SPRAWOZDANIA ARCHEOLOGICZNE 77/1, 2025
PL ISSN 0081-3834
DOI: 10.23858/SA/77.2025.1.4176

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QUANTITY MATTERS. STUDIES ON DEFENSIVE SETTLEMENTS OF THE HALLSTATT PERIOD IN GREATER POLAND

ABSTRACT

Szczurek G., Krzepkowski M., Wroniecki P. and Różański A. 2025. Quantity matters. Studies on defensive settlements of the Hallstatt Period in Greater Poland. *Sprawozdania Archeologiczne* 77/1, 317-346.

The issue of defensive settlement during the Hallstatt period (HaC-HaD) in the area of Greater Poland constitutes an important, although still insufficiently recognised, research topic. Given current research, 21 well-documented defensive sites are believed to have operated in the region at the beginning of the Iron Age. The article's findings indicate that there has been a significant underestimation of the phenomenon's scale. Pilot studies limited to three neighbouring districts have identified at least three new probable fortified settlements. The research was preliminary and requires continuation to confirm its chronological attribution to the Hallstatt period reliably. In the authors' opinion, applying analogous methodological assumptions in other areas of the region may yield comparable findings and thus significantly shape the catalogue of defensive settlements from the beginnings of the Iron Age in Greater Poland. Considerable progress in these studies could indeed be achieved through systematic and reliable remote sensing prospection, as well as through a re-analysis of sites previously assessed negatively.

Keywords: Early Iron Age, Wielkopolska (Greater Poland), Hallstatt period, defensive structures, fortified settlements, Lusatian culture

Received: 25.06.2025; Revised: 27.06.2025; Accepted: 06.10.2025

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INTRODUCTION

It has now been seventy years since Tadeusz Malinowski published the first summary and discussion of thirty-one fortified settlements of the Lusatian culture in Greater Poland in 1955 (Malinowski 1955). More than half of the sites included in that study, associated initially with settlement from the beginning of the Iron Age (HaC-HaD; 800/750-450 BCE), have since been shown to be defensive structures dating from the early medieval period (Śmigielski 1991; 1993). It should be noted, however, that the chronological classification of several of these sites remains subject to debate. Verification research, particularly in the 1970s, conducted by the teams of Dobromir Durczewski and Wojciech Śmigielski (Śmigielski 1993) and Zofia Kurnatowska and Alina Łosińska (Kurnatowska and Łosińska 1981), has significantly narrowed this list. Its later modifications (for example, Niesiołowska-Hoffmann 1963; Niesiołowska-Wędzka 1966) ultimately established a catalogue of eighteen confirmed fortified settlements dated to the Hallstatt period (Śmigielski 1993; Kaczmarek and Szczurek 2015). Despite uncertainties regarding its chronological position, this list should also include the site at Pudliszki in Gostyń County (Durczewski 1977; Lasak 1995; Jaeger 2010). In the years that followed, only two new fortified sites were added to this group. One is located in Jurków in Kościan County (Nowakowski and Rączkowski 2000; Wyrwińska 2001), and the other in Bieganin in Ostrów County (Splitt 1986; Janiak 2003, 52; Szczurek 2024, 89) (Fig. 1). It is also possible that the phenomenon of defensive settlement associated with the Lusatian Urnfields should be extended to include the extensive 14-hectare site at Wielowieś on the Prosna River in Ostrów County (Szczurek 2018). With a high degree of probability, this site complements the catalogue of large fortified settlements from the end of the Bronze Age in central Poland described over two decades ago by R. Janiak (2003).

The actual number of defensive sites in operation during the Hallstatt period in Greater Poland remains an open question, one that demands careful attention in any research efforts. Undoubtedly, in addition to exercising caution before drawing firm conclusions without comprehensive excavation-based verification of new discoveries, a careful review of the literature is recommended. This can help avoid the introduction of flawed information into academic discourse, especially information that was already discredited decades ago (see Góralczyk 2024).

Greater Poland is undoubtedly one of the most thoroughly studied archaeological regions in the Polish lands. Many generations of archaeologists have worked hard to bring us to what may seem a satisfactory level of understanding. Thanks to access to remote sensing data, our knowledge of immovable heritage sources is expanding at an unprecedented rate (*e.g.*, Mackiewicz 2023). In recent years, the so-called LiDAR revolution has led to a fundamental reshaping of inventories of early medieval strongholds and later knightly residences (*e.g.*, Krzepkowski *et al.* 2018). Why should this progress in available research tools not be reflected in studies on the scale of settlement at the beginning of the Iron Age

in Greater Poland? As we will attempt to show, this phenomenon is also evident in the issue under discussion here. However, it is not only terrain model analyses that are leading to the expansion of the catalogue of fortified settlements from the early Iron Age. Traditional academic tools, such as diligence and the ability to critically assess sources, remain valuable.

In this text, the term defensive settlement refers to the remains of a settlement originally surrounded by a defensive perimeter, now visible as an embankment representing the collapse of former fortification structures with highly varied layouts (Puziuk 2010). The function of these entire complexes, conventionally referred to here as 'defensive settlements,' was also most probably diverse and multidimensional (Dzięgielewski 2017).

We will present several examples from the last two years, which may alter our current understanding of Hallstatt-period defensive settlements in Greater Poland quite drastically. This concerns, in particular, the southern part of the region, where pilot studies were concentrated. Nevertheless, the application of analogous methodological approaches (LiDAR analysis, aerial photography, trial excavations, geophysical surveys, earth science dating methods, and re-analysis of materials and documentation from earlier research – *cf.*, Niedziółka 2017) in other parts of Greater Poland will undoubtedly lead to comparable findings and thus significantly influence the current shape of the catalogue of fortified sites from the beginnings of the Iron Age.

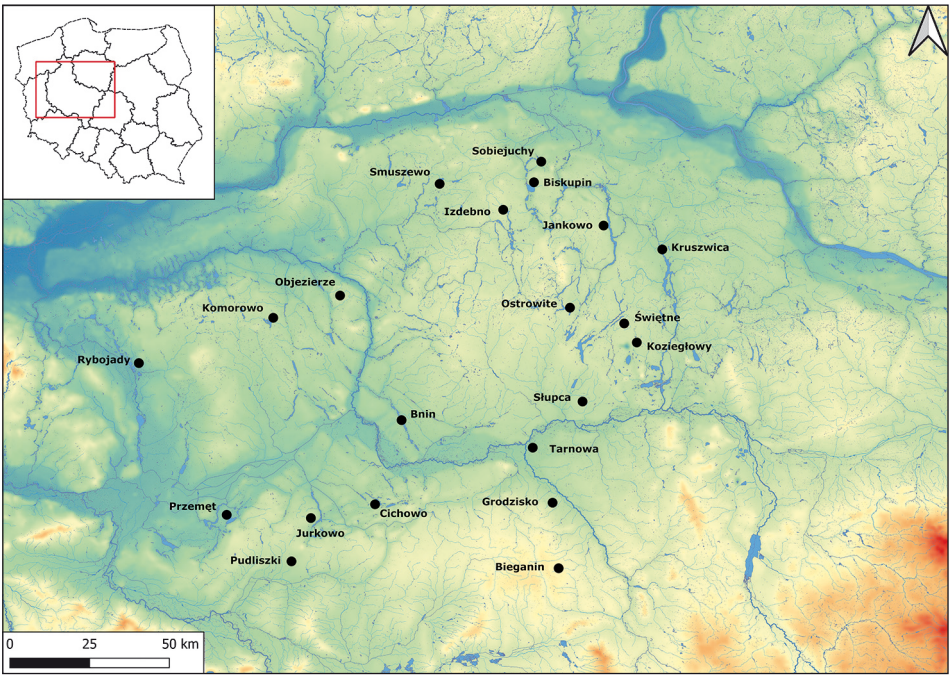

Fig. 1. Defensive settlements from the beginning of the Iron Age in Greater Poland in light of the current state of research (compiled by G. Szczurek after Śmigielski 1993; Kaczmarek and Szczurek 2015, with additions)

OVERVIEW OF RECENT DISCOVERIES OF PRESUMED DEFENSIVE SETTLEMENTS FROM THE HALLSTATT PERIOD IN GREATER POLAND

This section presents the results of the most recent research carried out within the Krzywiń Lakeland and the southern part of the Poznań Lakeland. First, we will refer to the findings concerning the site at Rogaczewo Wielkie in Kościan County (Krzepkowski *et al.* 2024). This will be followed by as yet unpublished results from fieldwork in Dolsk in Śrem County, remote sensing observations conducted in Mórka also in Śrem County, and very preliminary results from ongoing investigations related to an infrastructure project in Zaniemyśl in Środa County.

Rogaczewo Wielkie, Krzywiń Commune, Kościan County

The site is located in the Krzywiń Lakeland, approximately a quarter of a kilometre north of the village buildings. It lies in the floor of a marshy valley through which a now canalised stream flows, referred to as the Racocki Ditch or Wyskoć Ditch. Just 0.7 kilometres to the west lies the site at Turew, dated to the early phases of the early medieval period. It has been the subject of multiple surface and trial investigations and has been frequently mentioned in both older and more recent literature (*e.g.*, Kowalenko 1938, 312; Hensel *et al.* 1995, 101-104). Notably, the site under discussion here in Rogaczewo Wielkie, which is considerably more extensive than Turew and located nearby, has not been marked on any known maps of the area. No archival records or local accounts related to it have been preserved either. It is also surprising that the site was not recorded during two rounds of surface surveys conducted in the 1980s, especially since the area was not yet forested at the time and therefore would have been accessible for this type of prospection. Analysis of historical maps and aerial imagery indicates that, at least since the late nineteenth century, the site has been cultivated as meadows. A selection of aerial photographs from the years 1944 to 2021 clearly illustrates the change in land use and the gradual disappearance of the site's visibility in the vegetation cover (Fig. 2). During the surface surveys conducted over forty years ago on both sides of the valley, several extensive flat sites were identified in the immediate vicinity of the rampart remains. Many of these are associated with settlement from the Late Bronze Age and the early Iron Age. However, the nearby clearly visible scatter of ramparts was not recorded during those investigations.

The landform discussed here consists of an oval earthen rampart, heavily levelled, especially in its northern part. The base reaches a width of up to 14 metres, and its relative height does not exceed 1 metre. The total site area is 1.22 hectares. In the central part of the interior, a distinctive trapezoidal elevation draws attention. Its longer edges are oriented along the north-south axis (Fig. 3).

Preliminary verification of the newly discovered site at Rogaczewo Wielkie has so far been carried out in only two ways: the excavation of a single trial trench and a metal detector survey.

The first stage of the work involved the excavation of a trench with an area of 6 square metres (it measured 4 by 1.5 metres). It aimed to examine the rampart's structure, recover movable archaeological material, and collect samples for absolute dating of the site.

The stratigraphy within the trench was explored using a combined method of mechanical and natural layers. After removing the top layer of greyish-beige humic soil to a depth of approximately 35 centimetres, a cluster of partially burnt cobblestones was uncovered. Between the stones, there was a lens of coarse rust-yellow sand with crushed stone fragments. In the central and northern part of the trench, at a depth of around 40 centimetres, a layer of dark brown humus up to 25 centimetres thick was recorded, containing a high amount of charred material and fragments of carbonised wooden beams. Layers of light grey sand cut this structure with a small admixture of humic soil (Fig. 4).

At the next level of excavation, below the cluster of stones, a second layer of erratic boulders was found. These were slightly smaller in diameter and more loosely arranged. Beneath the layer containing the burnt material lay a stratum of grey humus. The level of

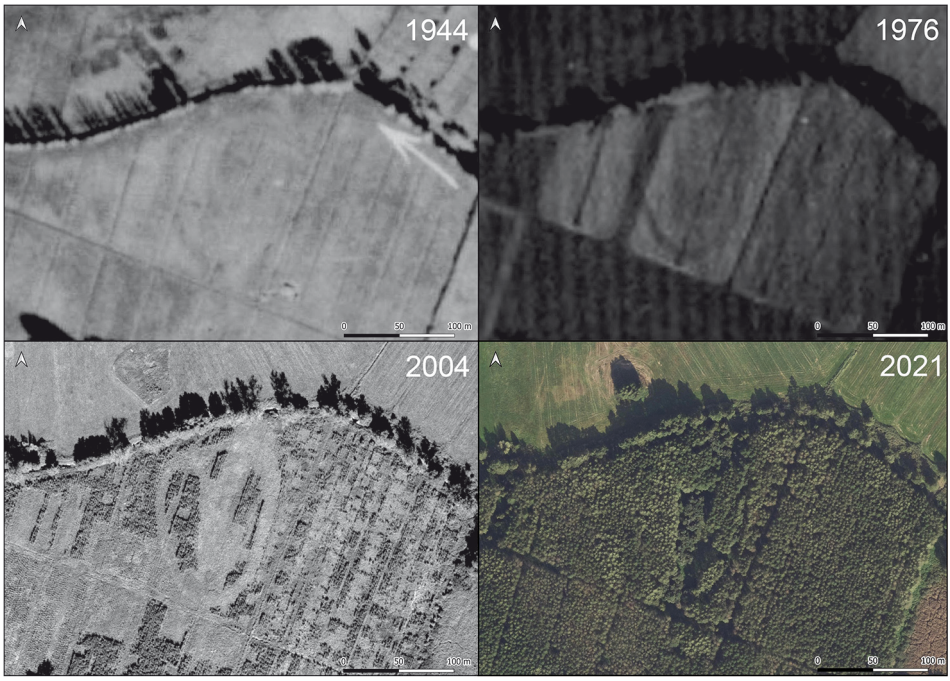

Fig. 2. Rogaczewo Wielkie, Kościan County, Site 22. Changes in land use and vegetation of the stronghold on selected photomaps from 1944-2021 (compiled by M. Krzepkowski after: igrek.amzp.pl – 1944; PAN Research Station archive in Turew – 1976; geoportal.gov.pl – 2004, 2021)

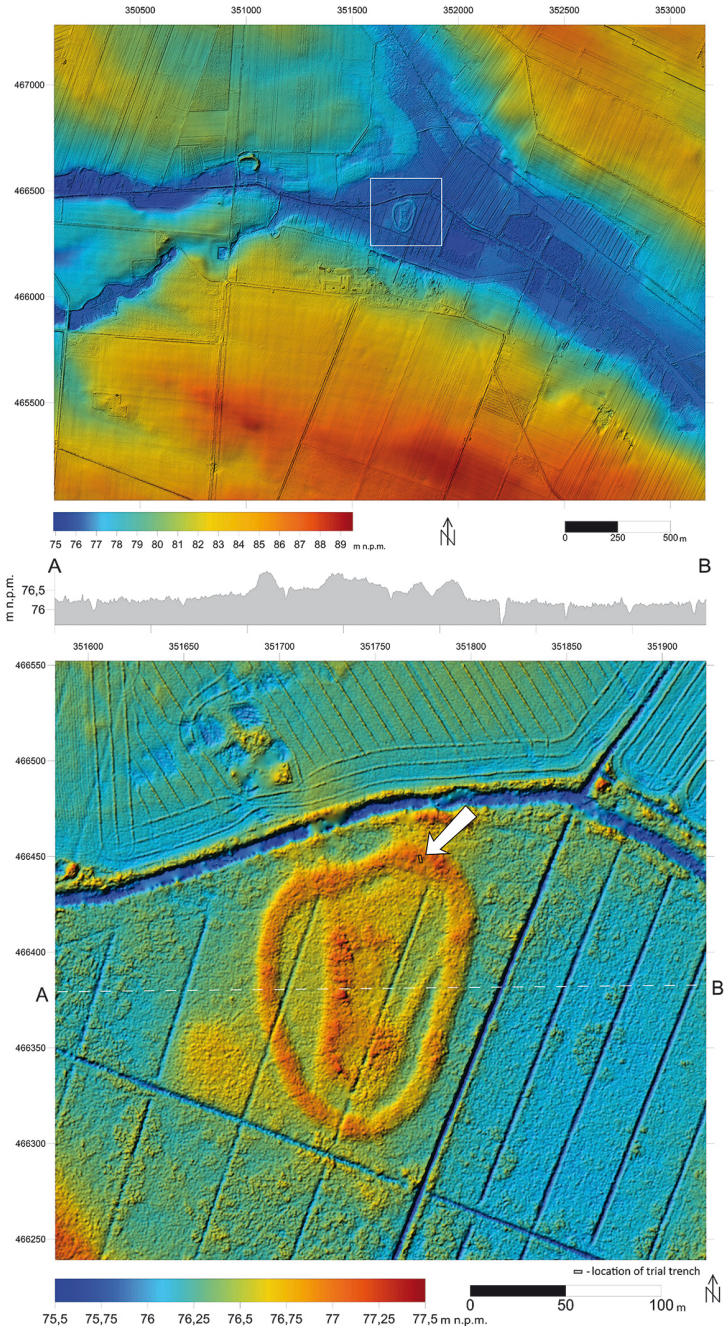

Fig. 3. Rogaczewo Wielkie, Krzywiń Commune, Kościan County, Site 22. Hypsometric visualisation based on processed ALS/LiDAR point cloud, source: GUGIK geoportal.gov.pl (compiled by W. Małkowski)

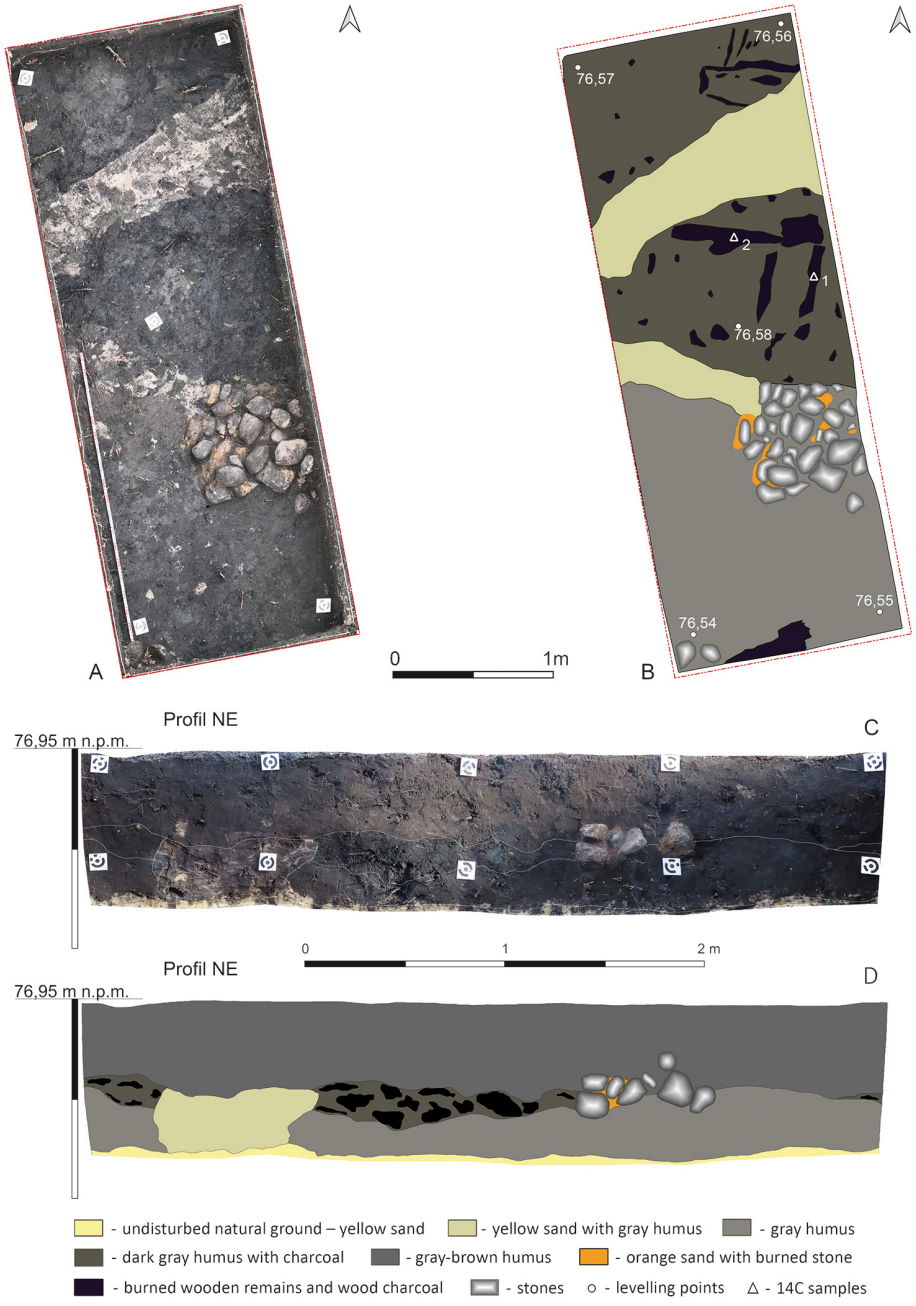

Fig. 4. Rogaczewo Wielkie, Krzywiń Commune, Kościan County, Site 22. Photogrammetric projections and NE profile drawings from Trench I: A, B – base of the first mechanical layer (level of wooden rampart construction); C, D vertical projections of NE profile (based on Krzepkowski *et al*. 2024)

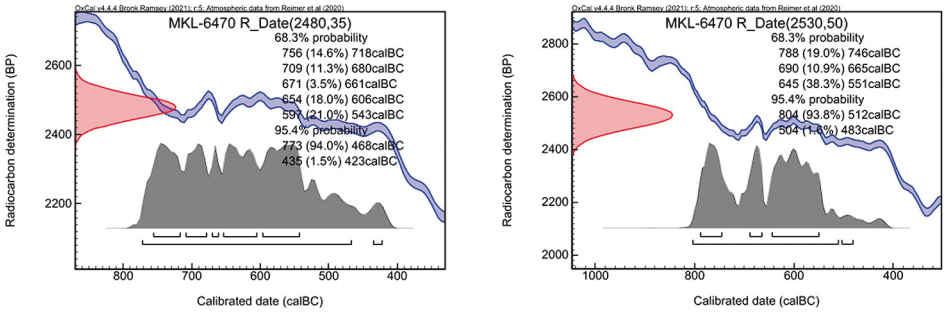

Fig. 5. Rogaczewo Wielkie, Krzywiń Commune, Kościan County, Site 22. Calibration graphs of radiocarbon dating results from burnt wooden elements of the rampart (compiled by M. Krąpiec)

compact sandy subsoil was reached at a depth of about 80 centimetres below the present ground surface. At this level, the outlines of two possible postholes were observed (Fig. 4). Although it was possible to distinguish individual horizontal construction elements, the small size of the trench limited broader observations of the rampart-construction method. Interestingly, despite very careful exploration, no movable archaeological material was recovered from the stratigraphy within the trial trench.

Similarly, a thorough surface survey of the site conducted with a metal detector did not yield any finds associated with prehistoric settlement. From the burnt layer revealed during the trial excavation, two charcoal samples were collected and submitted to the Laboratory for Absolute Dating in Kraków. The dating results indicate that the rampart was constructed at the beginning of the Iron Age. Both dates yielded very similar results, falling within the Hallstatt plateau: 804 to 483 BCE and 773 to 423 BCE (two sigma) (Fig. 5).

Dolsk, Dolsk Commune, Śrem County

The following site discussed here is located just under 20 kilometres southeast of Rogaczewo Wielkie, in the village of Dolsk, situated in the eastern part of the Krzywiń Lakeland. The site occupies a peninsula that projects into the gradually overgrowing Małe Dolskie Lake. The peninsula has an area of about 2 hectares (approximately 260 by 120 metres) and lies about 0.5 kilometres east of the medieval urban layout of Dolsk. It is separated from the mainland by an artificial ditch (which is visible on a map from the year 1853). Slightly farther to the west, a transverse earthen embankment runs across the peninsula along a north-to-south axis, with a base width reaching up to 50 metres (Figs 6 and 7).

The site at Dolsk's research history may be considered representative of a particular group of defensive sites in Greater Poland that have never received broader scholarly attention. Although the Dolsk feature has long been known, it has never been investigated through excavation. Previous activity was limited to occasional visits to the peninsula and surface surveys conducted as part of the Archaeological Record of Poland (Polish

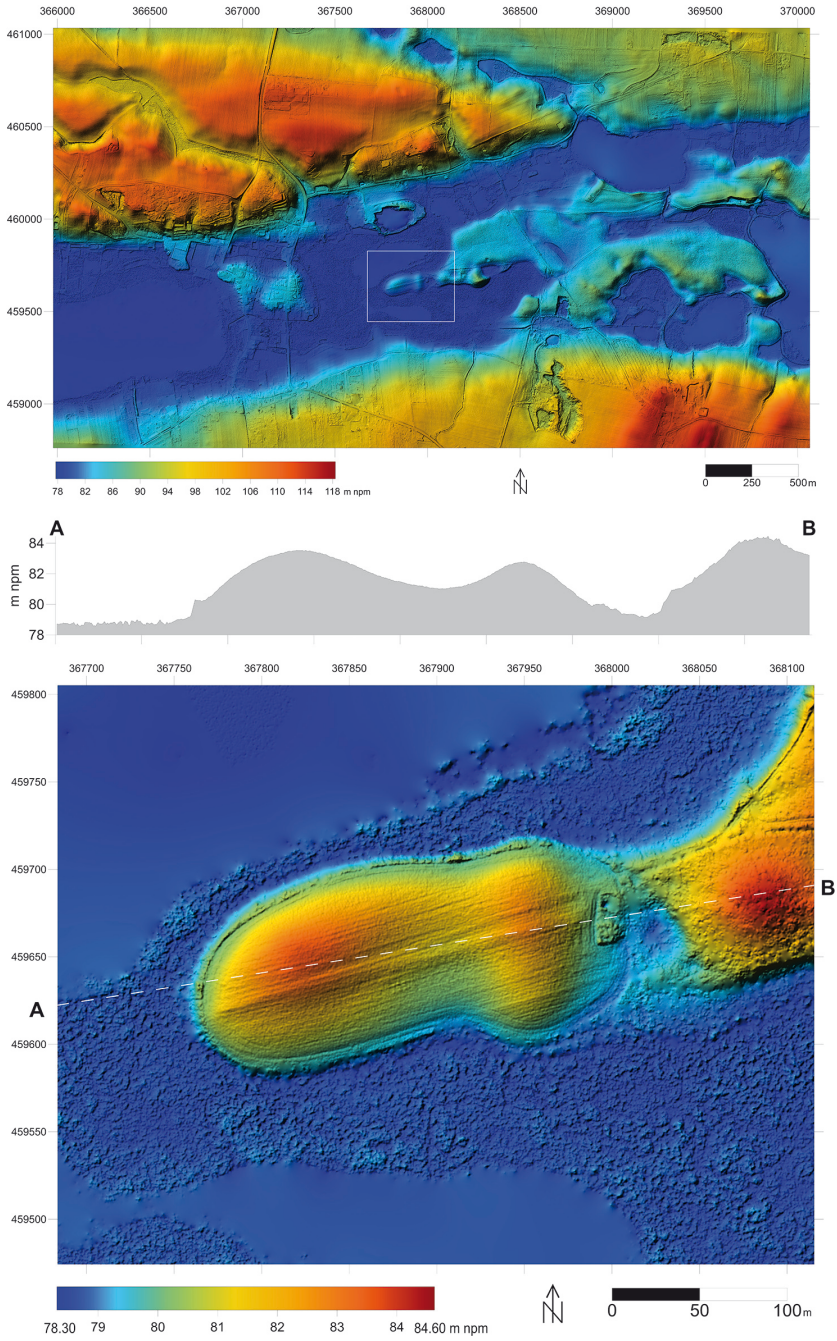

Fig. 6. Dolsk, Dolsk Commune, Śrem County (Kotowo, Site 68). Hypsometric visualisation based on processed ALS/LiDAR point cloud, source: GUGIK geoportal.gov.pl (compiled by W. Małkowski)

abbreviation: AZP) program. The existence of a defensive structure on the headland of Małe Dolskie Lake has often been questioned, and most of the information about the site dates from the interwar period or the first years after the Second World War (Kozierowski 1935, 79; Kowalenko 1938, 197, 198; Münch 1946, 107). The scarcity of information led Witold Hensel (1950, 180, 181) to classify the fortified settlement, or possibly fortified settlements, at Dolsk among the 'sites of undetermined type'. He stated that 'on the peninsula one might suspect the former presence of a concave stronghold,' adding, however, that 'the report of a stronghold in Dolsk should be verified once again, since two people have noted the complete absence of early historical artefacts from this location.'

A new chapter in the study of this site began with a surface survey conducted as part of the AZP program under the direction of A. Prinke. This time, a substantial amount of archaeological material was identified on the surface, allowing researchers to distinguish several settlement phases. These include a settlement of the Lusatian culture population, a settlement of the Przeworsk culture population, and an early medieval stronghold dated to phases B and C of the local dating scheme for that period.

The most recent phase of work conducted between 2022 and 2024 was part of a joint project by the Śrem Museum and the Relicta Foundation titled 'Inventory of Defensive Sites in Śrem County.' The research conducted so far has focused on remote sensing analysis, the creation of a topographic and contour map of the peninsula, multiple aerial

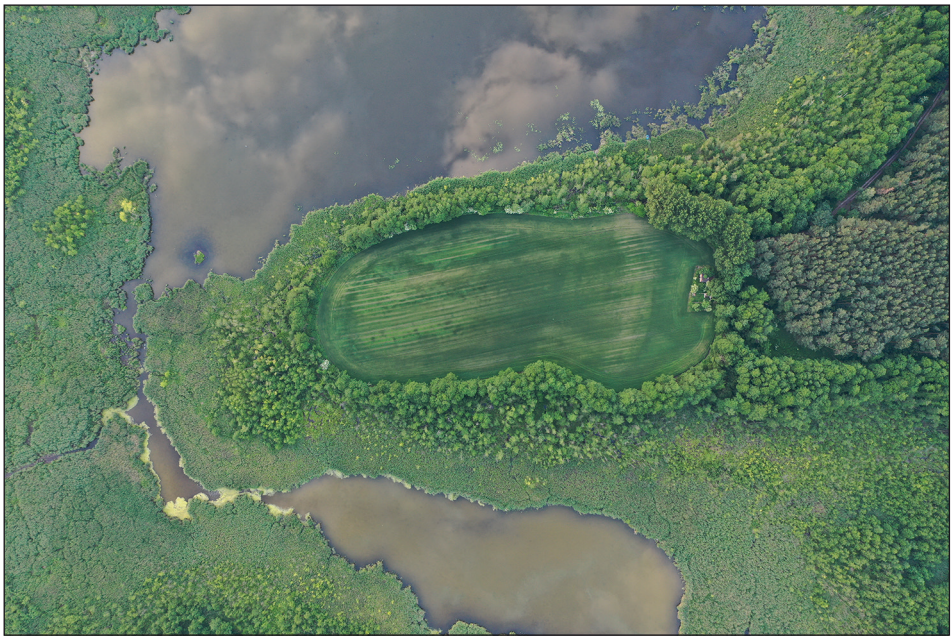

Fig. 7. Dolsk, Dolsk Commune, Śrem County (Kotowo, Site 68). Aerial photograph of the stronghold with visible remains of a transverse rampart (11.06.2022) (photo M. Krzepkowski)

surveys, and magnetic investigations. In the acquired imagery, the most clearly visible feature is the rampart of the defensive settlement located in the eastern part of the peninsula, extending along a north-to-south axis. However, in the southwestern section of the peninsula, a slight curved depression and an embankment can also be seen, which most probably correspond to the remains of a defensive perimeter such as a ditch and rampart. These observations have been confirmed by non-invasive investigations that covered the entire non-forested portion of the peninsula, which spans approximately 2 hectares (Wroniecki 2024). Based on the magnetic survey results, several significant features can be distinguished, providing valuable information about former defensive and settlement structures. The results indicate the presence of a complex, multi-layered system of anomalies, dominated by linear and curvilinear structures that often intersect and overlap one another (Figs 8 and 9). These complex patterns suggest that, despite considerable erosion of the terrain, deposits associated with defensive constructions are still preserved, albeit

Fig. 8. Dolsk, Dolsk Commune, Śrem County (Kotowo, Site 68). Orthophotomap of the site with superimposed geophysical survey results (compiled by P. Wroniecki)

in a heavily disturbed form. The richness of the recorded anomalies, in both quantity and quality, is highly impressive. The identified structures can be divided into two main groups. The first is a system encircling the entire headland, probably connected to former defensive features such as ramparts and ditches. The second group is an oval structure in the eastern part of the site, encompassing only that section. This difference in layout suggests a possible chronological relationship between the two configurations. It can be hypothesised that the circular structure in the eastern zone may be later than the fortifications surrounding the entire headland. However, due to the overlapping and interwoven nature of these structures, a clear interpretation of their temporal relationship is not possible at this stage of the research. Data obtained by the magnetic method provides a flattened horizontal view of underground structures. More complex stratigraphic sequences may lie beneath the surface, and understanding them will require further investigation.

Importantly, these numerous and complex anomalies indicate that the peninsula was once occupied by defensive structures such as ramparts and ditches, which were constructed and modified multiple times over different periods. In the centre of the interior area, within the site's central part, numerous point-like magnetic anomalies were recorded. These may indicate settlement remains such as post-built structural elements, hearths, or pits.

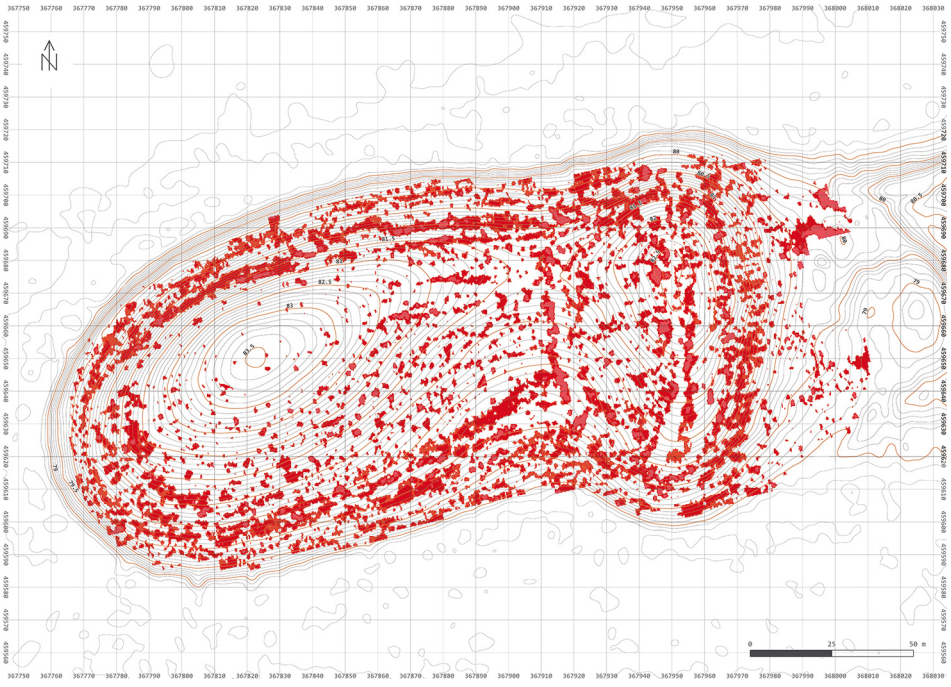

Fig. 9. Dolsk, Dolsk Commune, Śrem County (Kotowo, Site 68). Topographic-height plan of the site with magnetic survey results (compiled by P. Wroniecki)

Fig. 10. Dolsk, Dolsk Commune, Śrem County (Kotowo, Site 68). Aerial photograph of the stronghold showing rampart damage and charcoal sampling spot for radiocarbon dating (01.03.2022) (photo M. Krzepkowski)

During field inspection of the site, attention was drawn to the heavily damaged crest of the eastern rampart, oriented north to south, which had been significantly disturbed by ploughing. After ploughing, the field surface was covered with large quantities of charcoal, burnt wood, daub, and stones, all clearly originating from the fortification structures (Fig. 10). Across nearly the entire agriculturally used peninsula, large amounts of pottery fragments and animal bones were observed. Particularly noteworthy is the apparent predominance of relatively large, poorly fragmented sherds typical of ceramic production by Greater Poland communities in the early Iron Age, with only a minimal presence of early medieval pottery (Fig. 11). Naturally, we are not proposing here to establish the chronology of the fortified settlement based on surface ceramic analysis and frequency. Archaeology has fortunately moved beyond that stage. Considering the preliminary nature of the research efforts in Dolsk, it was decided to submit the material recovered by the plough from the rampart crest for radiocarbon dating. Samples were taken from two burnt wood fragments, which the Laboratory analysed for Absolute Dating in Kraków (Fig. 12).

In this case as well, although the results leave much to be desired in terms of precision, they are undeniably important in the research history of this site. At the 95 per cent confidence level, both results fall within the Hallstatt plateau: 778 to 520 BCE and 761 to 441 BCE. Although the samples did not originate from a homogeneous layer, the results provide a basis for hypothesising that the defensive site at Dolsk may have a significantly

Fig. 11. Dolsk, Dolsk Commune, Śrem County, Site 68 (Kotowo, Site 68). Pottery fragments observed on the surface of the stronghold in Dolsk (03.04.2022) 1-14 – early Iron Age, 15, 16 – early Middle Ages (later phases) (photo M. Krzepkowski)

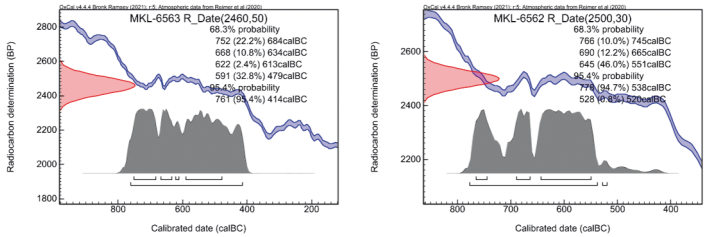

Fig. 12. Dolsk, Dolsk Commune, Śrem County, Site 68 (Kotowo, Site 68). Calibration graphs of radiocarbon dating results from burnt wooden rampart elements (compiled by M. Krąpiec)

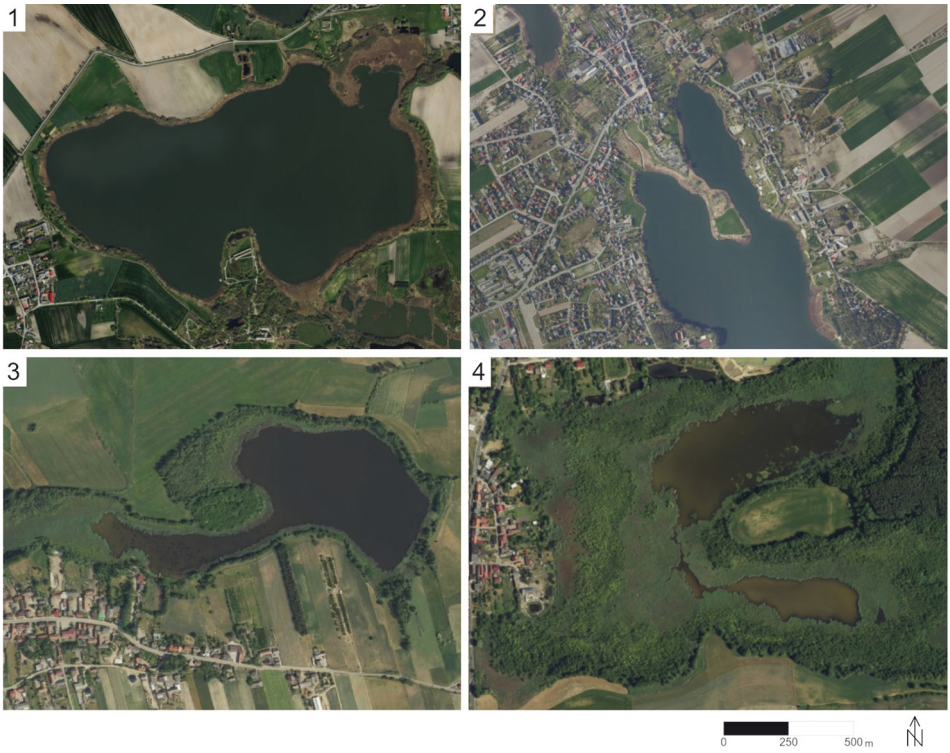

Fig. 13. Comparison of shape and location (peninsulas) of selected defensive structures from the early Iron Age in Greater Poland: 1 – Biskupin, Żnin County; 2 – Bnin, Poznań County; 3 – Cichowo, Kościan County; 4 – Dolsk, Śrem County (compiled by G. Szczurek after geoportal.gov.pl)

earlier origin than previously suggested. Support for this interpretation is also provided by analyses of the geomorphological conditions at the location, the site's size and shape, and the previously mentioned ceramic materials found on the surface. The location of fortified settlements on peninsulas is characteristic of at least one-quarter of the Hallstatt-period sites in Greater Poland. Examples include Biskupin in Żnin County, Bnin in Poznań County, and the relatively nearby site at Cichowo in Kościan County (Fig. 13). The surface area of approximately 2 hectares for the presumed early Iron Age fortified settlement in Dolsk also corresponds well with the dimensions of other similar features in the region. For example, Biskupin in Żnin County measures about 2 hectares, Smuszewo in Wągrowiec County about 2.7 hectares, Grodzisko in Pleszew County about 2.4 hectares, and Rybojady in Międzyrzecz County about 1.9 hectares (Szamałek 2009; Śmigielski and Szczurek 2013). The movable material lying on the peninsula consists of high-quality ceramics with excellent aesthetic and technological characteristics, identical to those known from other well-documented Hallstatt defensive sites in Greater Poland.

Mórka, Śrem Commune, Śrem County

Less than 10 kilometres west of Dolsk, in the village of Mórka in Śrem County, analysis of aerial imagery has produced interesting observations. On the shore of the lake that bears the village's name, an Iron Age settlement was identified in the 1980s as part of the AZP project. The area is now occupied by recreational development. Recent observations based

Fig. 14. Mórka, Śrem Commune, Śrem County, Site 68. Aerial photograph of the presumed defensive settlements (after Google Earth)

on remote sensing data have made it possible to identify an intriguing oval-shaped area of approximately 2 hectares, enclosed by a fully levelled rampart and ditch with a combined width of about 13 to 15 metres (Fig. 14). This is by far the least thoroughly documented site in the context of the settlement issues discussed here. In our opinion, however, there are reasons based on micro-location conditions, site parameters, and the chronological position of the artefactual material that conditionally warrant including this site among those requiring more extensive research.

Zaniemyśl, Zaniemyśl Commune, Środa County

To conclude, we briefly signal the preliminary results of research conducted on Edward's Island in Zaniemyśl in Środa County. Until now, the island was known mainly as the scene of the elaborate suicide of Count Edward Raczyński in 1845, who famously fired a cannon directly at his own head. Since the beginning of 2025, rescue archaeological excavations have been carried out around the foundations of a nineteenth-century larchwood Swiss-style cottage once belonging to this distinguished Polish patriot. These investigations have led to important findings that point to a much earlier phase of habitation on the island than previously recognised (Fig. 15). Beneath layers associated with nineteenth century settlement and the early medieval period, a stratigraphic layout characteristic of rampart collapse was recorded (Fig. 16). The ceramic material found in this layer is, without exception, linked to pottery traditions from the end of the Bronze Age and the beginning of the Iron Age (Żychlińska 2013; Kaczmarek 2017; Szczurek 2021). The assemblage is dominated by fragments of discoid plates and coarse-surfaced pot forms, as well as so-called tableware, carefully finished with blackened and polished surfaces (Fig. 17). The presence of ceramic material within the collapsed rampart cannot, of course, be taken as conclusive evidence for dating the entire site. The context of the finds in the relevant layers suggests secondary deposition, most probably associated with slightly earlier settlement activity that preceded the construction of the fortifications. It is important to reiterate that no later artefactual material was found in the rampart layers. This absence supports the hypothesis that the newly identified rampart remains are associated with settlement from the beginning of the Iron Age. Charred wooden construction fragments were collected during the excavations for radiocarbon dating. However, at the time this text was submitted for publication, the samples had not yet been analysed, and rescue work at the site was still ongoing.

DISCUSSION

The preliminary research results presented here warrant consideration in challenging the existing estimates of the number of defensive settlements from the Hallstatt period in Greater Poland, which are based on previously accepted findings. The observations

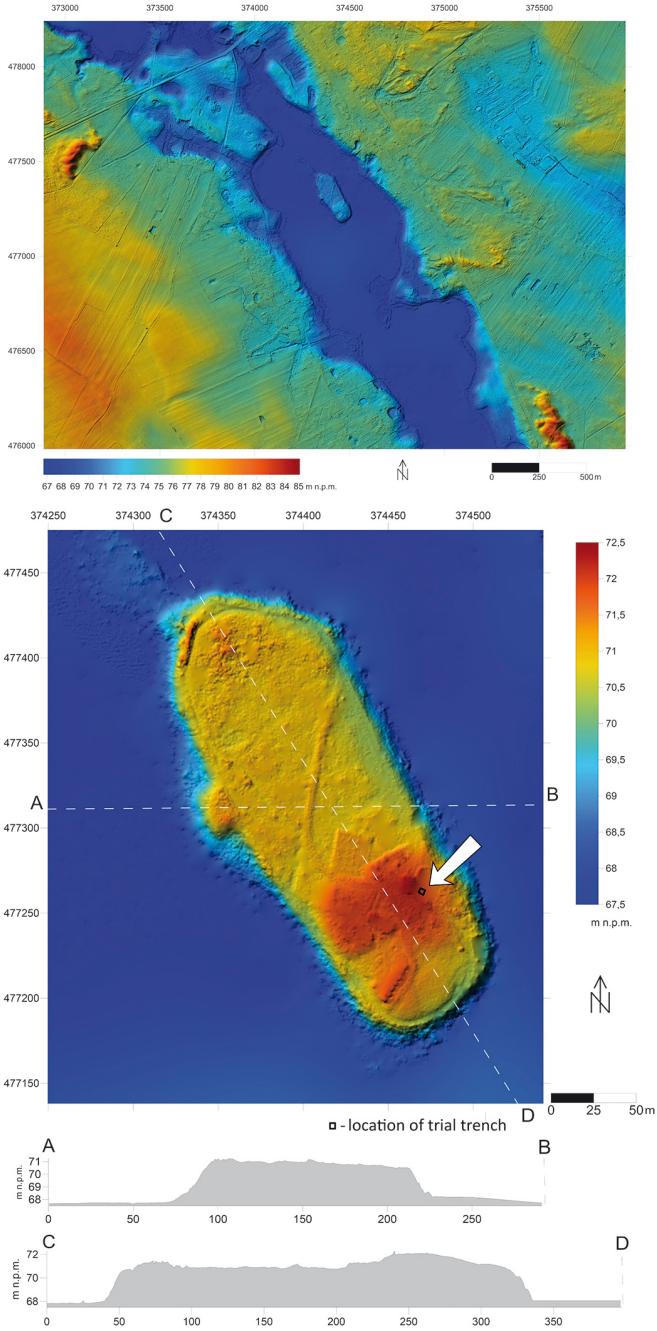

Fig. 15. Zaniemyśl, Zaniemyśl Commune, Środa County. Hypsometric visualization based on processed ALS LiDAR point cloud, source: GUGIK geoportal.gov.pl (compiled by W. Małkowski)

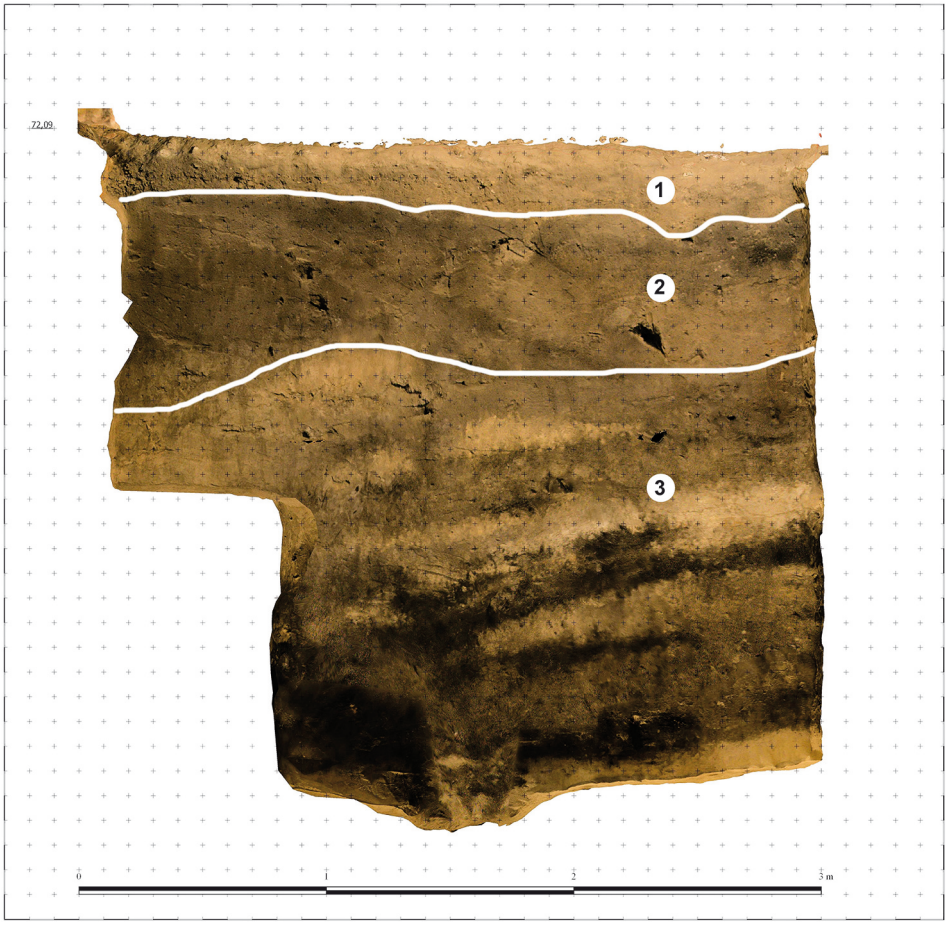

Fig. 16. Zaniemyśl, Zaniemyśl Commune, Środa County. Projection of the northern trench profile in the area of the Swiss House (compiled by A. Dębski and A. Różański)

discussed were preliminary, and while the possibility of negative verification for some of them cannot be ruled out, it appears unlikely. Even at this early stage, we already possess information that, to some extent, permits a more confident interpretation.

Definitive certainty regarding the chronological position and function of the sites briefly described here can only be achieved through excavation research that includes the entire sequence of defensive enclosures and the stratified deposits adjacent to them on the interior side, to investigate their interrelationships. This approach follows the model applied in the 1970s during the program to verify Lusatian culture defensive settlements, carried out by the Department of Greater Poland Archaeology at the Institute of the History of Material Culture of the Polish Academy of Sciences (Śmigielski 1993).

Fig. 17. Zaniemyśl, Zaniemyśl Commune, Środa County. Fragments of early Iron Age pottery recorded in the test trench within the rampart layers (photo G. Szczurek)

The preliminary nature of the work discussed and the resulting lack of adequate financial support did not allow for a research scope broad enough to determine the chronological position of individual sites with certainty. The extent of the undertaken activities was determined by the budget available to our team. Nevertheless, despite these evident limitations, the results should be considered satisfactory and provide a hopeful outlook for the future outcomes of the research efforts that have just been initiated.

The sites at Rogaczewo Wielkie and Dolsk are the most promising for a Hallstatt-period attribution of their defensive layouts, as we already have initial radiocarbon dating results for both locations.

The first two dates obtained for the wooden rampart at Rogaczewo Wielkie generally align with previous observations on the absolute chronology of Lusatian defensive settlements. However, their low precision is, of course, far from satisfactory. We are dealing exclusively with radiocarbon dating results, specifically from the clearly defined Hallstatt plateau (Walanus and Goslar 2004). The results become more acceptable if we assume that the actual age falls in the earlier part of the probability range, although this is only partially supported by modelling.

Only future planned investigations will allow a more precise determination of the site's chronological position at Rogaczewo Wielkie. It is possible that exploring stratified deposits in better-preserved, elevated parts of the rampart may yield valuable samples suitable for dendrochronological analysis. A broader excavation scope will also allow examination of the constructional and material layout of the rampart, as well as the internal architecture, including the nature of the enigmatic trapezoidal feature occupying the central zone of the enclosure. The absence of ceramic material within the rampart may indicate a lack of earlier settlement activity at this location. Despite the wooded condition of the defensive site, attempts were made to identify ceramic material in exposed areas such as animal burrows, uprooted trees, and molehills. Unfortunately, these efforts did not result in the recovery of a single pottery fragment, nor any metal artefacts.

This situation requires us to adopt a perspective somewhat different from the traditional interpretation of a Lusatian Urnfields defensive settlement. It is clearly too early to determine the role of this site within local settlement structures. Other, less conventional interpretations must also be considered, including ones not directly related to a settlement function in the strict sense. This is particularly relevant in light of the mysterious trapezoidal outline within the enclosure. On the other hand, if geophysical prospection confirms the absence of anomalies that could be correlated with domestic or utility structures, then it is worth considering the possibility that this may be an abandoned construction, left unfinished or used only briefly. Such cases are well documented in later historical periods (Wroniecki *et al.* 2021), and there is every reason to believe that similar instances occurred during the Hallstatt period as well. After all, ill-considered and unsuccessful decisions have always been a part of the human journey.

In the case of the defensive site at Dolsk, although the samples used for radiocarbon dating did not originate from a homogeneous layer, when combined with other data such as location, shape, surface area, and surface artefacts, we have a solid basis for formulating the hypothesis that this site expands the catalogue of early Iron Age defensive settlements in Greater Poland. The information obtained thus far through the research process clearly demonstrates that the site situated on the peninsula of Małe Dolskie Lake holds significant cultural value as an archaeological site, along with a previously underappreciated scientific and cognitive potential (Krzepkowski 2024). This is only one site among a long list of locations forgotten or overlooked by both academic research and heritage protection services, yet 'valued' by amateur metal detectorists, whose destructive activity is evidenced by countless pits scattered across the field.

As in the case of Rogaczewo Wielkie, the dating results align more closely with our current understanding of the absolute chronology of Hallstatt-period fortified settlements if we assume their age lies within the earlier portion of the probability range. Due to the significant flattening of the calibration curve, date modelling using OXcal software allows only for minor adjustments to individual intervals and the exclusion of the latest portion of the range, that is, after 500 BCE. The results obtained for both Dolsk and Rogaczewo Wielkie therefore fit only broadly within current observations concerning the chronology of fortification construction processes in Greater Poland during the Hallstatt period (Ważny 1994; 2009; Harding and Rączkowski 2009; 2010; Kaczmarek and Szczurek 2015). However, the possibility of later dating for the discussed sites should remain admissible, as is supported, among other evidence, by radiocarbon dates obtained for defensive settlements in the Chełmno Lake District (Gackowski 2012). It should be emphasised that the anomalies recorded during geophysical prospection form a complex system indicative of a multi-phase structure at Dolsk. Their precise dating and chronological differentiation will require extensive excavation, during which well-documented samples can be obtained for absolute dating, including radiocarbon analysis, but above all, dendrochronology. The physical characteristics of the timber fragments from the rampart structure brought to the surface by agricultural activity support the likelihood that future excavation will uncover preserved beam remains suitable for dendrochronological analysis, allowing the precise determination of the felling dates of the trees used in the construction of the fortifications.

There is much to suggest that future work will not yield definitive conclusions regarding the heavily damaged presumed site at Mórka in Śrem County. If we provisionally accept that the defensive perimeter enclosing part of the small headland is chronologically consistent with the ceramic material recovered during surface surveys, then, hypothetically, it would have had a form that departs from the known early Iron Age patterns. Fortifications from the Hallstatt period, not only in Greater Poland, were typically characterised by massive, structurally varied ramparts made of wood, stone, and earth, or by constructions combining multiple building materials (Puziuk 2010). When using the term 'defensive settlement' as a synonym for 'stronghold' or 'fortified site,' it is worth

reflecting on the conceptual scope of this designation. Including such sites within the category of defensive settlements in the strict sense, as understood in the scholarly literature, would undoubtedly be an overstatement. The character and constructional solutions of the defensive perimeter at Mórka may, unfortunately, remain forever unclear due to the extensive destruction caused by gravel extraction.

Despite the initial stage of research on Edward's Island in Zaniemyśl, the character of settlement organisation within the Kórnik-Zaniemyśl lake channel is beginning to take shape intriguingly. Years ago, this issue was addressed by J. Fogel in the context of his studies on the Bnin microregion, with the fortified settlement on the Szyja Peninsula in Bnin serving as a key reference point (Fogel 1985). The highly probable identification of a fortified settlement in nearby Zaniemyśl, located just 10 kilometres away, undoubtedly opens a new chapter in studies of late Bronze Age and early Iron Age settlement in this part of Greater Poland (Fig. 15). The limited scope of excavation, restricted to a trench measuring 9 square metres, does not yet allow even a hypothetical reconstruction of the fortification layout on the three-hectare island. The analysis of the digital terrain model and the spatial distribution of artefactual material provides some provisional insights in this regard. It is possible that the defensive structure encompassed the southern, slightly elevated part of the island, where characteristic pottery fragments are most heavily concentrated. The enclosed site identified on Edward's Island most likely expands the catalogue of numerous early Iron Age sites located on islands, such as those at Komorowo in Szamotuły County, Słupca in Słupca County, and Ostrowie in Konin County (Szamałek 2009 and references therein).

The example of Zaniemyśl, much like the remains of the site at Przemęt in Wolsztyn County studied by R. Virchow (Malinowski 1955 and earlier references therein), clearly illustrates a category of stronghold-type sites that have become entirely unrecognisable, lacking any visible topographic form due to later settlement and urban development. The number of such sites may be pretty substantial, and their identification through remote sensing methods is, for obvious reasons, nearly impossible.

It is important to emphasise the limited spatial scope of the pilot study, which was restricted to the three counties of Kościan, Śrem, and Środa. This represents just under seven per cent of the region's total area, from which only two Hallstatt-period fortified settlements were previously known, both located in Kościan County, in the villages of Jurków and Cichowo, in the Krzywiń Commune. It would be a methodological flaw to apply simple mathematical proportions and extrapolate the observations from these three counties to the entire region. Nevertheless, such a concentration of sites with comparable chronological attribution inevitably sparks the imagination. From there, it is only a short step to proposing a model in which fortified settlements in the early Iron Age were a relatively common feature of the settlement landscape in Greater Poland.

The cluster that is beginning to emerge, comprising the defensive sites at Jurków, Rogaczewo Wielkie, and Cichowo (all located within Krzywiń Commune), as well as Dolsk

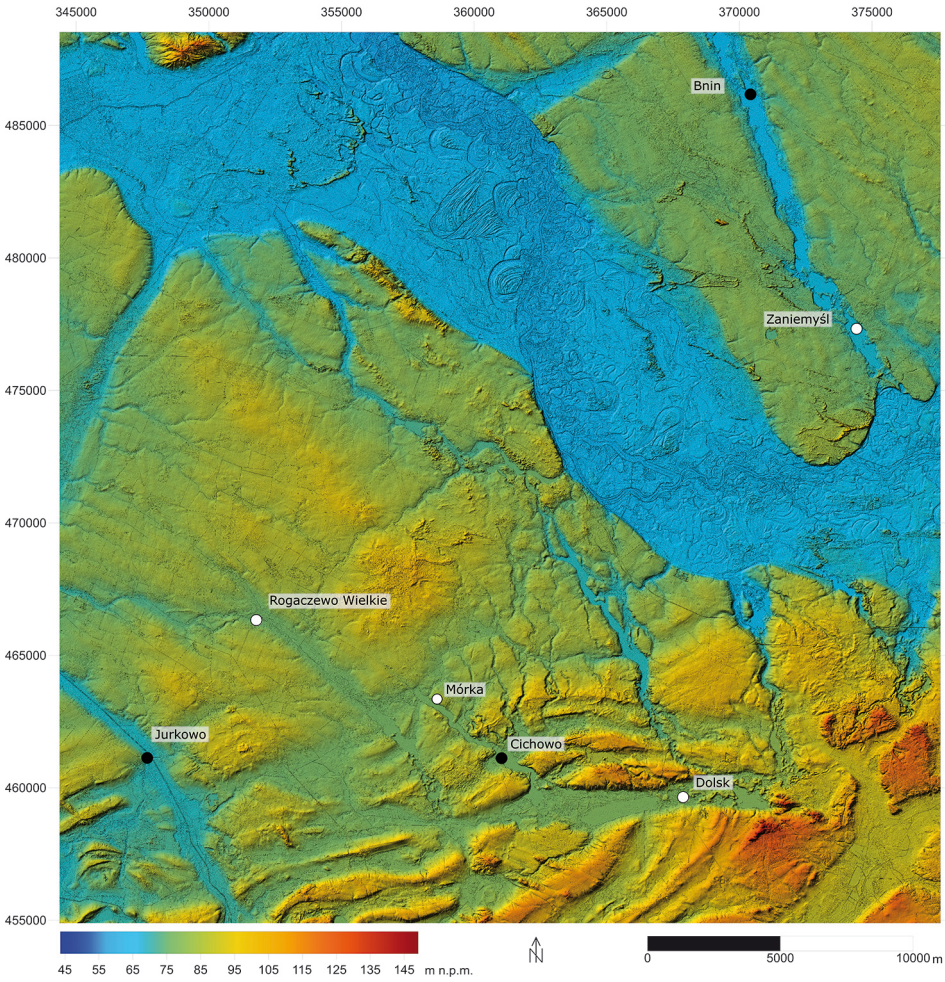

Fig. 18. Distribution of early Iron Age defensive sites in the Krzywiń Lake District and the Kórnik-Zaniemyśl lake valley. Black dots mark sites previously known in the literature, white ones mark those discussed in this article (compiled by G. Szczurek and M. Krzepkowski)

and, potentially, Mórka, is increasingly intriguing. Such a concentration of defensive settlements has not previously been observed in Poland. The frequency of fortified sites in this area may be higher than in the Pałuki region, which has held the lead in research on this phenomenon since its earliest stages (Figs 18 and 19). This area offers an excellent research ground for micro and mesoregional studies and for attempts to explain the place and function of early fortified enclosures within the settlement network of southern Greater Poland. Realising this fascinating objective will require long-term and interdisciplinary research, but there is no doubt that the effort should be made. It is at the most basic level

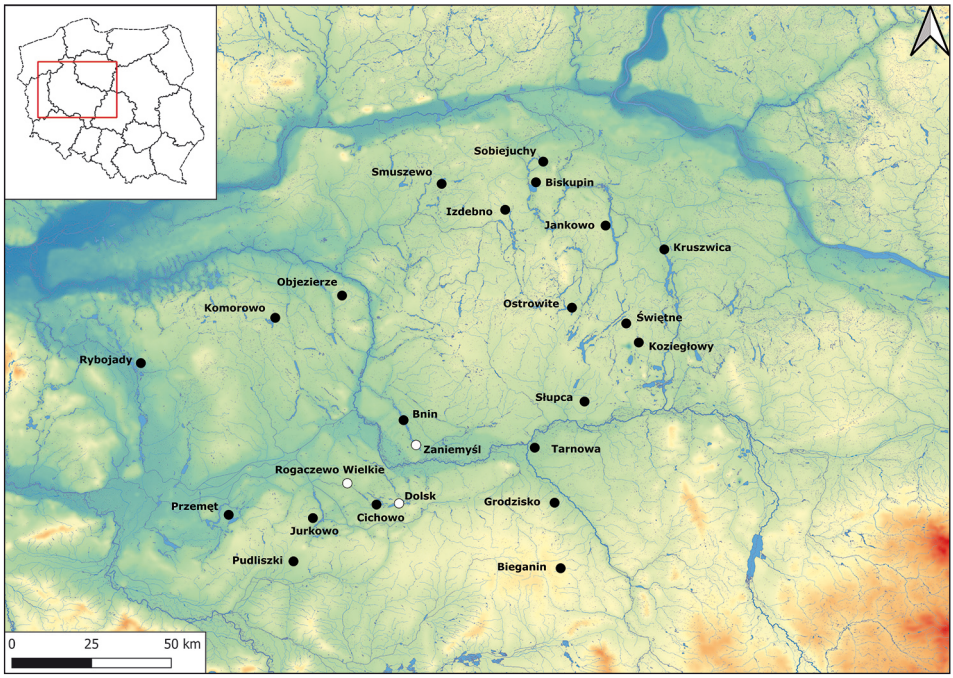

Fig. 19. Defensive settlements from the beginning of the Iron Age in Greater Poland in light of the current state of research – black dots (compiled by G. Szczurek after Śmigielski 1993; Kaczmarek and Szczurek 2015, with additions), including presumed new defensive sites discussed in this article – white dots

of organisational analysis — the microregional scale — that the most significant research potential lies, offering the possibility of identifying real past social and economic structures. The investigations within the Krzywiń Lakeland may mark the beginning of a new chapter in the study of fortified settlements in Greater Poland during the early Iron Age. They may help lift the field out of the stagnation it has undoubtedly endured for several decades.

FINAL REMARKS

More than one hundred years after J. Kostrzewski initiated research on defensive features from the beginning of the Iron Age, we still appear to be at a very early stage in understanding the nature and scale of this phenomenon. Throughout the past century, successive catalogues of Lusatian defensive settlements have shown considerable variation. Over time, they exhibited a clear tendency to expand. From thirteen sites identified at the outset of studies in the 1920s (Kostrzewski 1923), the number grew to 45 before the completion of verification work by W. Śmigielski and D. Durczewski (Śmigielski 1991 and earlier references therein), as well as research on early medieval strongholds by Z. Kurnatowska

and A. Łosińska (Kurnatowska and Łosińska 1981). Until now, the catalogue of defensive sites in Greater Poland with a Hallstatt-period attribution confirmed through excavation included 21 entries. In light of the most recent research findings presented in this article, this number will likely increase soon. The level of documentation concerning the site at Rogaczewo Wielkie already provides substantial grounds for such an addition. Further research is mainly required for the sites at Dolsk and Zaniemyśl, but even in these cases, solid source-based evidence supports this chronological classification.

Observations from three adjacent counties in Greater Poland authorise the hypothesis of a decidedly greater intensity of defensive settlement in the Hallstatt period than is confirmed by the current results of excavation work. Decisive progress in these studies will undoubtedly be driven by systematic, reliable remote sensing surveys covering the entire region. The picture that is beginning to emerge is much more complex and dynamic than previously thought, and it can be expected that large-scale application of aerial photography, LiDAR data analysis, and geophysical research will continue to significantly expand the corpus of known sites and our understanding of their functions (*cf.*, Fernandez-Gotz 2018). Important progress should also be associated with the re-analysis of some sites previously verified negatively, but for which such elementary analytical work as dating by natural science methods was not carried out. The implementation of a broadly conceived work will inevitably lead to a significant increase in the number of known fortified settlements in Greater Poland from the beginning of the Iron Age. In our assessment, estimates at least 50% higher than the current compilation are not exaggerated. Accepting as at least somewhat representative the observations from an area of less than 2000 km^2 of the region, since that is what the three counties covered by preliminary research encompass in total, one should decidedly lean toward the need to modify the existing picture of defensive settlement in the Hallstatt period in Greater Poland.

Acknowledgements

We extend our thanks to the Landscape Parks Team of Greater Poland Voivodeship, which financed the survey work in Rogaczewo Wielkie, Kościan County, and to the Voivodeship Office for the Protection of Monuments in Poznań for financing and enabling the presentation of non-invasive research results in Dolsk, Śrem County, carried out by the Relicta Foundation. Thanks to funds allocated by the Relicta Foundation and the Monument Protection Foundation, it was possible to date samples from the fortified settlement in Dolsk. We thank our colleagues, Dr. Marcin Maciejewski and Dr. Robert Staniuk, for rightly drawing attention to the need to include the site in Pudliszki, Gostyń County, in compilations of defensive settlements associated with the Lusatian Urnfields.

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