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FIELD SURVEY AND MATERIALS

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EARLY HOLOCENE SETTLEMENT IN THE MIDDLE NOTEĆ VALLEY. NEW EVIDENCE FROM THE MESOLITHIC SITE IN UJŚCIE

ABSTRACT

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The paper present the newly registered early Mesolithic Ujście Site 37 located on the edge of Toruń-Eberswalde ice-marginal valley. Inferring from techno-typological analysis of collected lithic materials, the site consists of two settlement horizons of Preboreal/Boreal chronology: the older related to the Duvensee/Komornica complex and the younger correlated with the Maglemosian complex. The chronological sequence is comparable with that known from the adjacent sites Krzyż Wielkopolski 7 and Żuławka 13. The paper presents the results of preliminary studies of Ujście Site 37 and its potential for future research on Mesolithic settlement in Central European Plain.

Keywords: Early Holocene, Mesolithic, ice-marginal valley, Duvensee/Komornica complex, Maglemose complex

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1. INTRODUCTION

Mesolithic research in Poland is characterised by two phenomena. On the one hand, the intensity of excavations results in an abundance of registered open-air sites on sandy terraces or dunes. On the other hand, the acidic environment of the sandy sediments where Mesolithic settlements are located causes almost complete decomposition of organic material – bone, antler, wood, *etc*. Therefore, Mesolithic sites in Poland, on which the narrative of the distant past is based, consist mainly of numerous flint specimens recorded in large scattered concentrations (Kobusiewicz 1999, 91; Domańska and Wąs 2007, 143). For this reason, the cognitive potential of such sites is significantly limited. The lack of organic material for precise dating of settlements determines a greater reliance on techno-typological methods (Sørensen 2006), often in the absence of a certain homogeneity of assemblages.

For many years, researchers have emphasised the key role of stratified sites located in such a sedimentary environment that would provide more non-lithic, organic sources, broader possibilities for palaeoenvironmental research and dating of settlement horizons, which could significantly increase the potential of Mesolithic research (Kobusiewicz 2000; Sørensen *et al*. 2018, 310; Kabaciński 2022).

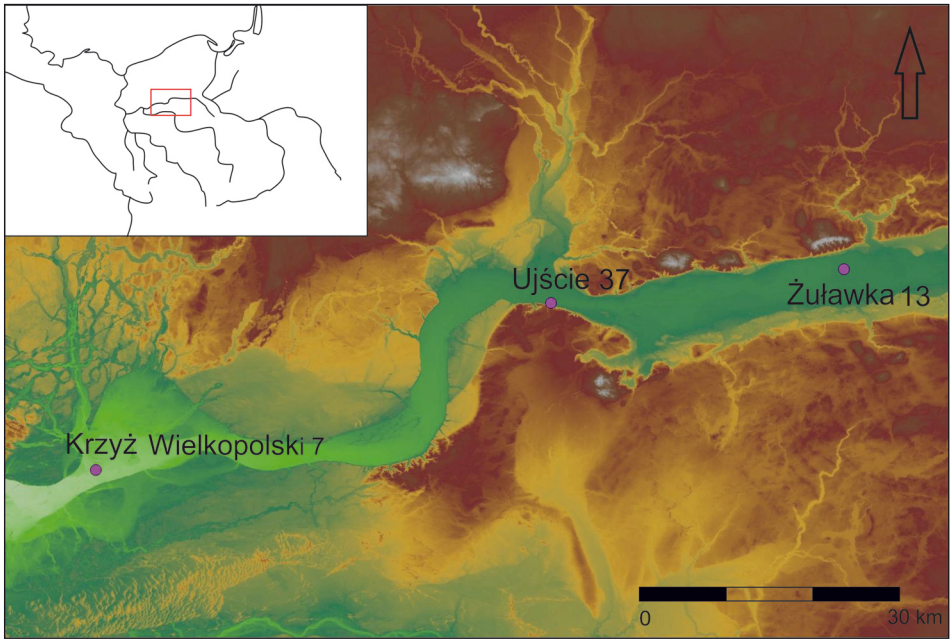

Fig. 1. Digital terrain model of the Middle Noteć Valley with Early Mesolithic sites mentioned in text marked

Fig. 2. Location of Ujście Site 37 plotted on the Prussian *mestischblatt* from the early 20th century. Note the passage for cows "*kuhbrücke*" where the antler adze was found

The presence of such sites is related to the occurrence of ice-marginal valleys – geological forms endemic to the areas of the Central European Plain, particularly Poland and Germany. A series of latitudinal proglacial valleys in central Poland undoubtedly provided an important corridor for human group movements and favourable conditions for settlement (Kozłowski 1989, 131; Kabaciński 2022, 104). Mesolithic sites in Poland, especially from the early Holocene, are often located on the edges of such ice-marginal valleys.

Special attention can be paid to the Toruń-Eberswalde ice-marginal valley (Fig. 1), where significant traces of Early Mesolithic settlement, in particular Site 7 at Krzyż Wielkopolski associated with the Late Preboreal and Boreal periods, have been recorded and studied in recent decades (Kabaciński *et al*. 2008; Kabaciński 2017). A very rich collection of wooden objects, bone and antler tools, fibre objects and faunal material was recovered from the Krzyż Wielkopolski Site 7, located at the northern edge of the Noteć valley, by an oxbow lake that was filled with peat deposits in the present day. Another site in the middle Noteć valley is Żuławka Site 13, where an Early Mesolithic settlement was recorded on the dune formed on the lower terrace of the river (Dmochowski 2005; Pyżewicz 2019).

In order to widen the scope of the observations, the authors, on behalf of the Institute of Archaeology and Ethnology PAS, have in recent years carried out intensive archival re-

search, surveys and initial excavations along the terraces and in the middle Noteć valley in order to detect similar Mesolithic settlements. During the intensive melioration of the Noteć valley in the 19th and early 20th centuries, numerous individual finds of Mesolithic chronology were found in the peat bog. These finds were handed over by local people to various museums, including the Archaeological Museum in Poznań. Special attention was paid to the area around the towns of Ujście and Nowa Wieś Ujska in the northern part of the Wielkopolska Region along the middle Noteć Valley, near the mouth of the Gwda River into the Noteć River (Fig. 1). In the 19th and early 20th centuries, several tools made of deer antler were found there and transferred to the Poznań Archaeological Museum.

The exact location of finding of one of the artefacts is known from the letters of its discoverer and the notes of the local authorities – documents currently kept in the archives of the Poznań Archaeological Museum. The adze was found in 1899 during the construction of a small bridge that allowed cows to cross from the village of Nowa Wieś Ujska, located on the southern bank of the Noteć, to the pastures on the other (northern) side of the river. From the valley, together with Mesolithic tools, a medieval sword and an iron axe were found. When analysing an old map from a slightly later period, a "bridge for cows" can be seen, which is undoubtedly the one described in the archive notes (Fig. 2).

The above mentioned findings were the reason for initiating a new archaeological project connected with a wider recognition of the research potential of the site located at the former bridge in Ujście.

2. UJŚCIE SITE 37

2.1. Geomorphology

The site is located on a slight rise, right next to the steep edge of the valley (Fig. 3). In the context of the overall morphology of the Toruń-Eberswalde ice-marginal valley, the section near Ujście is characterised by a large narrowing bottleneck. At this point, the Noteć River flows along the southern bank of the ice-marginal valley. The site is therefore located between its present bed and the bank of the ice-marginal valley. The edge of the proglacial valley at this site is characterised by numerous water streams cutting its edge. The high energy discharge caused the formation of an alluvial cone at the mouth.

The elevation where the river crossing was built and where the Mesolithic settlement was located is on such an alluvial cone. As the results of the examination of borehole data from 2014 and 2017 the complicated dynamics within the proglacial valley was revealed and the presence of gyttja in the lowest part, overlain by fluvioglacial deposits on which archaeological material was present, then covered by peat layers from the younger phase of the Holocene accumulation (Fig. 4). Modern ploughing in the valley has exposed some of the material lying beneath the upper peat layer on the surface.

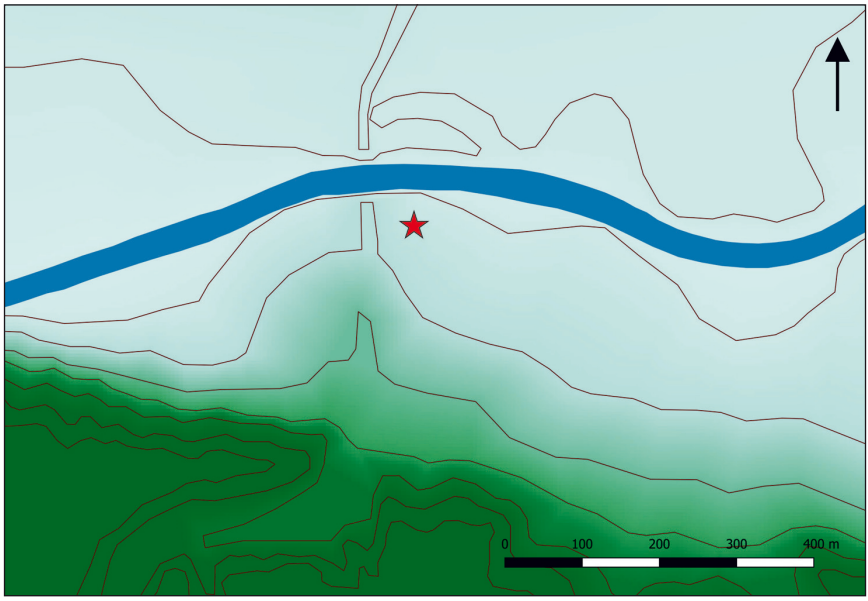

Fig. 3. Digital terrain model of Ujście site

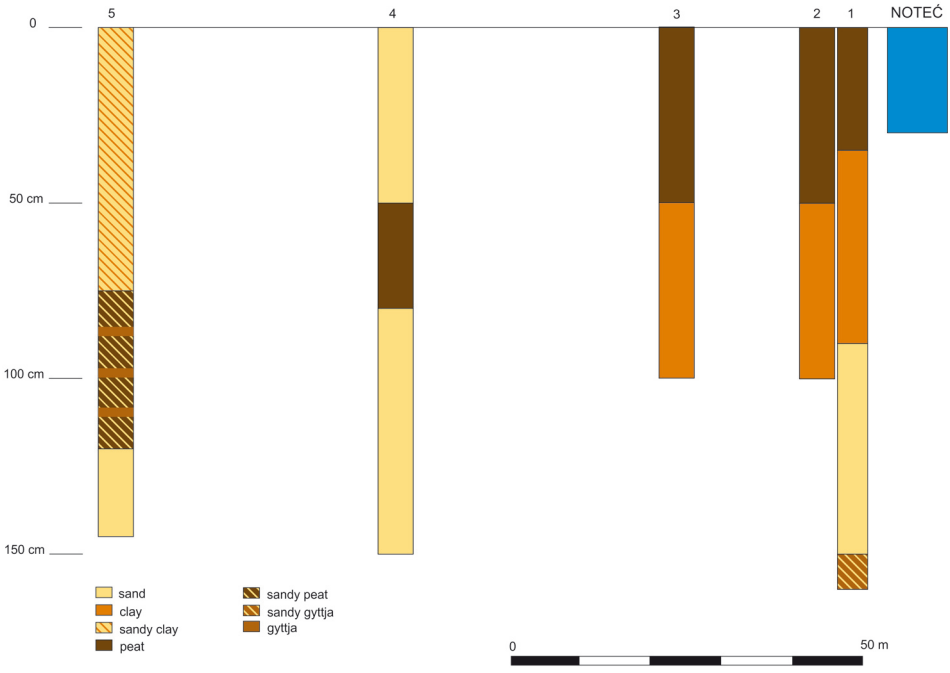

Fig. 4. Cross-section through Noteć valley at Ujście Site 37. Location of drillings marked on Fig. 8

2.2. Material in the Museum collection

A collection of five Mesolithic antler artefacts from Ujście is currently kept in the Archaeological Museum in Poznań. Four antler tools were found in the 1930s. The exact location of the findspots is unknown. Two of them are adzes made from the basal part of a shed deer antler (Fig. 5). The brow tine was cut close to the base. The working edge, which was placed on the beam, was prepared by grinding. The third tool is a mattock made from the middle part of a beam, the perforation is drilled perpendicularly through the beam (Fig. 6: A). The fourth artefact is a long object made of basal and beam parts. It has a perforation in the base and a shaped brow tine (Fig. 6: B). This type of object is often considered to be a non-utilitarian zoomorphic artefact, associated with symbolic and social significance (Kabaciński *et al.* 2011). The other tool was found at the end of the 19th century. It is an adze made from the basal part of a deer antler (Fig. 7). The tool is elongated, with the working edge formed on the beam perpendicular to the axis of the perforation. The morphology of the tools is diverse, but typical for early Mesolithic industries (Pratsch 2011); analogous types of antler tools are also known from Krzyż Wielkopolski Site 7 (Kabaciński 2009; Winiarska-Kabacińska and Kabaciński 2017).

2.3. Field Evaluation and Test Excavation

The area east and west of the former 'cow bridge' was initially surveyed in the spring of 2014 to locate the site. It appeared that there was a concentration of lithic material and individual animal bone fragments to the east of the bridge, suggesting good preservation of organic materials. Some initial surface geology and geomorphology drilling was also undertaken in that year. The archaeological investigation continued in 2017, when a two-stage survey was undertaken consisting of a further surface survey but also a trial excavation. Flint and animal bone fragments were recorded during this research. The surface survey identified the location of a relatively dense scatter of archaeological material and two trenches of limited size (Fig. 8) were dug. The detailed survey, from the river bank to the edge of the lower terrace of the two sides of the bridge scarp, covered an area of approximately 1000 m^2. On the surface, along with concentrations of flint artefacts, individual bone fragments were recorded. The area with the highest concentration of lithics was to the east of the remains of the bridge, close to the modern channel of the Noteć River. Two small trenches were set in this area. Trench 1/2017 (2 m × 2 m) was located 24 m south of the river bank, while trench 2/2017, 1 m × 3 m, was located 4 m further north. Sediments from the excavations were screened using water pumped from the river.

The profiles of both trenches showed a simple sequence of a main layer of black peat, well decomposed, with the humified peat soil on top and a layer of clay underneath (Fig. 9). The bottom of the peat layer was located between 40 cm (trench 1/2017) and 70 cm (trench 2/2017) below the surface. The archaeological material was recorded from the surface through the entire depth of the peat layer to the top of the clay.

Fig. 5. Antler adzes from the Ujście region discovered in the 1930s (Photo: J. Kabaciński; archive of Poznań Archaeological Museum)

Fig. 6. Antler tools from Ujście region discovered in 1930s.
(Photo: J. Kabaciński; archive of Poznań Archaeological Museum)

Fig. 7. Antler adze from the Ujście site discovered in 1899
(Photo: J. Kabaciński; archive of Poznań Archaeological Museum)

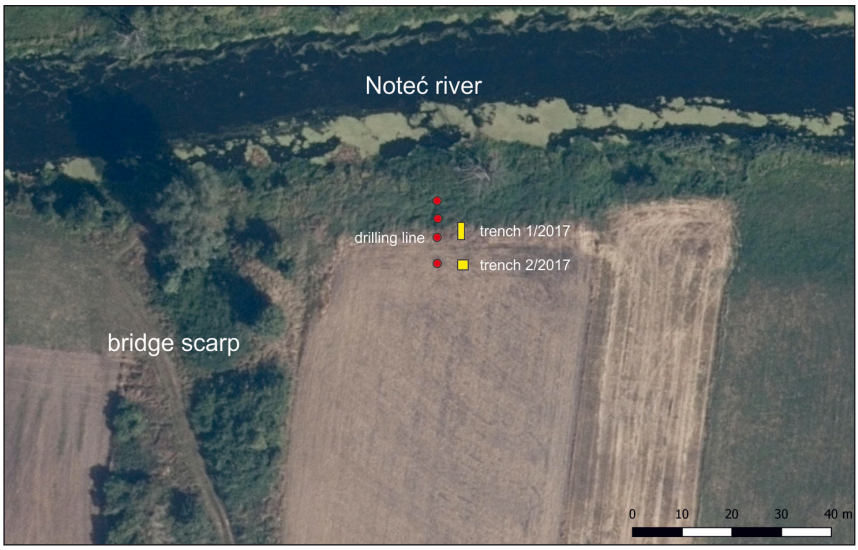

Fig. 8. Ujście Site 37. Location of Trenches and drillings

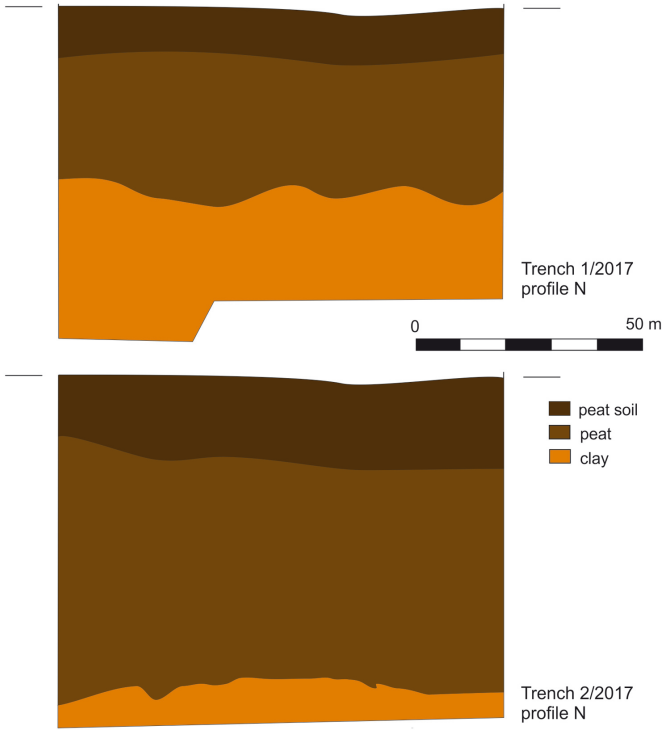

Fig. 9. Ujście Site 37. Profiles of Trenches 1/2017 and 2/2017

2.4. Material

The flint assemblage obtained from both investigations (the surface survey and the excavation) consists of 341 pieces (198 pieces from the excavation and 143 pieces from the surface survey). The assemblages were analysed using the dynamic technological classification method (Schild *et al.* 1975; Schild 1980). The summarised results of the analysis are presented in Tables 1 and 2.

Within the debitage group, the number of blade and flake samples is almost equal. Blades come exclusively from the processing of single platform cores, while flakes also come from opposed platform cores and cores with changed orientation. The group of technical forms is relatively common with dozens of crested blades, several core-trimming flakes and flakes from platform rejuvenation. The group of cores is dominated by single platform cores for blades. Out of a total of 32 cores, 10 are single platform cores for blades. Four of them were exploited using a pressure technique (Fig. 10: 1, 3, 4), the others a direct

Table 1. Ujście Site 37 – debitage classification with overall frequencies and main metrical data

		Excavation			Surface		
Group	Type	Amount	Largest (mm)	Smallest (mm)	Amount	Largest (mm)	Smallest (mm)
I	cortical flakes	9	50 × 50 × 27	19 × 24 × 6	12	42 × 36 × 19	14 × 16 × 4
	cortical blades	3			3	50 × 15 × 10	33 × 14 × 6
	initial core	1	54 × 36 × 38		2		
	crested blades	8	58 × 33 × 20	24 × 10 × 13	4	30 × 14 × 9	22 × 17 × 7
	core trimming flakes	1			3	41 × 40 × 19	22 × 17 × 7
II	Single platform \ cores for flakes				3	29 × 21 × 38	
						17 × 24 × 23	
						35 × 34 × 30	
	Flakes from single platform cores	13	44 × 43 × 20	18 × 13 × 3	13	32 × 23 × 9	20 × 16 × 3
	Opposed platform cores for flakes	2	22 × 20 × 11		2	31 × 31 × 28	
			29 × 21 × 16			33 × 21 × 14	
	Flakes from opposed platform cores	1			1		
	Cores for flakes with changed orientation	2	28 × 28 × 24		5	27 × 40 × 18	
			21 × 17 × 14			39 × 29 × 25	
						24 × 51 × 42	
						33 × 35 × 37	
						23 × 18 × 36	
	Flakes from cores with changed orientation	2	20 × 19 × 11		4	59 × 69 × 23	18 × 19 × 4

Table 1.

		Excavation			Surface		
Group	Type	Amount	Largest (mm)	Smallest (mm)	Amount	Largest (mm)	Smallest (mm)
III	Single platform cores for blades	5	40 × 24 × 6		5	56 × 41 × 36	
			28 × 19 × 18			46 × 17 × 31	
			27 × 20 × 15			29 × 16 × 13	
			38 × 24 × 10			37 × 25 × 13	
			21 × 20 × 18				
	Blades from single platform cores	17	29 × 12 × 4	23 × 6 × 3	13	43 × 14 × 5	29 × 14 × 4
	Opposed platform cores for blades				1	20 × 22 × 9	
IV	Scaled pieces	1	28 × 17 × 16				
V	Core tablet	1	24 × 22 × 23				
	Rejuvenation flakes	2	26 × 20 × 7				
VI	Core fragments	4			1		
	Non-identified flakes	14			12		
	chips	65			5		
	chunks	26			18		
	Total	176			107		

percussion technique (Fig. 10: 2, 5; Fig. 12: 2, 4, 7, 8). The cores are small – not exceeding 50 mm in length, usually with a plain platform and a prepared side or back of the core. Less frequent are cores for flakes with changed orientation (5 pieces – Fig. 10: 6, 7), opposed (4 pieces – Fig. 10: 8, 10; Fig. 12: 6) and single platform cores for flakes (3 pieces – Fig. 12: 1, 5). They also tend to have plain or cortical platforms and limited preparation. Three cores have a facetted platform. Only one example of opposed platforms core for blades was recorded (Fig. 12: 3). Relatively small nodules have plain platforms and lack any preparation. All core angles are acute within 75-90 degrees. Single scaled piece was registered in the inventory (Fig. 10: 9).

A total of 57 tools were recorded in both contexts – surface and Trench. Burins and flake axes were the two main tool types recorded in relatively large numbers. The group of burins is very diverse and includes dihedral burins (Fig. 11: 5; Fig. 13: 1), burins on the natural surface (Fig. 11: 6), on a truncation (Fig. 13: 2), multiple burin (Fig. 11: 4; Fig. 13: 3) and one tool made on an exhausted core (Fig. 13: 4). Flake axes (eight examples) are made on highly exploited cores (two specimens – Fig. 13: 11, 12), chunks (three specimens – Fig. 11: 12-13; Fig. 13: 15) or flakes (three tools – Fig. 11: 11; Fig. 13: 13, 14). End scrapers are less frequent (three specimens – Fig 11: 1-3). Other types such as side scraper (Fig. 13: 8), side-scraper with burin (Fig. 11: 9), perforator (Fig. 13: 6) and borer (Fig. 13: 5) are

Table 2. Ujście Site 37 – tool classification with overall frequencies and main metrical data

	Excavation			Surface		
Type	Amount	Largest (mm)	Smallest (mm)	Amount	Largest (mm)	Smallest (mm)
sidescraper	1	38 × 21 × 8				
endscrapers				3	43 × 21 × 10	10 × 30 × 11
dihedral burin	1	26 × 19 × 10		1	31 × 13 × 13	
burin on truncation	1	33 × 35 × 12		1	40 × 10 × 9	
burin on core	1	29 × 27 × 12				
burin on natural surface	1	22 × 25 × 12		3	44 × 36 × 20	29 × 25 × 12
burin spall				3		
axes	4	43 × 22 × 11	39 × 30 × 16	3	60 × 29 × 19	43 × 26 × 11
notches				1	37 × 20 × 3	
perforator	1	17 × 9 × 7				
borer	1	24 × 14 × 8				
shouldered point	1	21 × 16 × 2				
scalane triangle	1	25 × 6 × 4		1	17 × 5 × 1	
zonhoven point	1	20 × 10 × 4				
microlith non-identified	1					
combined tool (burin on truncation + endscraper)				1	36 × 22 × 14	
retouched flakes	2	47 × 29 × 13	13 × 17 × 2	7	33 × 22 × 8	21 × 13 × 4
retouched blades	2			4	54 × 14 × 11	25 × 9 × 4
retouched chip	1					
retouched chunk	1			5		
non-identified tool	1			3		
Total	22			36		

present as single specimens. The group of microliths includes two scalene triangles (Fig. 11: 10; Fig. 13: 9), a shouldered point (Fig. 13: 10) and a Zonhoven-type point (Fig. 13: 7). The remaining three categories of tools, the most numerous in total, are retouched non-distinctive debitage: retouched blades, flakes and chunks.

2.5. Faunal remains

During the survey, a total of 43 fragments of animal bones and antlers were recovered, generally small, about 10-20 mm in size. These included the remains of roe deer and large cervids (deer or elk). Although fragmented, the faunal material is well preserved. At this stage of the study, it is not possible to link the faunal assemblage to a specific phase of settlement.

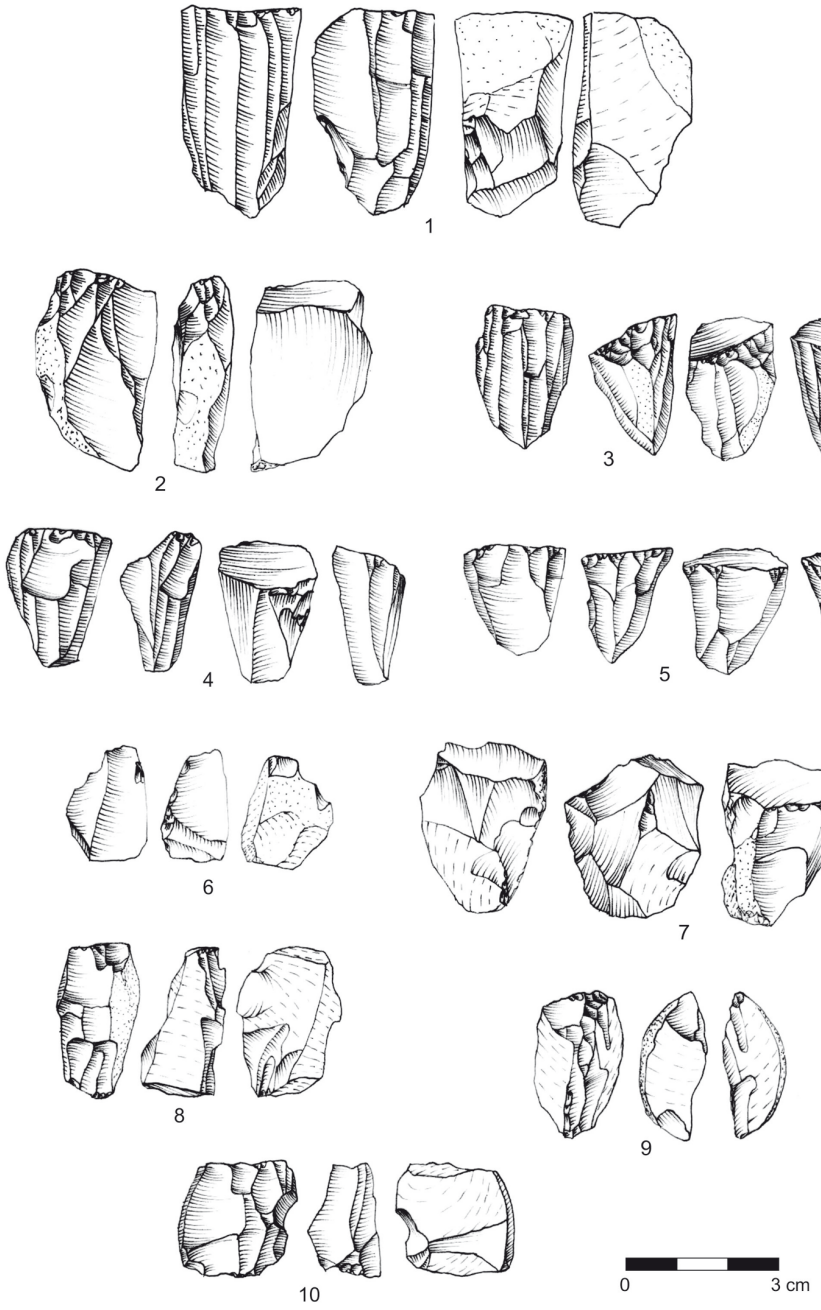

Fig. 10. Ujście Site 37 – cores and scaled pieces from excavations:
1-5 – single platform cores for blades; 6,7 – cores for flakes with changed orientation; 8, 10 – opposed platform cores for flakes, 9 – scaled piece

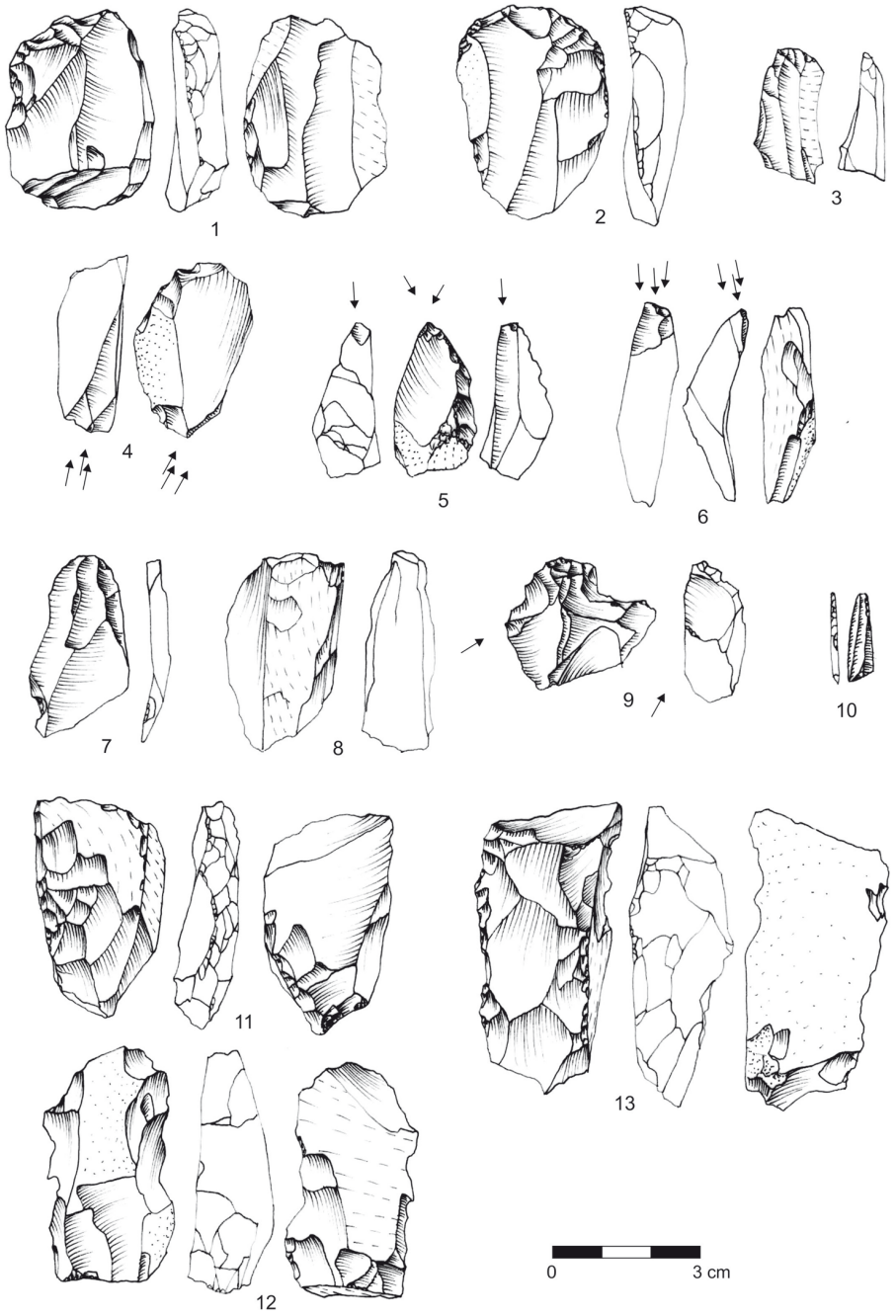

Fig. 11. Ujście Site 37 – tools from surface survey: 1-3 – endscrapers; 4 – combined tool; 5-6,8-9 – burins; 7 – notched tool; 10 – scalene triangle; 11-13 – axes

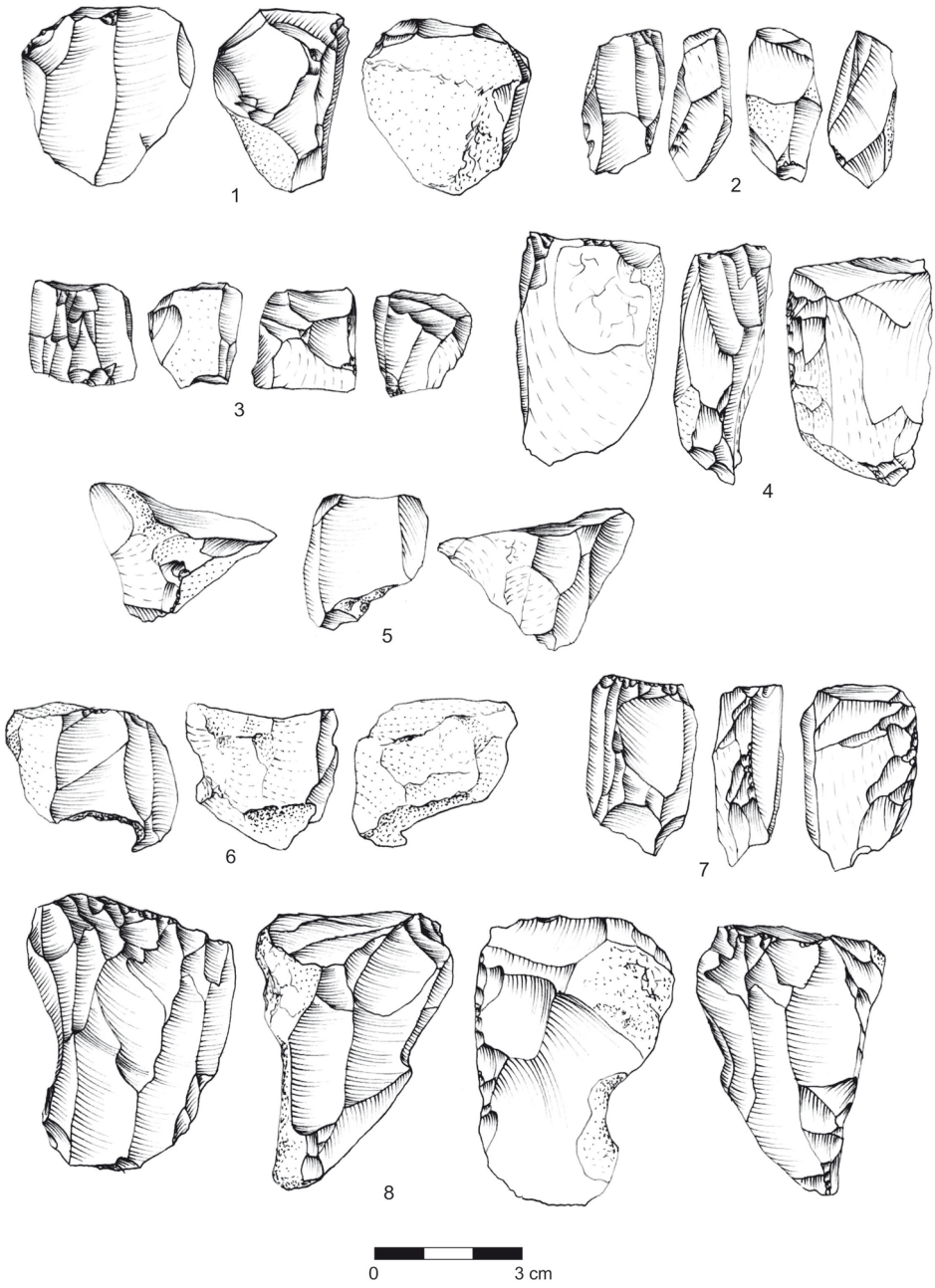

Fig. 12. Ujście Site 37 – cores from surface survey:
1, 5 – single platform cores for flakes; 6 – opposed platform core for flakes; 2, 4, 7-8 – single platform cores for blades; 3 – opposed platform cores for blades

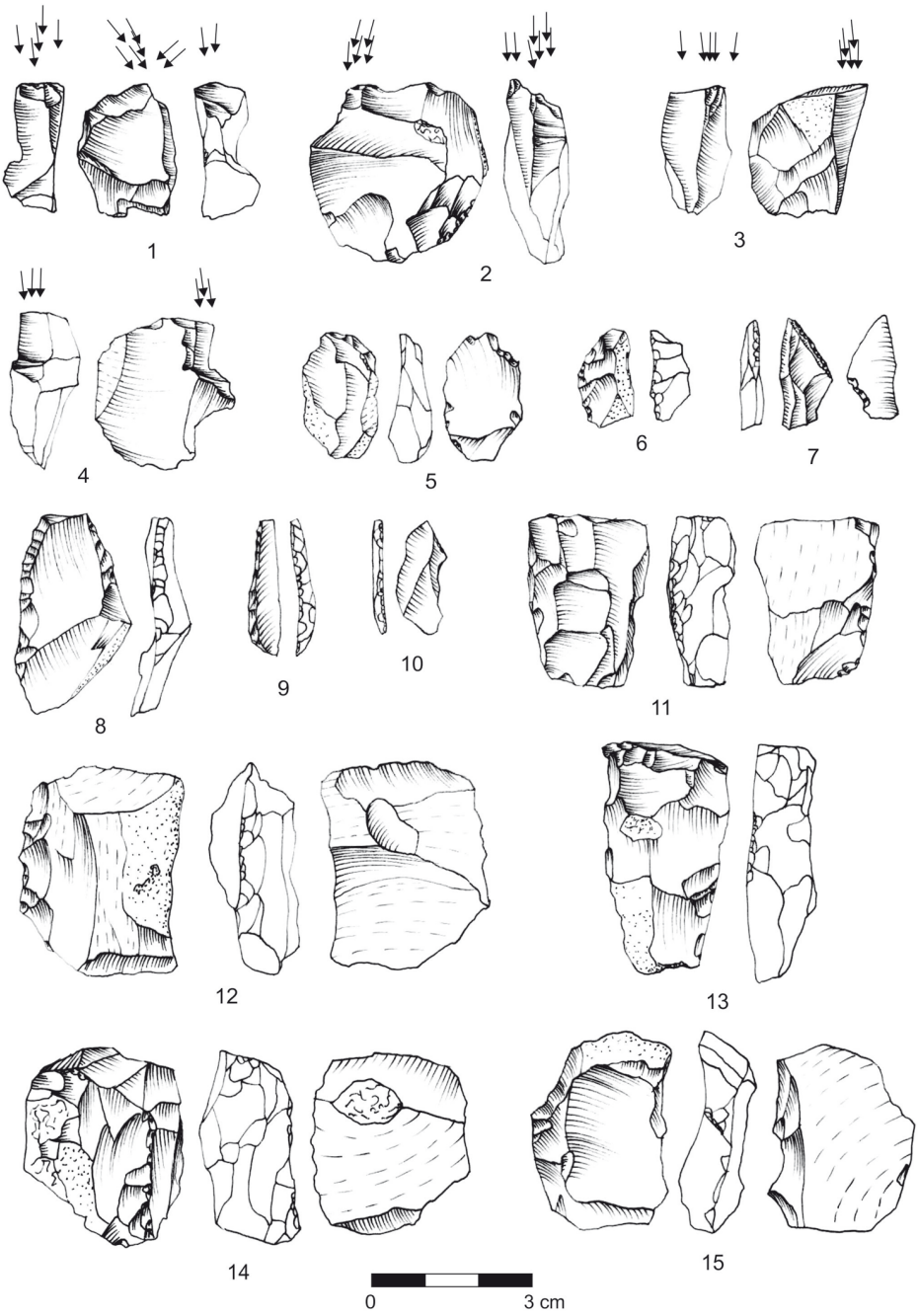

Fig. 13. Ujście Site 37 – tools from the excavations: 1-4 – burins; 5 – borer; 6 – perforator; 7 – Zonhoven type point; 8 – sidescraper; 9 – scalene triangle; 10 – shouldered point; 11-15 – axes

2.6. Chronology

An attempt was made to establish the absolute chronology of the Ujście settlement using ^{14}C dating. For this purpose, a fragment of deer antler and a fragment of long bone were sent for dating. Unfortunately, the antler could not be dated due to an insufficient amount of collagen, while the bone date was much too young for the lithic material (Fig. 14). Therefore, the only way to establish a more precise chronology for the site is through a techno-typological analysis of the lithic assemblage.

A preliminary techno-typological analysis of the archaeological material from the excavation and surface survey allows two main chronological horizons to be distinguished. The first is related to the occupation of hunter-gatherer groups of the Early Mesolithic, which can be typologically linked to the so-called Duvensee-Komornica complex, dated to the Preboreal and Early Boreal. This phase can be associated with unidirectional blade technology, which used the direct impact technique for the production of blanks. The tool inventory belonging to this older phase of occupation consists of numerous burins and flake axes made on flakes and chunks. A single specimen of a Zonhoven type point may also be associated with this Early Mesolithic phase.

However, the lithic assemblage also contains frequent elements that indicate the presence of a more recent settlement horizon. These elements are of both technological and

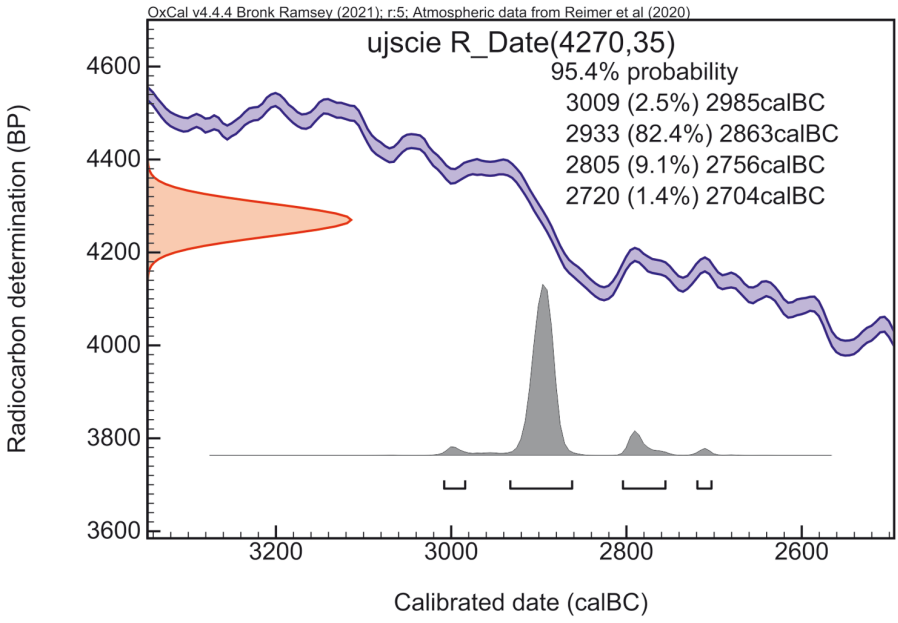

Fig. 14. Ujście Site 37 – radiocarbon date obtained from bone fragment. Calibrated using OxCal v4.4 (Bronk Ramsey 2021)

typological nature. The most significant feature is the evidence of a pressure technique used to obtain small, regular flakes. The presence of a scalene, an elongated triangle and a shouldered point can also be associated with a younger horizon. The later tool in particular can be associated with the northern cultural zone – the Maglemose complex.

3. DISCUSSION

A chronological sequence analogous to that of the site Ujście 37, consisting of an older – Duvensee – and a slightly younger – Maglemosian – phase, is observed at Krzyż Wielkopolski Site 7, located not far to the west. The settlement at Krzyż, located on a promontory between oxbow lakes in the central part of the Toruń-Eberswald proglacial valley, near the mouth of the Drawa River into the Noteć River, has provided a number of indications confirming and detailing such a chronology. The sequence of over 40 radiocarbon dates produced for the settlement at Krzyż indicates a long and relatively undisturbed continuous occupation, with no visible gaps in occupation. It falls into the early Holocene, from the second half of the Preboreal to the end of the Boreal. The analysis of the stratigraphy and the correlation of dates with the sequence of biogenic sediments of the oxbow lake suggest the existence of two settlement horizons: the first falls in the late Preboreal and the beginning of the Boreal (c. 8700-8100 cal BC), the second covers the middle and late Boreal (c. 8100-7300 cal BC) (Kabaciński 2016; 2017). This division is confirmed by the techno-typological analysis of the archaeological material.

In the flint inventory, the first settlement phase is associated with tool types characteristic of the Duvensee/Komornica tradition: Komornica type truncations, isosceles triangles and, above all, a large number of macrolithic tools: pikes and axes made of flakes and chunks. There are also numerous types of burins. In the younger phase, however, in addition to the earlier tool types, there is a much greater abundance of Stawinoga type backed blades; there are also lanceolate and Maglemosian-backed blades, as well as shouldered points. From a technological point of view, the presence of a group of cores and blades processed with the pressure technique is noteworthy.

A group of aurochs bone tools should be considered as a very important element associated with the younger Maglemosian horizon. The absence of aurochs remains indicates that these tools were not made locally but brought to the site from elsewhere. The radiocarbon date of the aurochs metapodial bone axe is 7600 cal BC, placing it in the middle of the younger occupation phase (Kabaciński 2016).

The phenomenon of this type of cultural sequence, clearly visible and described for Site 7 in Krzyż Wielkopolski, is also present at Ujście Site 37. Further down the proglacial valley, a similar cultural sequence can also be found at the Żuławka 13 site. Although the authors of the research suggest that the younger horizon is associated with post-Maglemosian communities and the Atlantic period (Pyżewicz 2019a), there is no clear evidence to ex-

clude an earlier, Late Boreal chronology and a scenario analogous to that observed in sites Krzyż Wielkopolski 7 and Ujście 37.

In the light of the data presented, it can be hypothesised that traces of the developed Maglemose complex (characteristic of the third phase of the Maglemose technocomplex – Sørensen 2012) appear as early as the Boreal Period among the Duvensee/Komornica communities inhabiting the margins of the ice-marginal valleys of Central Europe. The nature of this phenomenon of "Maglemosation" (Galiński 2002, 176) is still unclear, and it is difficult to determine whether this phenomenon reflects the exchange of cultural information, or whether it is associated with at least a partial migration of Maglemosian communities from the north, reflecting a wider process of migration in northern Europe caused by the rise of the sea level and the flooding of the Dogger Bank (Terberger 2006; Coles 1998; Lampe 2002). The presence of aurochs bone tool imports at Krzyż Wielkopolski Site 7 may at least suggest a flow of cultural goods. Certainly, in the Late Boreal, the proglacial valley corridor became part of the wider Maglemosian exchange network. However, while the emergence of pressure technology and the direction of diffusion of this innovation is still debated (Derosiers 2012), the presence of pressure technology at the Polish sites before the onset of the Atlantic Period can strengthen the hypothesis of its transmission from the east (Kunda culture) to the west (Maglemose culture) (Sørensen 2012; Sørensen *et al.* 2013; Damlien *et al.* 2018).The proglacial valley of the Polish Plain would be a cultural crossroads of different social networks.

4. CONCLUSION

The archaeological research carried out in 2017, the first at the site, was of a preliminary nature. However, it confirmed the extraordinary research potential of Site 37 in Ujście. Its scientific value is mainly due to the presence of favourable biochemical conditions at the site, which preserve artefacts made of organic materials (bone, antler, wood). This is a unique situation, extremely rare in Mesolithic sites on the European Plain. The importance of the site is increased by the presence of two phases of Mesolithic settlement associated with the occupation of the first Mesolithic groups of the Duvensee/Komornica complex in the Polish Plain and the early presence of the Maglemose complex.

Acknowledgements

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