived in the early 14th century. By the middle of the 15th, a total of more than 500 settlements had developed in the two counties, thus becoming the medium-populated and medium developed counties of the Carpathian Basin⁴². The densest settlement network existed in both counties on the plain along the Danube. Based on written sources analysis, field surveys, and remote sensing research, we know that villages and market towns are

³⁷ Maksay 1971, 113–115; lásd még Bogdán-Maksay 1967, 106–110.

³⁸ Maksay 1971, 118.

³⁹ Történeti összefoglalását lásd Pánya 2019, 321; Pánya 2021, 27.

⁴⁰ Györffy 1963, 201.

⁴¹ Györffy 1963, 205; Pánya 2019, 328.

⁴² Szabó 1954, 5; Kubinyi 1996, 159.

located on average 1–3 km from each other. The settlement network on the Bácska loess plateau was sparse, and the settlements were 3–5 km apart.

The Ottoman expansion in the early 16th century broke the development of the settlement network. In the years before the Battle of Mohács (1526), the social impact of the Turkish campaigns was already being seriously felt. In 1521, the most important settlement of the southern border castle system, Nándorfehérvár (Belgrade) was occupied by the Turks. Subsequently, the Ottoman troops also led raids on the territory of Szerém and Bács County. In 1522, no taxes could be collected from the two southernmost districts of Bács County along the Danube, as they were destroyed (*omnino desolatus*)⁴³.

In the first third of the 16th century, in the years following the battle of Mohács (1526), the Hungarian administration collapsed in Bács and Bodrog Counties. Most of the aboriginal Hungarian population disappeared, perished moved to the northern part of the Kingdom before the occupation of Buda (1541). In parallel with the disappearance of the population, the mixed (Rascian-Wallachian) population moved from the Balkan to the southern half of the Danube-Tisza Interfluve Region. Thus, the Hungarian-Slavic language border shifted to the north, roughly to the Tolna (HU)-Dusnok (HU)-Jánoshalma (HU) line⁴⁴.

The settling mixed population continued to use villages, market towns, and their names in most cases. Despite the change of population, most of the settlement names kept their original form (e.g., Hetes, Baja, Baracska) or turned into Slavic equivalent (Szántó>Santova, Haraszti>Harasztina, Apáti>Opatin, Szabadka> Subotica) until the end of the 16th century.⁴⁵ From the end of the 16th century, Hungarian settlement names were gradually replaced by South Slavic/Turkish settlement names (Rég > Karakoria, Hájszentlőrinc > Godecsovo)⁴⁶. During the liberation wars against the Turks at the end of the 17th century, most of the southern part of the Danube-Tisza Interfluve Region (Bácska/Bačka) became uninhabited because of the constant state of war. The South Slavs, who had previously lived in relative tranquility in the region during the 17th century, left countless villages and market towns. Following the end of the fighting against the Turks, the Habsburg Government aimed to populate these uninhabited areas with a Habsburg-friendly (Slavic and German) population. A significant part of the former Slavic population also returned to Bácska/Bačka. During the 18th century, Germans were first settled in the uninhabited settlements owned by the Habsburg Government, and in parallel, spontaneous

⁴³ Szabó 1954, 5.

⁴⁴ Krstić 2014, 61; Pánya 2019, 332–333.

⁴⁵ Đurđev, Zirojević 1988, 7–80; Pánya 2019, 334.

⁴⁶ Fóti-Pánya 2021.

migration began, during which Hungarians, Slovaks, Ruthenians, etc. settlers arrived in Bácska/ Bačka. In the Middle Ages, Bácska was still an area with an almost entirely Hungarian population, but by the end of the 18th century, it had become a multi-ethnic region⁴⁷.

Method

The retrospective method used in the research was presented in detail in a previous study, so here we will now discuss the methodological elements that are important from the point of view of settlement morphology⁴⁸.

Several historians have outlined the main types of settlements in medieval Hungary by comparing medieval sources and modern manuscript maps. According to our research, a very large number of medieval diplomas of Bács and Bodrog Counties have survived, even though, because of the 16th-century Turkish expansion, many ecclesiastical and family archives were destroyed or scattered throughout the country. During the examination of the medieval sources, many property descriptions and border description documents containing geographical data were identified⁴⁹.

It was mentioned above that the population and settlement network of the Danube-Tisza Interfluvium was completely transformed in the 16th century. Thus, there is a continuity between the medieval and the modern settlement network in few places. Medieval documents are thus basically suitable for outlining the elements and topological order of a theoretical, once-existing village network. To interpret written medieval sources in contemporary geographical space requires the involvement of additional data sources⁵⁰.

The connection between the medieval and the modern landscape is represented by 18–19th century manuscript maps (German *Flurkarte*). These are very important maps made before the integration of Bácska/Bačka into the Habsburg Empire. These maps depict the uninhabited landscape after the expulsion of the Turks from Southern Hungary⁵¹. The purpose of the maps was

⁴⁷ Kocsis 1996, 79.

⁴⁸ Pányi 2019, 324–326; Antonson 2014, 165–166.

⁴⁹ Rég village (Zombor/Sombor North, 1407: DL 9021): *...ad predictam villam Reg ubi in medio platee eiusdem ville circa imaginem Sancti Nicolai confessoris esset una meta terrea, abinde in eadem platea, ab eandem plagam meridionalem pergendo, versus cappellam in eadem villa Reeg in honorem Sancti Martini confessoris fabricatam...*; Bakacs village (Zombor/Sombor Northeast, 1405: DL 10161): *...vadit ad villam Bakach ad medium eiusdem ville, item de medio platee ipsius villa Bakach per unam viam qua duceret ad possessionem Parys...*

⁵⁰ Pányi 2019, 327.

⁵¹ See the conscription of deserted SW Bácska villages (1746): MNL OL E 156 – a. – Fasc. 065. – No. 096.; Maps of settlements of S-SW Bácska (1771): ÖStA HKA KS L14 1–63 – Mappa der Bacser Kameralherrschaft.; MNL OL S11 0457a-b Southern-Backa – Šajkaška district.

to determine the value and habitability of the deserted settlements. In addition to the various landscape elements (forests, fields, arable land, vineyards, etc.), the maps also show traces of medieval villages. For the cartographers, the most spectacular was the ruins of a stone/brick church or in some cases a monastery, manor house, or castle (Latin *rudera templi*, *rudera sacelli*, *Templomrom*, *gradina*, *kostol*, *crkva*-*crkviste*, etc.)⁵². These buildings were demolished in the 18–19th century, their stones and bricks were carried away by the moving population and recycled for their buildings.

If the ruins were destroyed or no longer visible from the vegetation, the cartographers inscribed the interior of the former settlement to be on the maps (Latin *locus possessionis antiqua*, *locus colonia*, Slavic *staro selo*, *seliste*, etc.)⁵³. Unfortunately, no detailed drawings or sketches of these have survived from Bács and Bodrog Counties, so we only have guessed what the engineers and cartographers could have seen at the site of the deserted settlements. In the 18–19th century descriptions, it is mentioned that on the abandoned, grass-covered area of the former settlements, decades and centuries after their desertion, there were still half-buried ditches, various pits on the former plots, and there were debris mounds on the place of the former houses⁵⁴. These phenomena persisted until the modern age when the location of most settlements was plowed.

In our experience, these are carefully crafted, drawn-colored-painted 18–19th century maps that can be used well in GIS environments, they can be georeferenced with minimal spatial error (RMS). After integration into the GIS system, the data on them can be compared with other maps/ aerial photographs or searched in the field. Faulty drawing, inaccurate marking can be observed in only a few cases, despite the 18th century cartographic methods (angle measurement, distance measurement with rope and chain) that seem extremely simple to today's eyes.

These written sources make it possible to outline a theoretical/topological settlement network. The historical maps provide an opportunity to fit this theoretical network into the contemporary landscape and settlement network. Additional data on the structure and spatial characteristics of the settlements identified based on the (written/map) sources can be obtained in several ways.

Classical archaeological methods (field survey, excavation, metal detection) and newer non-destructive methods (magnetometer, GPR) are time-consuming

⁵² Wicker 2006, 5.

⁵³ Papp, Rajsli 2005, 56, 168, 174.

⁵⁴ Traces of the settlement (ice storage pits, wells, ditches) of medieval Bödreegyház, which existed in Pest County near Nyáregyháza (HU), could be observed in 1642, many decades after the destruction of the village in 1526. See Novák 1994, 184; Szakály 2001, 351.

and expensive, an enormous amount of planning and preparation is required to inspect the sites. In the settlement research program of the Danube-Tisza Interfluvium Region, we decided on aerial archeological methods (low-altitude aerial photography and satellite image analysis) for the study of enormous areas⁵⁵. We also used drones to photograph the sites and took pictures of the built elements (churches, monasteries, and manor houses)⁵⁶. However, the latter method provided different amounts and qualities of knowledge only from the northern half of Bodrog County. No archival/contemporary aerial photographs were available to map the southern part of Bodrog County and the entire area of Bács County, therefore satellite imagery was analyzed. At the beginning of the research, it was seen that commercially available high-resolution satellite images are very expensive. If we wanted to use imagery from multiple periods, that would have multiplied the cost. We experimentally tested Google Earth, released by Google Inc. in 2001. This application is primarily a non-profit/educational satellite imagery catalog (geobrowser), provides aerial and satellite imagery from the last 10–15 years. It allows mass access to high-quality georeferenced satellite images with a resolution of less than 1 meter. In Google Earth there is no possibility to spectral analysis of satellite images, to study different spectral wavelengths, or to perform cluster analysis. However—as we will see later—a significant amount of archeological phenomena, including morphological features of the deserted settlements, could be observed with visual analysis on the RGB and panchromatic imagery. The abundant image database provides an adequate overlap between the images from different sources, so it is more likely to find a recording that was made under more optimal conditions from the point of view of settlement research. Targeted field inspections were carried out in Hungary, in Bács-Kiskun County, to correctly interpret the phenomena seen in the aerial and satellite images. During this, the pattern types shown in the images were verified by field surveys, metal detection, geophysical survey, and excavation. Based on the field experience, a ‘pattern collection’ was created that allowed for the mass processing of satellite images. Linear phenomena (ditches, walls, pits) can be theoretically deduced from the signs (crop mark) of certain plant types on the images taken during the vegetational period (spring-summer)⁵⁷. However, practice shows a more nuanced picture. The amount and distribution of precipitation, the method of soil and field cultivation, the geographical location of the plots, etc. strongly influence the usability of images taken of vegetated areas⁵⁸. In our experience, the satellite imagery available on

⁵⁵ Szabó 2017, 399.

⁵⁶ Pánya 2019, 355.

⁵⁷ Szabó 2018, 73–82.

⁵⁸ Szabó 2017, 403.

Google Earth shows fewer signs of vegetation during the vegetation period, so the structure of the deserted settlements can be interpreted less well. Therefore, during this period, we used oblique-axis (drone) photographs to map the place of medieval settlements⁵⁹.

From the point of view of settlement morphology, satellite images of plowed surfaces, usually taken outside the vegetation period, proved to be much easier to use, on which soil changes and discolorations (soil-marks) indicate the location of former settlements [Fig. 3.]. Once the fields have been plowed and prepared for sowing, they remain uncovered for a relatively long time. During field surveys on the plowed fields, it is possible to regularly find fragmented debris of medieval houses built of clay on former settlement sites. The clay remains of a medieval house often cover several tens of square meters and can be easily seen from above, as they are different in color from the surrounding soil. In the photos taken of the plowed surfaces, mostly large, blurred spots and wide stripes can be observed, from which it can be deduced the streets and rows of houses of the settlement and the more significant buildings (church, manor house, monastery, castle, etc.).

The sites of the demolished stone/brick buildings are usually covered with light-colored stone, plaster, and brick debris over a large area. This thick debris layer is turned over and spread by plowing year after year. The streets, which have been used for decades to centuries, in contrast to houses made of clay, usually appear as darker lanes on the images. Traces of the former residential area are most spectacular when the color and characteristics of the soil and the remains of the buildings differ significantly. On the dark, alluvial soil of the plain along the Danube, the light-colored clay remains of medieval houses are extremely visible. On the sandy, light surface of the Sand Ridge, light-colored building debris mixed with the soil is less visible.

The best chance is to examine the sites of the deserted settlements if they are on large plots cultivated/sown/plowed at the same time. In the pictures taken in different periods (spring/summer/autumn), the place of a former settlement can be seen better sometimes, so almost all houses/plots can be isolated from each other and the street line. Other times, however, the results of various weather factors (precipitation) and agricultural interventions blur traces of destroyed/demolished buildings and appear on the dark-colored soil as large, contiguous gray spots. [Fig. 4.].

⁵⁹ Pánya 2019, 355–356.

Results

The eastern, sparsely populated half of the area of Bodrog County was on the Telecska loess plateau, and the western, more densely populated half was on the Danube plain. Based on the archival studies, relatively few medieval written sources have survived about the settlements that existed on the loess plateau, and the traces of these settlements can only be found sporadically on the 18–19th century maps.

On the one hand, probably, several settlements that still exist today (Csávolý, Bácsborsód) were established on the site of former medieval-early modern age (14–17th century) villages, therefore more in-depth research will be possible only by excavation or archaeological observation in the future. On the other hand, the memory of many former settlements was not preserved by the inhabitants who moved in the modern age, so their place was forgotten.

The solution in these areas would be targeted field research based on predictive methods, which provide field data at a relatively low cost. This could be followed by annual aerial photography of the sites found, targeted evaluation of satellite imagery.

We have morphological data on a dozen villages/market towns in the western part of Bodrog County, on the Danube plain. One of the most spectacular of them is the market town of Hájszentlőrinc identified on the western part of Gádor / Gakova [Fig. 4–5.]⁶⁰.

The location of Bács County is geographically similar to Bodrog County. Its northern, smaller part was on the Telecska loess plateau, where the identification of medieval villages based on written sources, maps and remote sensing is more difficult due to what is described in Bodrog County. However, most of the county was located on the Danube plain covered with fertile, dark-colored alluvial soil, most of which is under intensive agriculture. Based on the written data, maps, and satellite images, the places of over 100 medieval settlements could be accurately identified, which is almost a third of the number of settlements in the county. The layout and main characteristics of the settlement could be determined in about 90 of these locations.

The question arises why the number of discovered settlements in the areas of Bodrog County along the Danube is less than in the similar areas in Bács County. Two factors certainly influence the results of the research. On the one hand, the Google Earth application used to explore the location of settlements contains images taken by different satellite imagery providers (Maxar Tech., CNES/ Airbus, Landsat/ Copernicus) at different times and qualities. Often

⁶⁰ Pánya 2021, 32; Bátmonostora market town (Bátmonostor, HU) Pánya 2018, 114–116; Arany village (Vaskút, HU) Pánya 2019, 355–356.

satellite images of varying quantities and quality are available from adjacent areas.

On the other hand, the morphology, soil, and land use of the two regions show many similarities, but there are also differences. The soil conditions are essentially the same, the area of both is mostly covered by dark, fertile soil formed from the alluvium of the Danube. The part of Bodrog County around Zombor/ Sombor is strongly diversified, it has numerous former swamps, watercourses, and abandoned Danube riverbeds. Here, the location of former settlements is more difficult to identify on satellite images. However, there are areas covered with large plots, where traces of former settlements and buildings can be seen in the fields [see already mentioned Fig. 5.]. In most of Bács County, cultivating takes place on larger arable lands, therefore remote sensing for archaeological purposes can be performed on them with greater efficiency.

Morphology

Morphological data on the structure of 115 settlements in the Counties of Bács and Bodrog counties could be collected from written sources, maps, aerial and satellite images [Fig. 6.]. The 'spindle structure' could be observed in 62 of these settlements, making it the most common type of all. 39 were simple street/row settlements, and most of them had only one street with plots in two rows. In the case of 14 settlements, it is not possible to decide to which type (simple row settlement or spindle structured row settlement) may have belonged in terms of its structure. There are settlements with a special structure/plan, usually aligned to a natural formation (height, river) [Fig. 7–9.].

Within the primary groups, especially on the spindle structured type, we can observe quite a variety. The central part of these settlements is the spindle-shaped area (*Anger* in German), which is essentially a central square ("main square"). In many settlements, this space is relatively small, as the church in the center is tightly surrounded by the main street of the village/town. In other cases, this space is much larger, wider, and stretches long along the axis of the settlement.

Size of the settlements

Regarding the extent and size of the settlements, it is important to note that the spots ("footprint") seen in the aerial photos show the maximum of the built-up area of the settlement, on which different amounts of inhabited and uninhabited plots existed in certain periods. A good example of this is a

census of 1487 from Bodrog County. In this, the inhabited/ uninhabited plots and other features of nine settlements, such as the church/ chapel, were listed⁶¹.

Csente (*Chenthe*) – 8 inhabited plots, a consecrated tomb chapel (*capellam sepulturam dedicatam*)

Tótfalu (*Thothfalw*) – 20 inhabited and 2 uninhabited plots

Negyven (*Neghwen*) – 5 inhabited and 2 uninhabited plots

Belküllőd (*Belkywlewd*) – 11 inhabited and 4 uninhabited plots, a consecrated tomb chapel

Avató (*Awatho*) – 10 inhabited and 16 uninhabited plots

Vanna (*Wanna*) – 40 inhabited and 18 uninhabited plots, a church without a tower

Keresztes (*Kerezthes*) – 5 inhabited and 8 uninhabited plots

Battyán (*Batyan*) – 8 inhabited and 8 uninhabited plots, a church without a tower

Szentfalva (*Zenthfalva*) – 26 inhabited and 4 uninhabited plots, a consecrated tomb chapel

Of the nine settlements in Bodrog County listed, 133 of the 191 plots were inhabited and 58 were abandoned in 1487. In some villages there were none or a few uninhabited lots, however, we can see that in many villages no one lived on a third or half of the plots in the period. As a result, it is not possible to determine exactly how many houses/plots the settlements shown in the aerial photographs could have had, as this may have changed from year to year because of moves, epidemics, campaigns, etc.

Aerial photographs provide an opportunity to compare the size of settlements the length of their streets [Fig. 10.]. In the case of villages/market towns consisting of one street, this is a simple task, as the difference between the lengths of the two settlements can be seen by juxtaposing the aerial photographs. In the case of settlements consisting of several streets, it is possible, to sum up, the lengths of each street and calculate an average settlement length. In terms of size, there are smaller, one-street villages with streets 200–300 meters long. The most common are one- or multi-street settlements with a length of 300–1000 m. Of the length 1000–1500 m, less than a dozen existed. Only two settlements (market towns) larger than 1500–2000 m were identified.

Churches and other ecclesiastical building

The document of 1487 cited above can also be a valuable source of ecclesiastical buildings. In 4 of the 9 settlements, no church buildings were mentioned.

⁶¹ 1487: DL 72048.

In two cases, one church was recorded. In three cases a tomb chapel, which was probably not an independent parish from the ecclesiastical point of view, and its size may have been smaller than that of the average church.

During the examination of the satellite images, in 75 of the 115 settlements, the location of the church could be determined based on the crop marks and soil marks. Sometimes, traces of the foundations/walls of the buildings could be observed, but an exact plan could only be determined for one or two churches. Research in Hungarian sites shows that to get to know the plans of buildings, it is worth taking (oblique and vertical axis) drone photos every year and/or, if possible, conducting GPR research on the site of the buildings.

In nearly 50 cases, the church ditch was visible. Most of these may have been ditches surrounding the cemetery around the church.

On the satellite images, we can also observe multiple ditches around some churches, which are probably non-standard cemetery ditches. These are probably contemporaries of the 13th-century defense ditches discovered between the Danube-Tisza Interfluvium Region, built during the Tartar invasion⁶².

A high-ranking ecclesiastical building could be identified in two places. The first was the chapter of Házszentlőrinc market town, which functioned as an authentic place (Latin *loca credibilia*) of Bodrog County until the second half of the 14th century [Fig. 5.]. The second was an Augustinian monastery that existed in the market town of Derzs, next to Bács [Fig. 9.].

Discussion

Because of targeted historio-geographical-archeological research, the number of identified villages and market towns in the Counties of Bács and Bodrog has multiplied. The progress is outstanding not only in quantity but also in quality, as we have a lot of new data about the medieval landscape and the medieval settlements that existed in it. These two counties are similar in many aspects in terms of history and geography. Both are very rich in the written sources, with many manuscript maps and a sizeable amount of satellite imagery. However, it can be seen from the presented examples that their research yielded spectacularly different results, the remote sensing study of Bács County yielded orders of magnitude more data than that of its northern neighbor.

It is clear from the results that the medieval settlements can be classified into a few types and the main characteristics of each group (rows of houses, plots, church, street) can be well identified in the sources, and in the field from the ground and from above. With a suitable sampling, a system of conditions can be developed, based on which other, previously unknown settlements can

⁶² See a detailed description of the topic Rosta, Pánya 2021.

be found in the landscape, and the key features of their structure can be read from remote sensing data.

The “backbone” of the settlement structure research project presented in the study is provided by Google Inc.’s desktop application, Google Earth, which contains more and more and better-quality satellite imagery every year. The application only allows visual analysis, so there is no way to perform various filtering like on commercially available multispectral images. However, the present research shows well how the soil marks observed on field surveys can be detected on satellite images *en masse* in the framework of low-budget research.

Conclusion

The method presented in the study – based on historical sources and remote sensing – allows us to study the medieval settlements of a region in a large area, in a statistically meaningful quantity, in large number and, in comparable quality and quantity. However, this requires intensive medieval source exploration, mass processing, and evaluation of maps and satellite imagery.

In the introduction, it was mentioned that the study of Bács and Bodrog Counties is part of a larger archaeological-historical geographical research covering the entire Danube-Tisza Interfluvium Region. One of the most important goals of this project is to publish a constantly expanding database created during the work. The initial plans included a printed repository. The satellite images presented here are only fragments of the image catalog created during the research, which contains nearly 1000 images from 115 settlements (with an average of 8–12 images per location). It is difficult to preserve them and make them available to researchers in the traditional, printed form. The goal will therefore be an online database that allows researchers to browse large amounts of images/maps and written data interactively.

The medieval and early modern history of the Danube-Tisza Interfluvium Region is very similar to the areas of the east-southeast of the Tisza. Because of the Turkish expansion in the 16th century, countless settlements also disappeared in the Counties of Arad, Békés, Csongrád, Krassó, Szörény, Temes and Torontál. An in-depth historical-geographical-archaeological study of these counties has not yet taken place to date⁶³. Hopefully, the method presented in this study can contribute to their complex and cost-effective research.

⁶³ Archaeologist Adrián Berta examines Torontál County in the framework of Ph.D. research with a complex methodology similar to that described in the article.

BIBLIOGRAPHY

- Antonson 2014,
H. Antonson, *Retrospection of medieval landscape change in mid-Sweden: historical maps analysed using a retrogressive approach*, in Eldar Heide–Karen Bek-Pedersen, eds., *New Focus on Retrospective Methods*, 2014, 163–185.
- Bárth 1996,
J. Bárth, *Szállások, falvak, városok*, Kalocsa, 1996.
- Bogdán, Maksay 1967,
I. Bogdán, F. Maksay, *Királyi öl és királyi hold*, in *Agrártörténeti szemle*, 1069/1–2, 1967, 106–110.
- Bond 1985,
C. J. Bond, *Medieval Oxfordshire Villages and their Topography: a Preliminary Discussion*, in D. Hooke, ed., *Medieval villages, A review of current work*, 1985, 101–123.
- Csapó 2016,
T. Csapó, *Település-morfológiai kutatások Mendöl Tibor óta napjainkig*, in *TFT*, 5/1, 2016, 17–26.
- Csánki 1894,
D. Csánki, *Magyarország történeti földrajza a Hunyadiak korában*, II, Budapest, 1894.
- Đurđev, Zirojević 1988,
B. Đurđev, O. Zirojević, *Opširni defter Segedinskog sandžaka*, in *Mešovita grada*, 17–18, 7–80.
- Fodor 1929,
F. Fodor, *Településföldrajzi kutatások*, in *TFK*, LVII/8–10, 1929, 131–137.
- Fóti, Pánya 2021,
M. Fóti, I. Pánya, *Bodrog vármegye településhálózatának rekonstrukciója a török defterek alapján: A zombori és a bajai náhije települései 1578-ban*, Monumenta Museologica, Budapest–Kecskemét, expected release end of 2021.
- Göransson 1978,
S. Göransson, *Regulated villages in medieval Scandinavia*, in *Geographia Polonica*, 38, 1978, 131–137.
- Gulyás 2017,
L. Sz. Gulyás, *Mezővárosi önkormányzat a középkori Hegyalján*, Budapest, 2017.

Györffy 1963,

G. Györffy, *Az Árpád-kori Magyarország történeti földrajza*, I, Budapest, 1963.

Hegyí et alii 2020,

Al. Hegyi, A. Sarris, Fl. Curta, C. Floca, S. Fortiu, P. Urdea, Al. Onaca, F. Timofte, M. Pisz, S. Timut, M. Nica, D. Maciulschi, A. Stavilă, *A Deserted Medieval Village Reconstruction Using Applied Geosciences*, in *Remote sensing*, 2020.

Hooke 1985,

D. Hooke, ed., *Medieval villages, A review of current work*, Oxford, 1985.

Kocsis 1996,

K. Kocsis, *A magyar etnikai térszerkezete változásai a honfoglalástól napjainkig*, in *Tér és társadalom*, 10, 1996/1, 1996, 79–94.

Krenzlin 1978,

A. Krenzlin, *Régions d'habitat de la Marche de Brandebourg en tant que résultat d'activités de la grande propriété foncière*, in *Geographia Polonica*, 38, 159–167.

Krstić 2007,

Al. Krstić, *Vreme turske vlasti u Sremu*, in *Srem kroz vekove. Slojevi kultura Fruške gore i Srema*, 2007.

Krstić 2014,

Al. Krstić, *Bačka pod osmanskim vlašću*, in M. Matićki, V. Jović, eds., *Bačka kroz vekove. Slojevi kultura Bačke*, 2014, 56–86.

Kubinyi 1996,

A. Kubinyi, *A Magyar Királyság népessége a 15. század végén*, in *TörtSz*, 2–3, 1996, 135–162.

Kubinyi 2000,

A. Kubinyi, *Városfejlődés és vásárhálózat a középkori Alföldön és az Alföld szélén*, *Dél-Alföldi évszázadok* 14, 2000.

Maksay 1971,

F. Maksay, *A magyar falu középkori településrendje*, Budapest, 1971.

Mendöl 1963,

T. Mendöl, *Általános településföldrajz*, Budapest, 1963.

Miklós, Vízi 2003,

Zs. Miklós, M. Vízi, *Ete – egy elpusztult középkori mezőváros a Sárközben*, in *MFME Studia Archaeologica*, 9, 2003, 399–406.

Mišić 2010,

S. Mišić, ed., *Leksikon gradova i trgova srednjovekovnih srpskih zemalja – prema pisanim izvorima*, 2010.

K. Németh 2015,

A. K. Németh, *A középkori Tolna megye templomai*, Szekszárd, 2015.

Nikolić 2012,

V. Manojlović Nikolić, *Srednjovekovni nakit sa nekropola X-XV vek na teritoriju Vojvodine: Bibliografija radova*, in *Vojvodanski prostor u kontekstu Evropske istorije zbornik radov*, Újvidék/ Novi Sad, 2012, 61–66.

Nikolić 2013,

V. Manojlović Nikolić, *Bibliografija radova arheoloških istraživanja srednjovekovnih seoskih naselja IX–XV veka na teritoriji Vojvodine*, in D. Hardi, ed., *Srednjovekovna naselja na tlu Vojvodine*, Srmska Mitrovica 2013.

Novák 1994,

L. Novák, *Nagykörös története és néprajza a XIX. század közepéig*, I–II, Nagykörös, 1994.

Papp, Rajsli 2006,

G. Papp, I. Rajsli, *Bácskai helységek Pesty Frigyes 1864. évi kéziratoss helynévtárában*, Tóthfalu, 2006.

Pálóczi 2006,

A. H. Pálóczi, *Az elpusztult késő középkori falvak morfológiai variációi*, in *Arrabona*, 44/1, 2006, 357–390.

Pálóczi 2021,

A. H. Pálóczi, *Cumania Maior. A Nagykunság térségének településrendje a X-XVII. Században*, Budapest-Szolnok, 2021.

Pánya 2017a,

I. Pánya, *Történeti településföldrajzi kutatások Bács-Kiskun megyében 2011–2016*, in *TFT*, 2017/1, 2017, 91–107.

Pánya 2017b,

I. Pánya, *A Solti-szék történeti földrajza*, in *TFK*, 2017/3–4, 2017, 84–95.

Pánya 2018,

I. Pánya, *A Duna szerepe Baja és Bátmonostor kora újkori történetében*, in *Cumania*, 28, 2018, 97–116.

Pánya 2019,

I. Pánya, *Possibilities and methods for the reconstruction of the settlement structure of medieval Bodrog county*, in *Banatica*, 29/I, 2019, 321–352.

Pánya 2021,

I. Pánya, *Bodrog vármegye története*, in *TFK*, 2021/1–2, 2021, 27–43.

Pánya, Mordovin, Nagy 2020,

I. Pánya, M. Mordovin, B. Nagy, *Sic transit gloria mundi – Szeremlén mezőváros története*, in *Cumania*, 29, 2020, 23–80.

Piti, C. Tóth, Neumann 2010,

F. Piti, N. C. Tóth, T. Neumann, *Szatmár megye hatóságának oklevelei (1284–1524)*, in *NJAMÉ*, 65, 2010, 17–20.

Pusztai 2003,

T. Pusztai, *Két középkori település szerkezeti rekonstrukciója térinformatikai eszközök segítségével*, in *MFMÉ Studia Archaeologica*, 9, 2003 407–417.

Pusztai 2010,

T. Pusztai, *Középkori falvak és mezővárosok régészeti kutatása (The Archaeological Researching of Medieval Villages and Market Towns)*, in E. Benkő, G. Kovács, eds., *A középkor és a kora újkor régészete Magyarországon = Archaeology of the Middle Ages and the Early Modern Period in Hungary*, MTA Régészeti Intézete, 2010, 113–139.

Roberts 1978,

B. K. Roberts, *The regulated village in northern England: some problems and questions*, in *Geographia Polonica*, 38, 245–252.

Roberts 1985,

B. K. Roberts, *Village patterns and forms: some Models for Discussion*, in D. Hooke, ed., *Medieval Villages*, Monograph no. 5, Oxford, 1985, 7–26.

Roberts 1996,

B. K. Roberts, *Landscapes of Settlement – Prehistory to the Present*, London, 1996.

Roberts 2006,

B. K. Roberts, *Hartside, Northumberland and Cockfield, County Durham: Specific Cases, Settlement Systems and Time Trajectories*, in *Landscapes* 7:2, 70–89, DOI: 10.1179/lan.2006.7.2.70.

Rosta 2014,

Sz. Rosta, *A Kiskunsági Homokhátság 13–16. századi településtörténete*, Phd dissertation, 2014 source: <https://edit.elte.hu/xmlui/handle/10831/22570>.

Rosta, Pánya 2021,

Sz. Rosta, I. Pánya, *Gondolatok a síkvidéki középkori erődítésekről – Egy topográfiai kutatási program váratlan hozadéka*, in *Archaeologia Cumanica*, 5, Kecskemét expected release end of 2021.

Sárosi 2013,

E. Sárosi, *Landscapes and Settlements in the Kecskemét Region, 1300–1700*, Ph.D. dissertation, 2013.

Stanojev 1996,

N. Stanojev, *Srednjovekovna seoska naselja od V do XV veka u Vojvodini. – Mittelalterliche dörfliche Siedlungen vom 5. bis zum 15. Jh. in der Wojwodina*, Újvidék/Novi Sad, 1996.

Stibrányi 2015,

M. Stibrányi, *Fejér megye középkori templomos helyei*, Ph.D. dissertation, 2015 source: <https://edit.elte.hu/xmlui/handle/10831/32975>.

Szabó 1954,

I. Szabó István, *Bács, Bodrog és Csongrád megye dézsmalajstromai 1522-ből*, Budapest, 1954.

Szabó 1969,

I. Szabó, *A középkori magyar falu*, Budapest, 1969.

Szabó 2017,

M. Szabó, *A légitérészet helye a megújuló MRT-ben*, in *Magyarország régészeti topográfiája – Múlt, jelen, jövő*, 399–424.

Szabó 2018,

M. Szabó, *Repülés a múltba – A légitérészet története*, Pécs, 2018.

Szakály 2001,

F. Szakály, *A hódolt megye története*, in *Pest megye monográfiája 1/2, A honfoglalástól 1686-ig*, 2001, 329–543.

Szatmári 2005,

I. Szatmári, *Békés megye középkori templomai*, Békéscsaba, 2005.

Szekeres 1982,

L. Szekeres, *Középkori települések Északkelet-Bácskában*, in *Hungarológiai közlemények*, 1982, 1–77.

Wicker 2006,

E. Wicker, *Crkve, Klisza, Gradina, Klostr. Középkori településeket jelző határrészek Bács-Bodrog vármegyében*, in *Cumania*, 22, 2006, 5–78.

TIPURI DE AȘEZĂRI PE TERITORIUL COMITATELOR MEDIEVALE BÁCS ȘI BODROG

Rezumat

Studiul de față prezintă tipurile de așezări din comitatele medievale Bács și Bodrog. Conform istoricilor, „așezarea adunată/ așezarea deschisă/răzlețită” (*Hungarian szalagtelekes falu*) a fost forma de locuire cea mai obișnuită în regatul Ungariei în timpul evului mediu. Totuși, trebuie să observăm că această afirmație este una mult prea generalizată, bazată pe studiul așezărilor existente în zonele vestice, nordice și estice din Bazinul Carpatic, mai puțin sau deloc expuse distrugerilor din perioada turcească, în secolele XVI-XVII. Zonele Marii Câmpii au fost mai intens devastate de campaniile otomane din secolul al XVI-lea, de aceea doar puține informații fragmentare, rezultate din excavațiile arheologice, pot veni în sprijinul opiniei istoricilor.

Cercetarea complexă de la Bács și Bodrog, bazată pe GIS/ Sistemul Informațional Geografic, a permis creșterea calitativă și cantitativă a bazei de date privind structura locuirii în regiunea analizată. Studiarea zonei satelor medievale pustiite *en masse* și analiza structurii lor, precum și a caracteristicilor cheie au fost realizate cu ajutorul aplicației gratuite Google Earth. Prin analiza vizuală a imaginilor satelitare a fost posibilă colectarea a aproape 1000 de imagini din 155 așezări medievale. Rezultatele demonstrează că în comitatele sudice, dens populate, ale regatului medieval al Ungariei, majoritatea așezărilor aparține celor cu case cu parcele longitudinale de pământ (*toft and croft* în engleză, *szalagteleg*, în maghiară), iar în cadrul acestora, tipul cel mai obișnuit a fost cel al așezărilor deschise, de factură fusiformă. Întrucât descoperirile din cadrul acestui studiu au fost deja prezentate, sistemul Google Earth achiziționat efectiv este cel adecvat să dea la lumină rezultate semnificative, în cadrul unei viitoare cercetări a zonelor similare Marii Câmpii de Sud, care au fost puternic distruse de ocupația turcească (județele Timiș, Arad, Békés, Csongrád, Torontál, Caraș și Severin).

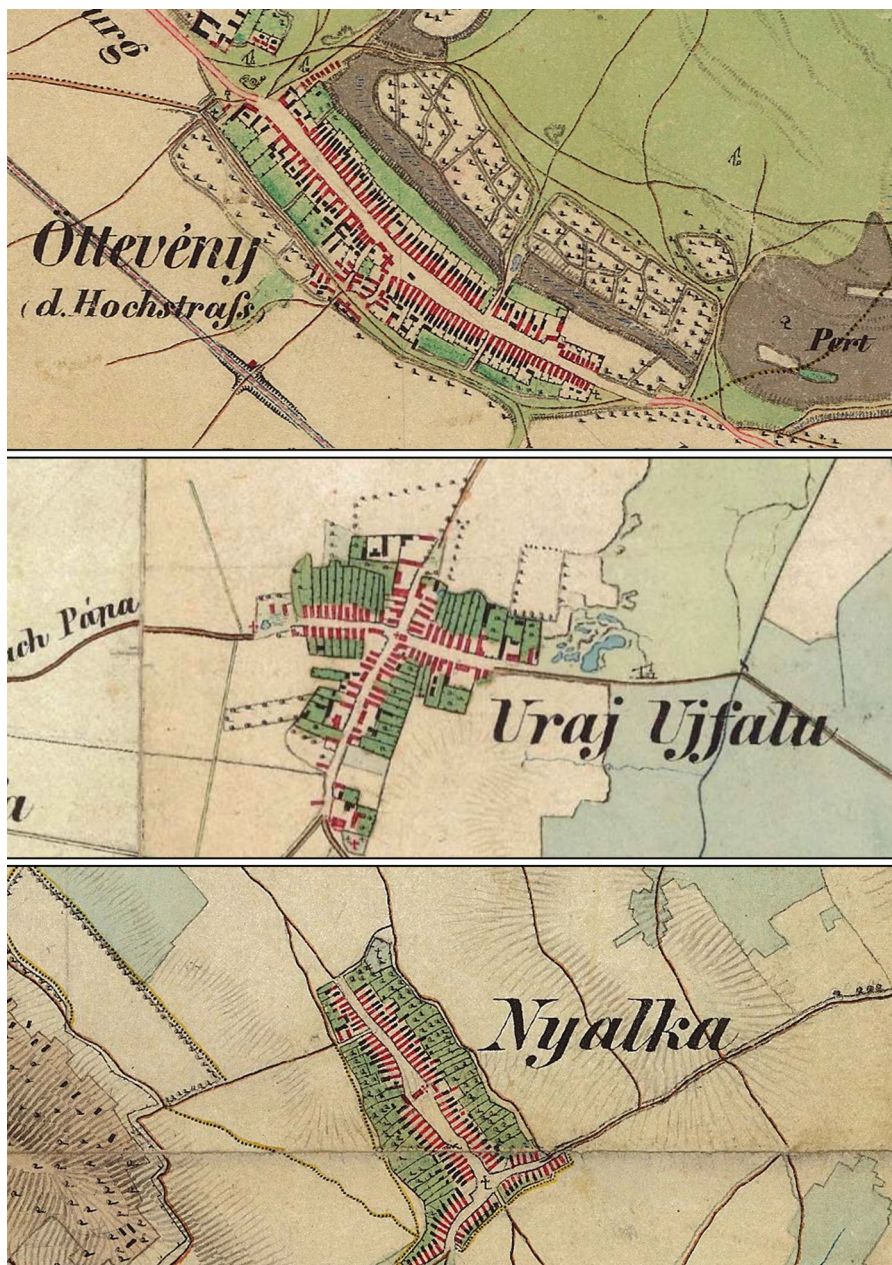


Fig. 1. Representation of one-street (above), cross-street (middle) and spindle structured (bottom) row settlements in Western Hungary in Second Military Survey.
/ Reprezentare a aşezărilor deschise din Ungaria de vest, în cea de-a doua ridicare militară: cu o stradă (sus), cu intersecție (mijloc), fusiformă (jos).



Fig. 2. Geographical conditions of Bács and Bodrog Counties. / Situația geografică a județelor Bács și Bodrog.

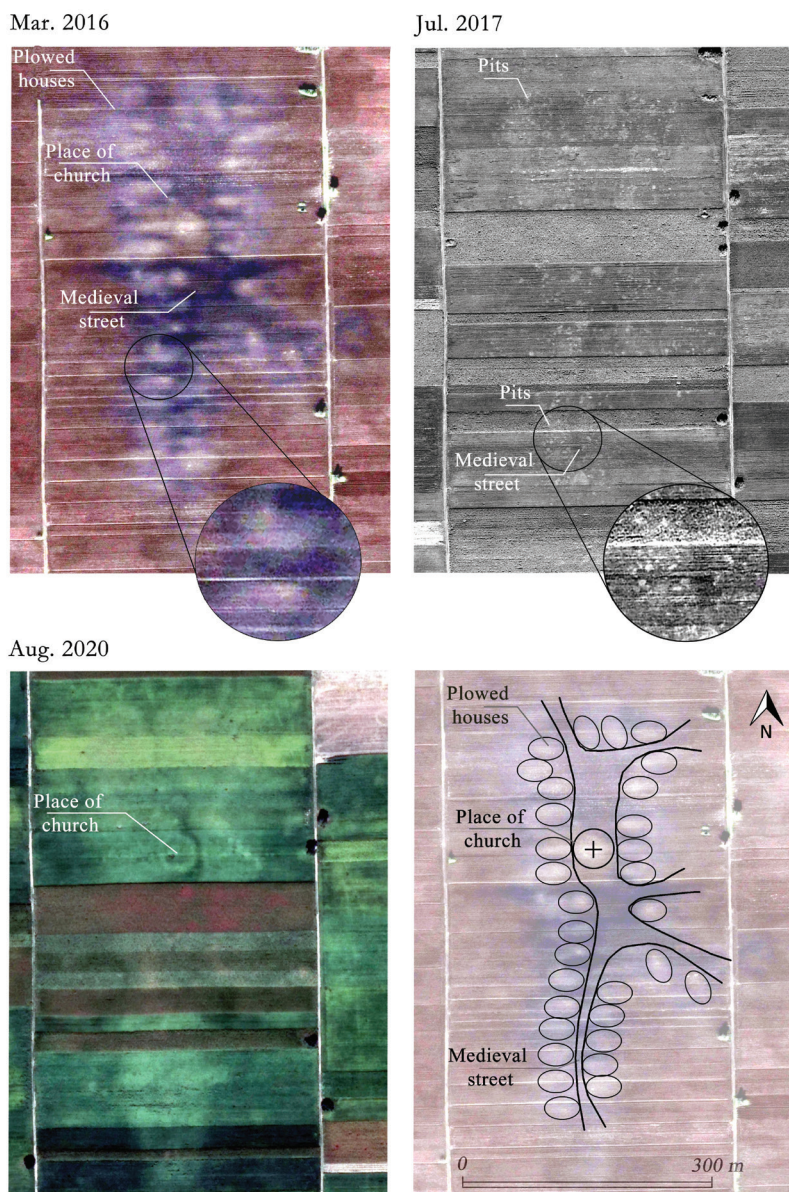


Fig. 3. Picture of the location of a medieval settlement under agricultural cultivation after plowing (top left), when the grain ripens (top right), before harvest (bottom left), and the schematic drawing of the settlement (bottom right) (N from Bácsújfalu/ Selenča SRB, source: Google Maps). / Imaginea amplasamentului unei așezări medievale din perspectiva agriculturii: aratul (stânga, sus), cultura la maturitate (dreapta, sus), înainte de recoltat (stânga, jos), și o imagine schematică a așezării (dreapta, jos) (la nord de Bácsújfalu/ Selenča, Serbia, sursa Google Maps).

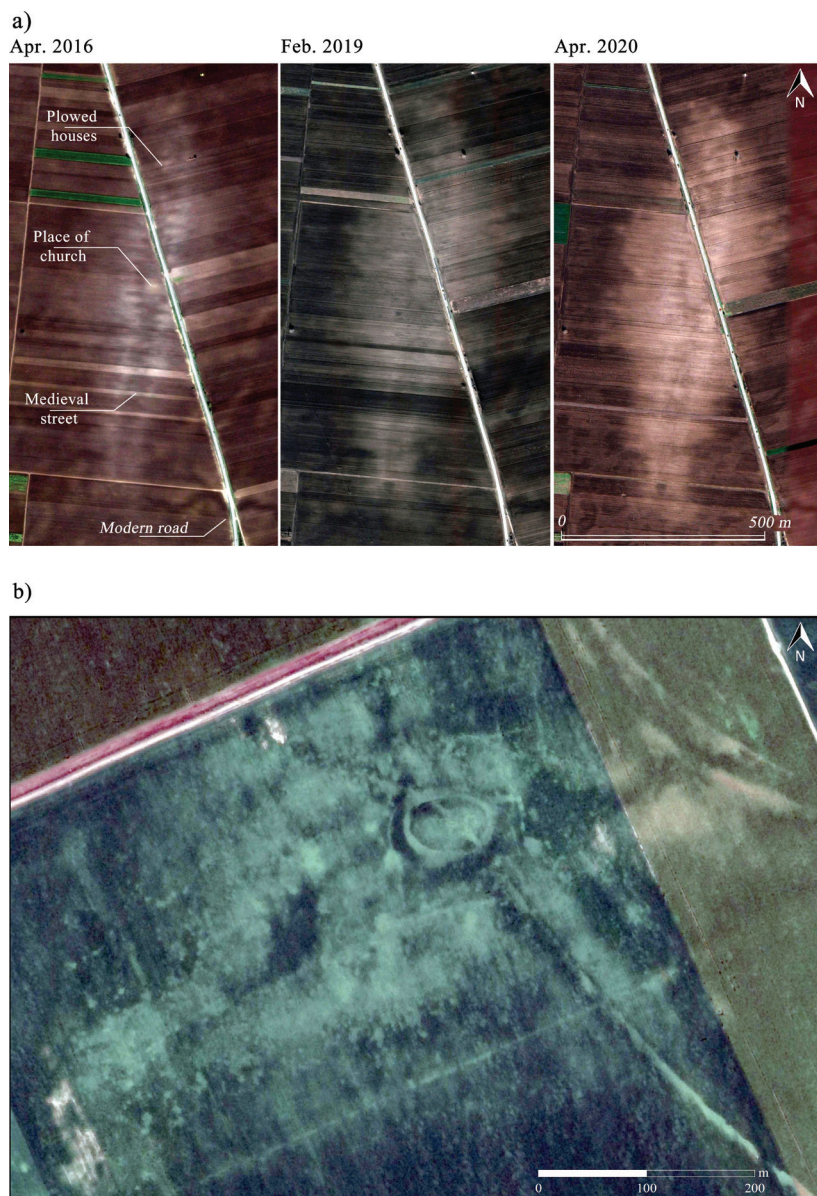


Fig. 4. a) Picture of a deserted medieval village with a spindle structure on a plowed surface(S from Kiszács/ Kisač SRB, source: Google Maps). / Imaginea unui sat medieval pustiit, cu structură fusiformă, pe o suprafață arată (la sud de Kiszács/ Kisač, Serbia, sursa: Google Maps). b) The graincovered area of the market town of Hájszentlőrinc on a satellite image (W from Gádor/Gakovo SRB, source: Google Maps). / Zona cultivată cu cereale a târgului Hájszentlőrinc, pe imagine satelitară (la vest de Gádor/Gakovo, Serbia, sursa: Google Maps).

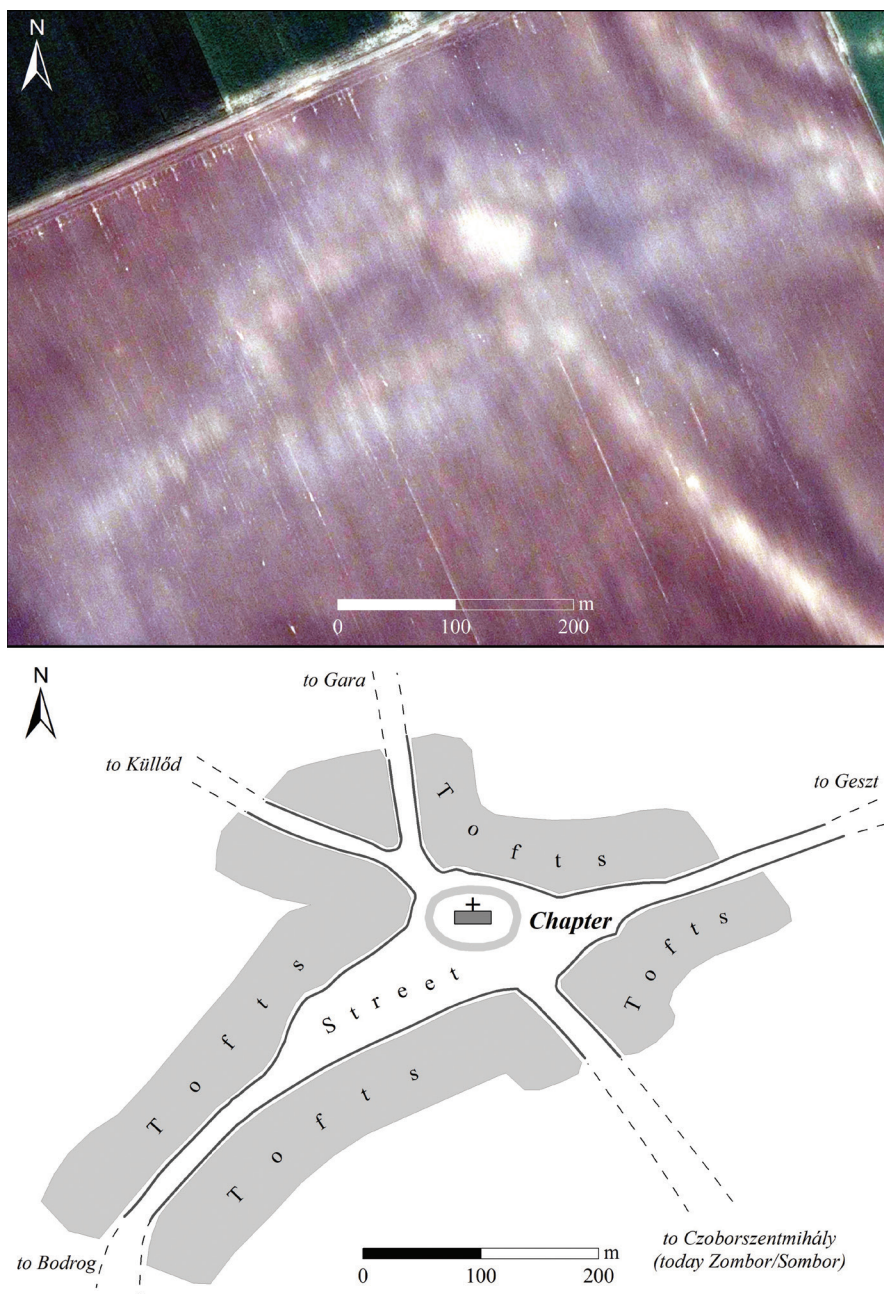


Fig. 5. The area of the market town of Hájszentlőrinc on a satellite image (W from Gádor/Gakovo SRB, bottom, source: Google Maps), sketch of the settlement structure (top). / Zona târgului Hájszentlőrinc pe imagine satelitară (la vest de Gádor/Gakovo, Serbia, jos, sursa: Google Maps), schița structurii așezării (sus).

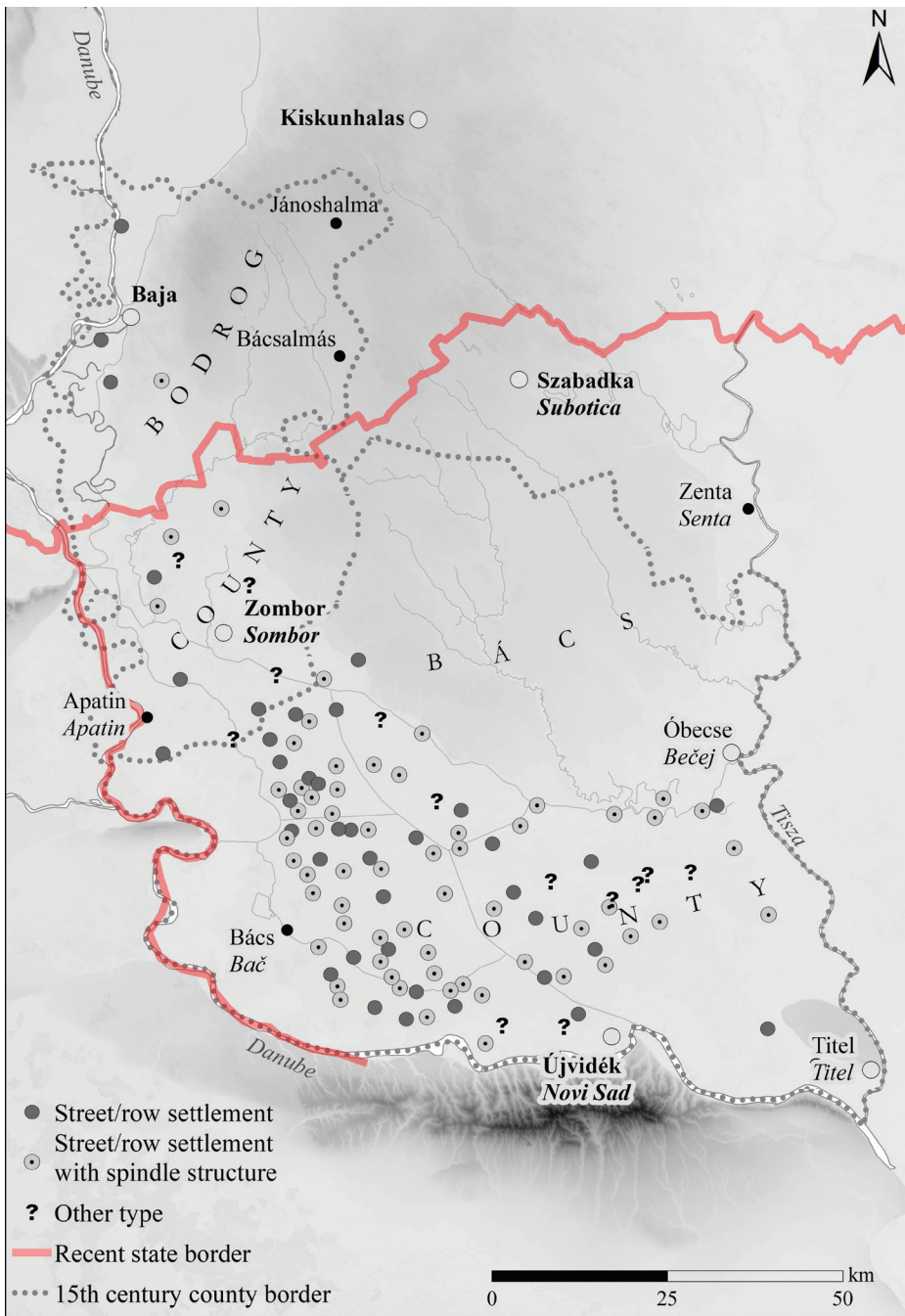


Fig. 6. Identified settlement forms in the area of Bodrog and Bács counties. / Forme de locuire identificate în arealul județelor Bodrog și Bács.

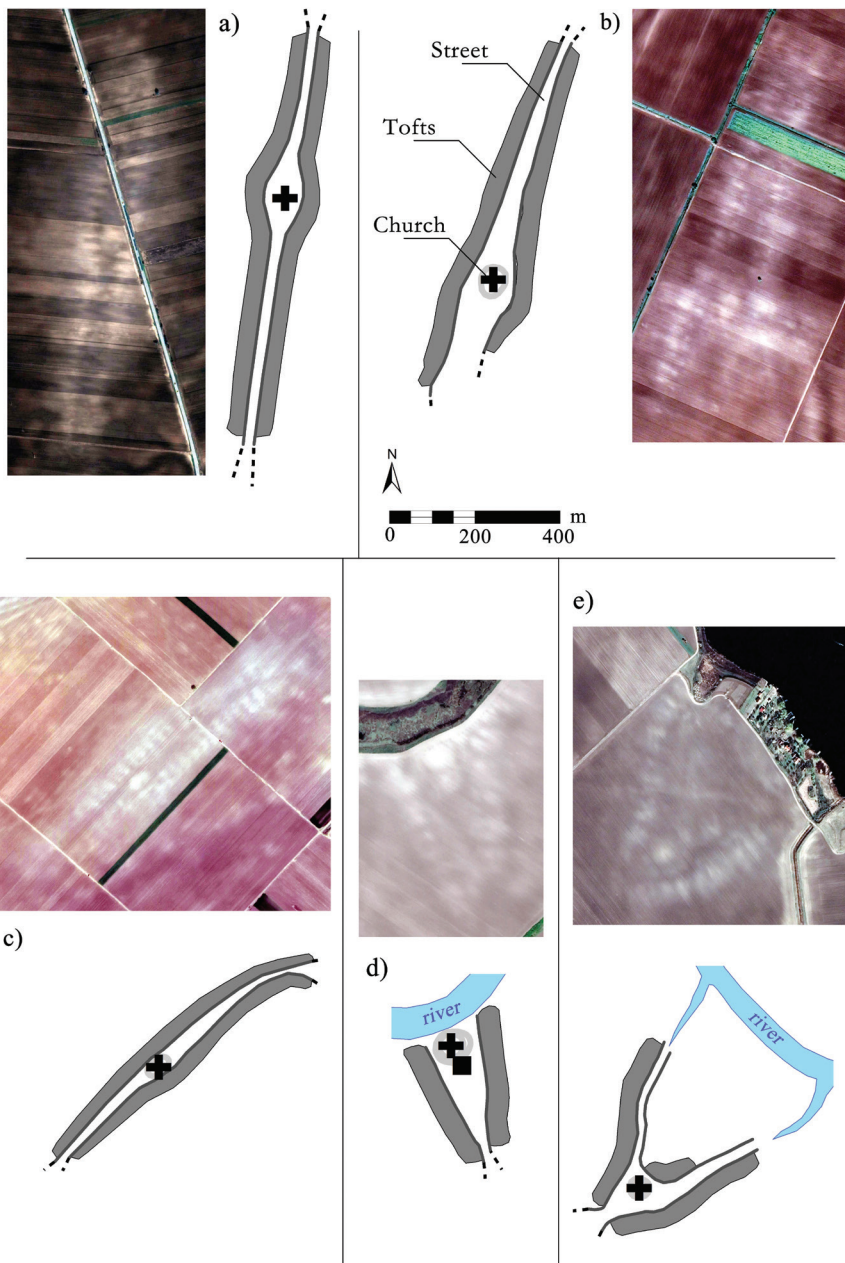


Fig. 7. a) S from Kiszács/Kisač SRB; b) S from Sóvé/Ravno Selo SRB; c) W from Boróc/Obrovac SRB; d) Bácsföldvár/Bačko Gradište SRB; e) N from Nádálja/Nadalj SRB. / a) la sud de Kiszács/Kisač, Serbia; b) la sud de Sóvé/Ravno Selo, Serbia; c) la vest de Obrovac, Serbia; d) Bácsföldvár/Bačko Gradište, Serbia; e) la nord de Nádálja/Nadalj, Serbia.

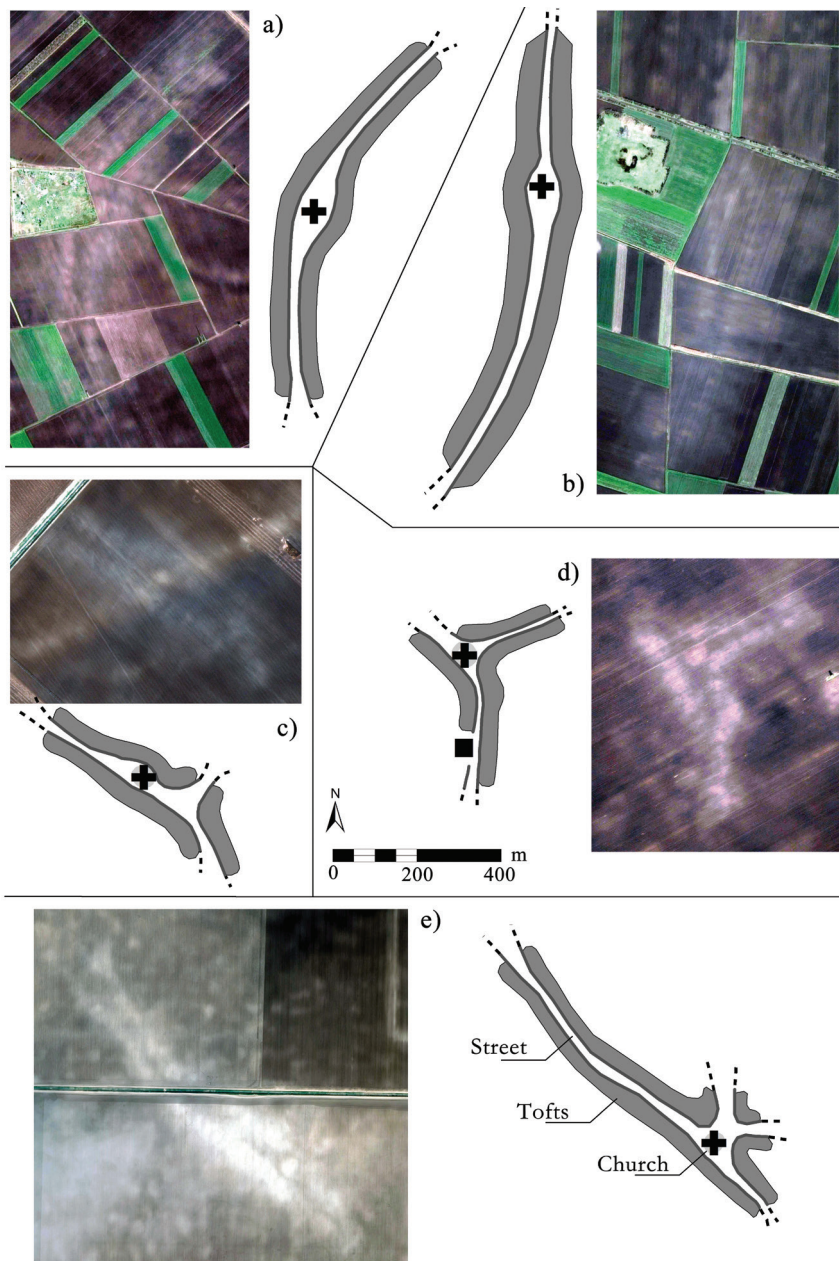


Fig. 8. a) NE from Liliomos/Lalić SRB; b) SE from Veprőd/Kruščić SRB; c) SE from Boróc/Obrovac SRB; d) S from Szilberek/Bački Brestovac SRB; e) S from Militics/Srpski Miletić SRB. / a) la nord-est de Liliomos/Lalić, Serbia; b) la sud-est de Veprőd/Kruščić, Serbia; c) la sud-est Boróc/Obrovac, Serbia; d) la sud de Szilberek/Bački Brestovac, Serbia; e) la sud de Militics/Srpski Miletić, Serbia.

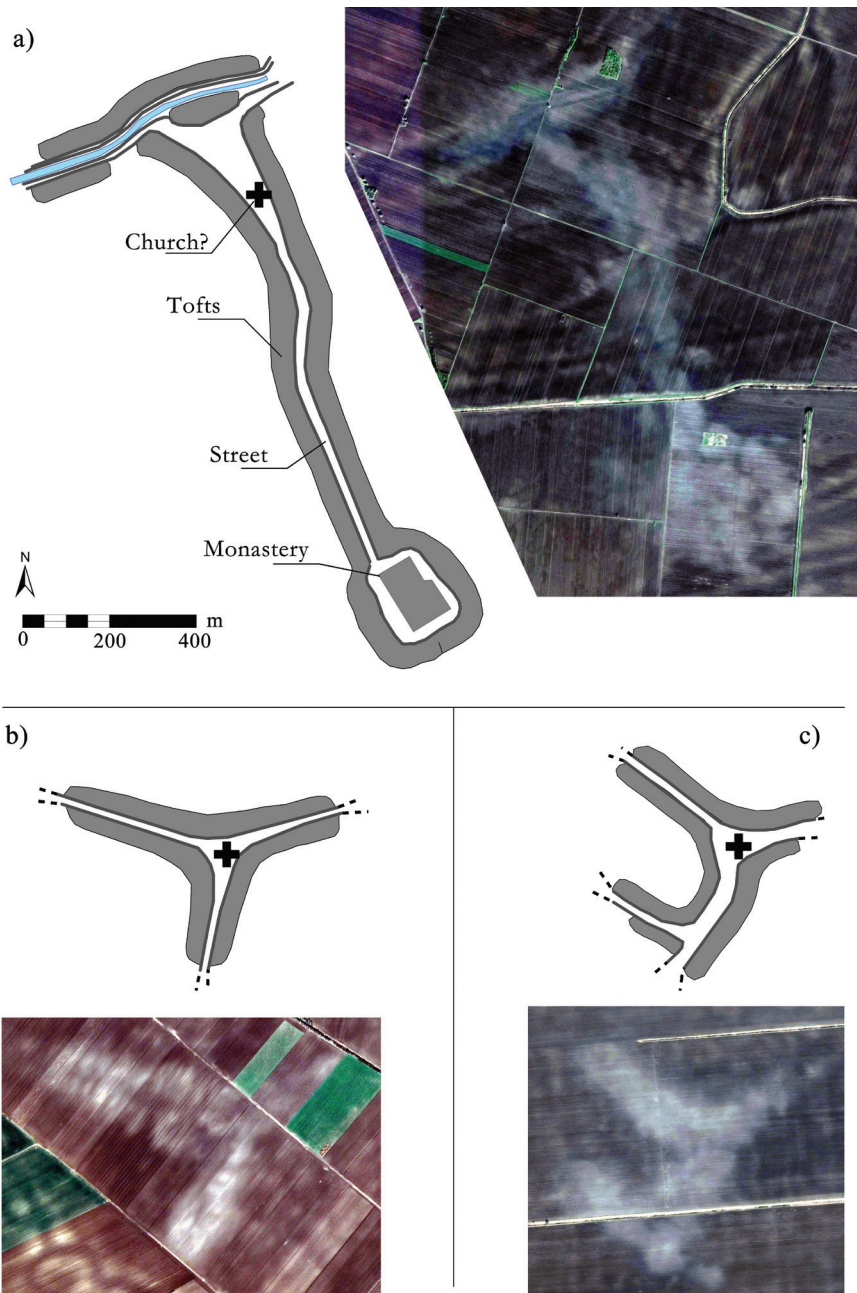


Figure 9. a) N from Bácsstóváros/Tovariševo SRB; b) S from Wekerlefalva/Nova Gajdobra SRB; c) E from Militics/Srpski Miletic SRB. / a) la nord de Bácsstóváros/Tovariševo Serbia; b) la sud de Wekerlefalva/Nova Gajdobra Serbia; c) la est de from Militics/Srpski Miletic Serbia.

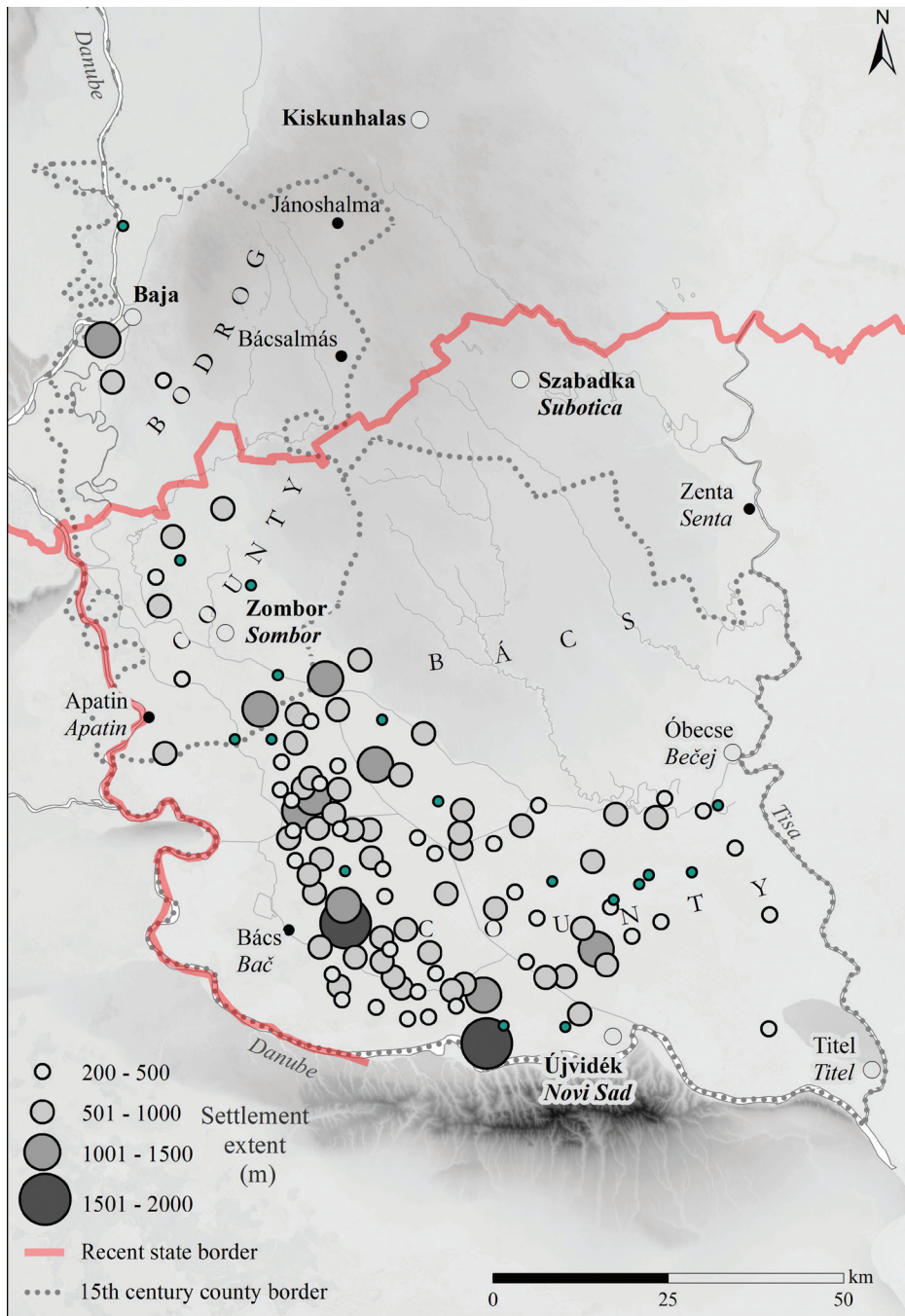


Fig. 10. The average extent of the identified settlements in the area of Bodrog and Bács Counties. / Întinderea medie a așezărilor identificate în zona județelor Bodrog și Bács.