

Danuta Żurkiewicz<sup>1</sup>, Jakub Niebieszczanski<sup>2</sup>,  
Jan Romaniszyn<sup>3</sup>, Sebastian Teska<sup>4</sup>

## FIRST EARTHEN LONG BARROWS IN CENTRAL GREATER POLAND. RESULTS OF TEST EXCAVATIONS IN FBC CEMETERY, SOBOTA, SITE 52

### ABSTRACT

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The article presents the results of test excavations on one of the first Funnel Beaker culture long barrow cemeteries explored in the middle Warta River catchment, Greater Poland. The excavations at Sobota Site 52 near Poznań covered 80 sq. m and cut across the heads of two (M4 and M5) out of five barrows. Neolithic and Roman period materials were recovered. Burnt animal bones found in excavated barrow mounds were radiocarbon dated, indicating the interval of 36335-3520 BC (at the probability level of 95.4%). As far as can be deduced from the narrow strip explored, the side enclosure of the barrows consisted of ditches dug into the undisturbed soil and filled with boulders of various sizes. A stone envelope/pavement could have also once covered the mounds of these barrows. The Sobota barrows seem to find no analogy in the structures of this type in the Funnel Beaker culture eastern group.

Keywords: Greater Poland, Funnel Beaker culture, earthen long barrows  
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1 Adam Mickiewicz University, Faculty of Archeology, Uniwersytetu Poznańskiego st. 7, 61-614 Poznań, Poland; danuta@amu.edu.pl; ORCID 0000-0002-5219-0622

2 Adam Mickiewicz University, Faculty of Archeology, Uniwersytetu Poznańskiego st. 7, 61-614 Poznań, Poland; jakubniebieszczanski@gmail.com; ORCID 0000-0002-2147-7620

3 Adam Mickiewicz University, Faculty of Archeology, Uniwersytetu Poznańskiego st. 7, 61-614 Poznań, Poland; jan.romaniszyn@amu.edu.pl; ORCID 0000-0002-0562-7414

4 Archaeological Museum in Poznań, Wodna st. 27, 61-781 Poznań, Poland; sebastian.teska@gmail.com; ORCID 0000-0002-2913-6898

## INTRODUCTION

Until 2018, the area of central Greater Poland was devoid of discoveries related to classic long earth barrows of the Funnel Beaker culture (FBC) (Żurkiewicz 2021). The forms identified here were classified into tombs of other types, also much younger, dating back to the first half of the fourth millennium BC (Wierzbicki 2013, 234-237).

New research indicates that the discoveries from Sobota may not be the only discoveries of this type for the Greater Poland region. Research is currently underway on the verification of further individual tombs and complex cemeteries. Verifying their existence will significantly change the current image of the community inhabiting the area of the central Warta River basin (Żurkiewicz 2022).

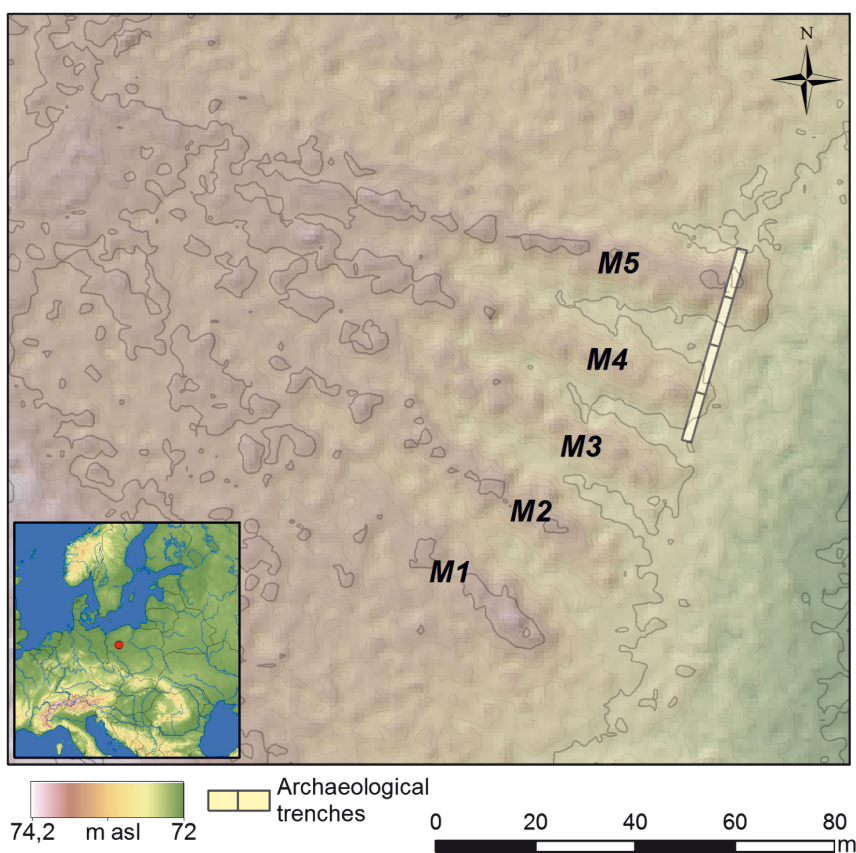


Fig. 1. Sobota, Site 52, Greater Poland. Elevation model of a section of the site, giving the location of the test trenches

Sobota, Site 52 (Rokietnica Commune, Poznań District, Greater Poland province) was discovered in 2018 while reviewing ALS (Airborne Lidar Scanning) images. The discovery was made by Tomasz Wiktorzak (Society of Friends of Łupawa – Valley of Łupawa Megaliths), who informed the authors about the presence of probable long barrows. The information was first verified by a preliminary identification of suspected structures in the field as well as by magnetometry surveys and test boreholes limited to a small section of the site. The results indicated the occurrence of stone boulders within the barrows, thus pointing to the artificial origins of structures (Żurkiewicz *et al.* 2020). The initial work therefore pointed to the possible existence of the first known unchambered long barrows of the FBC in Greater Poland.

The cemetery at Sobota, Site 52 comprises five long barrows (M1-M5), oriented along the NWW-SEE axis (Fig. 1). The structures are not parallel – they fan out from their tails to heads radially. Their state of preservation allows estimation of their original lengths as between 132-145.5 m. The current height of the barrows is below 1.55 m. The discussed structures are located within an area that has been forested since at least the middle of the 19<sup>th</sup> century AD and therefore they have avoided the agricultural denudation witnessed heavily in Greater Poland for the last 150 years (Jaeger *et al.* 2015; Żurkiewicz *et al.* 2020).

The test excavations reported in this article, were carried in out in 2022, because of the need to define the chronology of these structures and to possibly relate them with the FBC funeral pattern.

## EXCAVATION

The conducted fieldwork was financed by the County Office for the Protection of Heritage in Poznań and, importantly, comprised rescue excavations. For this reason, four narrow trenches were established at the head area of two barrows (M5 and M4) on the basis of the magnetometry and drilling results which had provided brief insight into the stratigraphy. The trenches, measuring 10 × 2 m each, were arranged along a NNE-SSW axis. An additional factor determining the layout of the trenches was the distribution of forest undergrowth and a desire to stay clear of the 90-year-old pine trees.

Inside the explored area of 80 sq. m, seven stratigraphical features were revealed and a section of the cultural layer was documented which yielded altogether 56 potsherds of the Przeworsk culture (PC) as well as seven potsherds of the FBC, 22 clusters of small burnt (animal?) bones, seven flints and two metal artefacts (Tab. 1). The site was explored manually, using a system of arbitrary horizontal levels, 0.25 m thick (AL), beginning with the highest point inside the excavation grid located at the top of Barrow M5 (app. 72.75 m. a.s.l. in Trench 1). Each find was located three-dimensionally and the explored sediments were sieved. Geodetic tools including a total station Leica TCR407 and the RTK antenna Leica CS15 with receiver were used during the excavations. All inventoried artifacts were

**Table 1.** Sobota, Site 52, Greater Poland.  
Features recovered in test excavations divided into exploration units

Feature	Layer	Material	Chronology	Amount	Comments
Mound of Barrow M5	AL I	ceramics	PC	8	
	AL II	ceramics	PC	3	
	AL III	ceramic	PC	1	
	AL III	metal	PC	1	
	AL IV	ceramic	PC	1	
	AL VI	flint	FBC?	1	erratic material, retouched flake/ perforator Fig. 6:1
	DUMP	ceramics	PC	6	
	DUMP	bone		1	
M5 Feature 1	AL I	ceramics	PC	17	
	AL II	ceramics	PC	8	
	AL IV	flint	FBC?	1	erratic material, single-platform core Fig. 6:2
M5 Feature 2	AL II	ceramics	PC	5	
M5 Feature 5	AL V	ceramic	FBC	1	Fig. 5:1
M4 subsoil horizon	AL III	ceramic	PC	1	
	AL IV	flint	FBC?	1	burnt retouched blade Fig. 6:3
	AL VI	ceramic	PC	1	
Mound of Barrow M4	AL IV	charcoal		1	
	AL V	ceramic	FBC	1	Fig. 5:2
Barrow M4	DUMP	ceramic	FBC	1	Fig. 5:3
M4 Feature 3	AL V	ceramics	FBC	2	Fig. 5:5
M4 Feature 6	AL VI	flint	FBC?	2	erratic material, retouched blade; burnt flake Fig. 6:4
		ceramics	FBC	2	Fig. 5:4, 5:6
M4 Cultural layer	AL IV	ceramics	PC	2	
		bones		7	
		metal	PC	1	
	AL V	ceramic	FBC	1	Fig. 5:7
		ceramic	PC	1	
		flint	FBC?	1	erratic material, flake
		bones		8	dated sample (3640-3518 BC, 95.4% probability)
	AL VI	ceramic	PC	1	
		flint	FBC?	1	burnt, splintered piece flake
		bones		6	dated sample (3636-3379 BC, 95.4% probability)

recorded within the coordinate system, which allowed for the creation of planigraphy plans.

The stratigraphy is considered as a uniform pattern along the excavated trench. The natural layer recorded at the base of each of the trenches is the Pleistocene glaci-fluvial sand of fine sorting and yellowish-grey colour. Additionally in the section of the trench passing through Barrow M5, a palaeosoil level with high organic material and iron oxide content was recorded, indicating the surface level on which the long barrow was erected. Above the natural strata, a layer of uniform mound material was documented, consisting of dark yellow sandy-silt with considerable amount of organic material. Its thickness varied from 0.75 m on the slope of Barrow M5 to 0.45 m in the case of M4. Over the lithological unit of the mound proper, a continuous layer of illuvial yellow sandy silts was encountered of app. 0.47-0.35 m thickness (respectively: W profile at the head of Barrow M5, and E profile at the head of Barrow M4). This layer should probably be regarded the same as original mound structure below, however changed by ongoing soil processes within the woodland. Within the unit, a considerable amount of larger stone boulders were documented, which testify to the presence of specific funeral architecture. Aside of repeatable stratigraphical units witnessed in both of the barrows, between them a feature resembling the backfill of a ditch was recorded, which might be the remnant of an original stone enclosure. The fill consisted of brownish sand layer with considerable amount of organic material, and coarser yellowish sands with presence of larger stones.

To compare the stratigraphy with the natural soil development in the area a test drilling provided the following sequence. At shallow depths (0.4 m b.g.l.) the yellowish sands of glaci-fluvial origins were overlaid by a subsoil horizon consisting of sandy silts of darker colours. The latter continued to approximately 0.07 m b.g.l. where the topsoil of pine forest occurred.

## EXCAVATION RESULTS

The archaeological features and artefacts documented during the excavations are linked to different cultural provenances: the FBC discussed below and the PC (see Tab. 1), which will be the subject of another paper.

### FBC archaeological features

The two earthen long barrows investigated in Sobota should be treated as belonging to the FBC funeral rite. Apart from them, in the close proximity, just south-east of the M4 structure, a single feature was also assigned to this cultural unit. Due to the narrow extent of excavation, all of discussed below features were revealed only partially (Fig. 2):

### Long Barrow M5

This monument is the tallest, and also the northernmost of the whole cluster of barrows. Its relative height may be estimated to approx. 1 m and is about 145 m long and positioned along the WSW-ENE axis. The maximum width of the barrow is approx. 15.5 m (Fig. 1). The test excavation trench was set in the area of widest section of the head-part. The relative height of this section is approximately 1.55 m.

The central part of the barrow was destroyed by a large PC feature (Feature 1). Observation of the stratigraphy confirmed that this structure was dug into the original object. The same situation was documented in the northern slope of the barrow, where another PC feature was identified (Feature 2) and whose lithological markers were less clear. Nevertheless, it contained chronologically consistent material.

The structural elements of Barrow M5 included ditches dug into the undisturbed soil, which formed the foundations for a lateral stone enclosure positioned within the ditch (Feature 4 – northern enclosure, Feature 5 – southern enclosure), a mound and presumable elements of a stone pavement, or an envelope (Figs 2; 3).

#### Feature 4 – northern enclosure of Barrow M5

The location of Trench 1 didn't allow the complete exploration of the structural elements that are found outside the mound delineated on the plan. Indirectly, the existence of such a structure may be presumed by analysing the W profile of Barrow M5 (Figs 3; 4:1). Its outline is visible also on the horizontal plan of Arbitrary Level (AL) VI. What can be clearly seen there is a trough-like hollow whose fill consists of brown sand with a high organic content. Its documented width is 1.66 m and it visibly juts onto the N trench wall. The base of the visible feature extends at least 0.43 m below the undisturbed soil level in the central portion of the profile. In the feature, no finds have been recorded.

#### Feature 5 – southern enclosure of Barrow M5

The feature was documented in the W and E profiles of Barrow M5 and on the plans of AL V and VI. This was an extensive structure of a maximum width of 5.76 m (Figs 2; 3; 4:2). Its floor consisted of boulders of various sizes and extended 0.87 m below the undisturbed soil level in the central part of the barrow. The feature fill was yellow medium-grained sand with the subsoil stratum in the upper part of the feature. Perhaps this is somehow related to the degradation of the barrow mound when the original empty or boulder-filled ditch was filled with subsoil horizon and the original layer of the barrow mound. The feature yielded only one artefact: an uncharacteristic FBC potsherds (Fig. 5: 1) recovered from a depth corresponding to where the boulder layer began to be recorded.

#### Mound of Barrow M5

The best preserved stratigraphy of Barrow M5 was documented in the west section of the Trench, where the mound's surviving deposits were estimated to be 0.67 m thick. They comprise dark yellow silty sands with a considerable admixture of organic matter. Much of the stratigraphy within the excavated section was interrupted by a PC feature dug into the central part and visible mostly in the eastern section. Along the opposite one, the outline

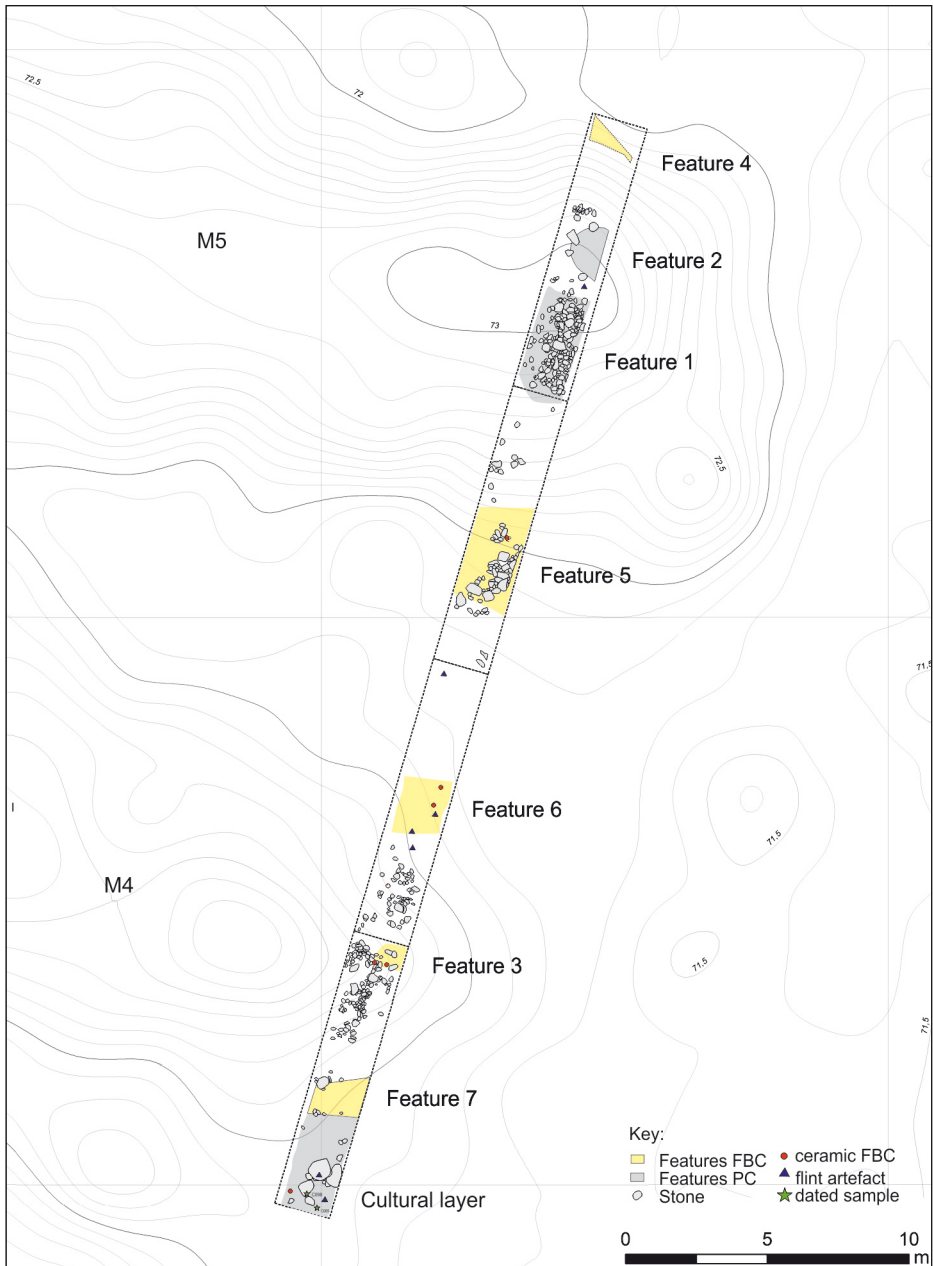
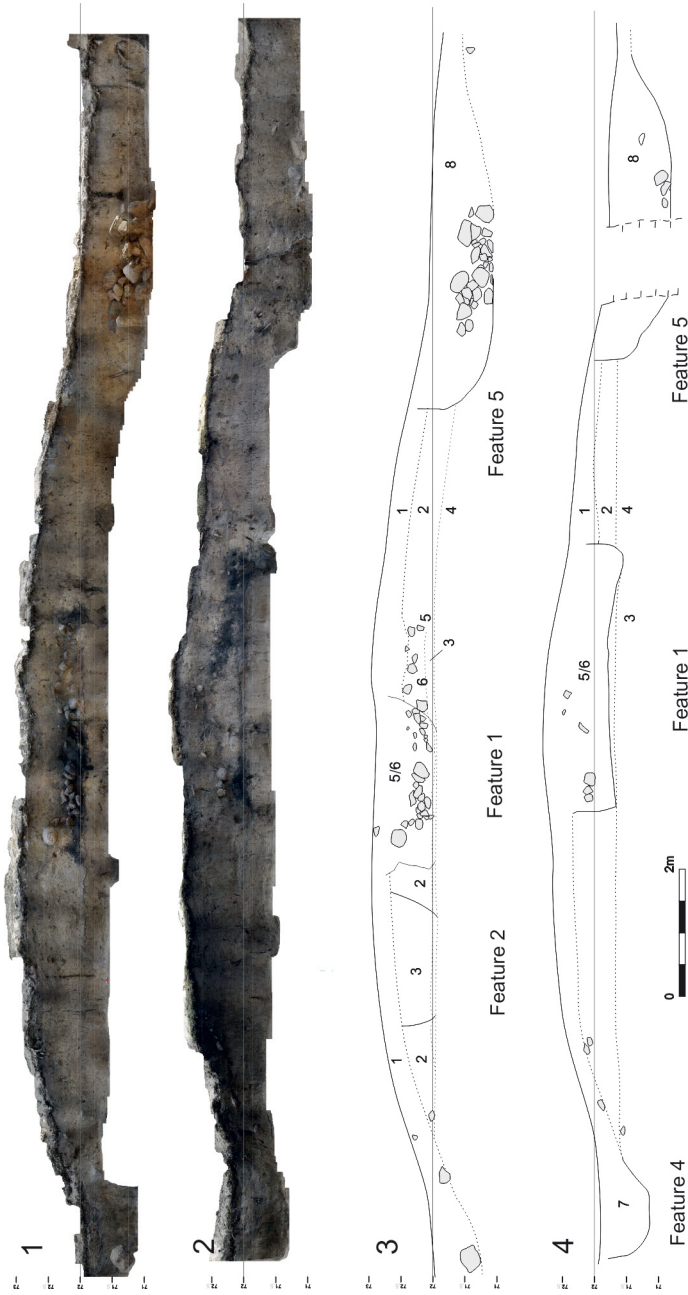
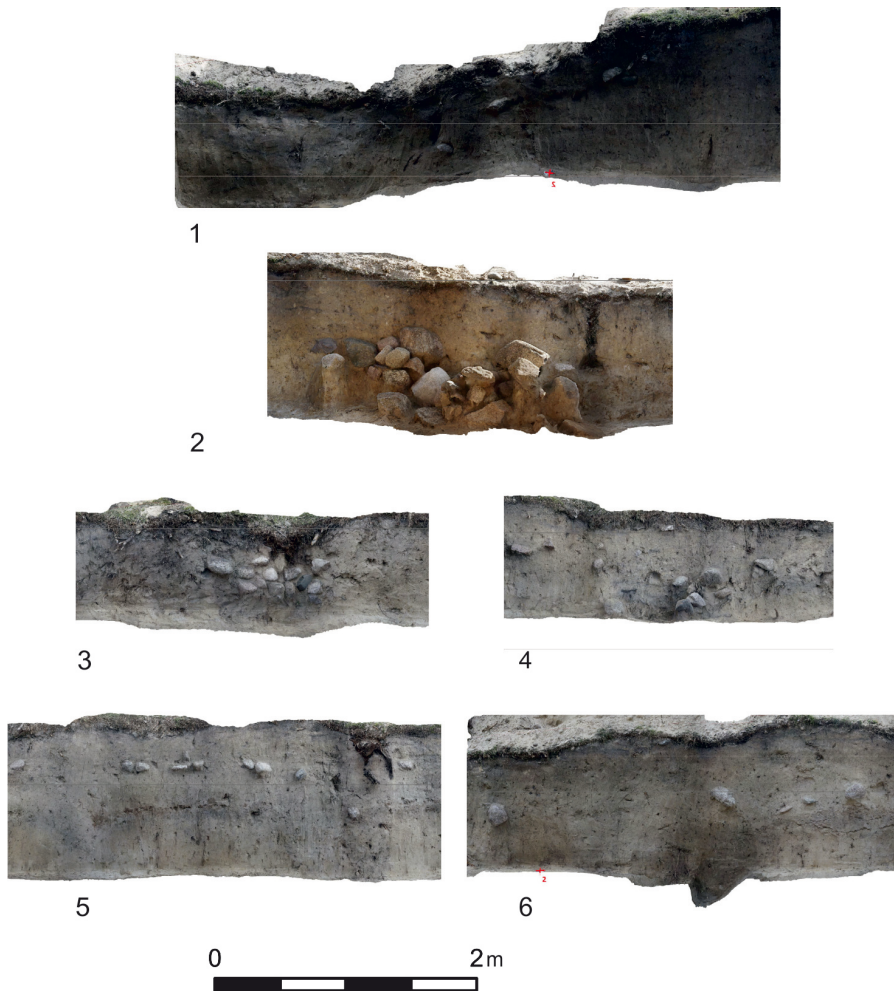


Fig. 2. Sobota, Site 52, Greater Poland. Features and layers on all exploration levels



**Fig. 3.** Sobota, Site 52, Greater Poland. Barrow M5. 1, 3 – E profile; 2, 4 – W profile. Legend: 1 – subsoil horizon, yellow sandy silt; 2 – mound – dark yellow sandy dust with boulders; 3 – hardpan and original soil layer; 4 – undisturbed soil, yellow fine-grained sand – upper surface of glaciofluvial sand layer; 5 – dark grey sandy silt with organic content; 6 – light yellow silty sand; 7 – dark yellow silty sand; 8 – yellow medium-grained sand





**Fig. 4.** Sobota, Site 52, Greater Poland. Views documenting selected portions of profiles of Barrows M5 and M4. 1 – Feature 4, E profile, stone envelope elements; 2 – Feature 5, E profile – southern enclosure of Barrow M5; 3 – Feature 6, E profile – northern enclosure of Barrow M4; 4 – Feature 6, W profile, side enclosure of Barrow M4; 5 – mound of Barrow M4, W profile; 6 – Feature 3, profile

of Barrow M5 could be discerned with a distinct border between the natural deposits and the mound's main unit. Within the extent of the excavated part of the barrow, 19 PC pottery fragments were collected, one bone fragment and a piece of metal object. On the last exploration level (AL VI), a retouched flake was found, which could have been a perforator (Fig. 6: 1). In addition, the PC feature fill yielded (in AL IV) one more flint artefact (single-platform core, Fig. 6: 2).

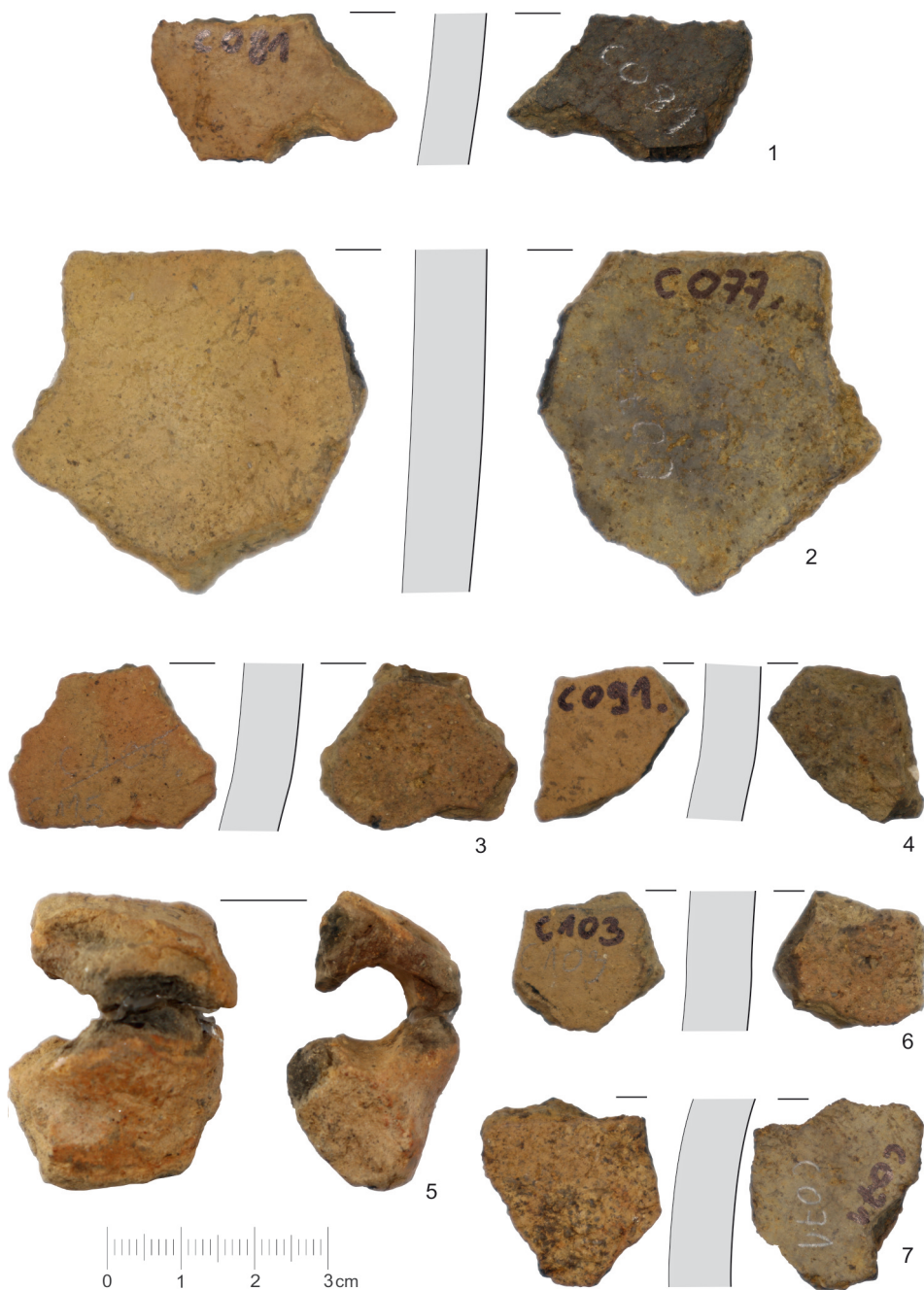


Fig. 5. Sobota, Site 52, Greater Poland. FBC pottery recovered in test excavations: 1 – Feature 5; 2 – Mound of Barrow M4; 3 – Barrow M4 Dump; 4 – Feature 6 ; 5 – Feature 3; 6 – Feature 6; 7 – Cultural layer

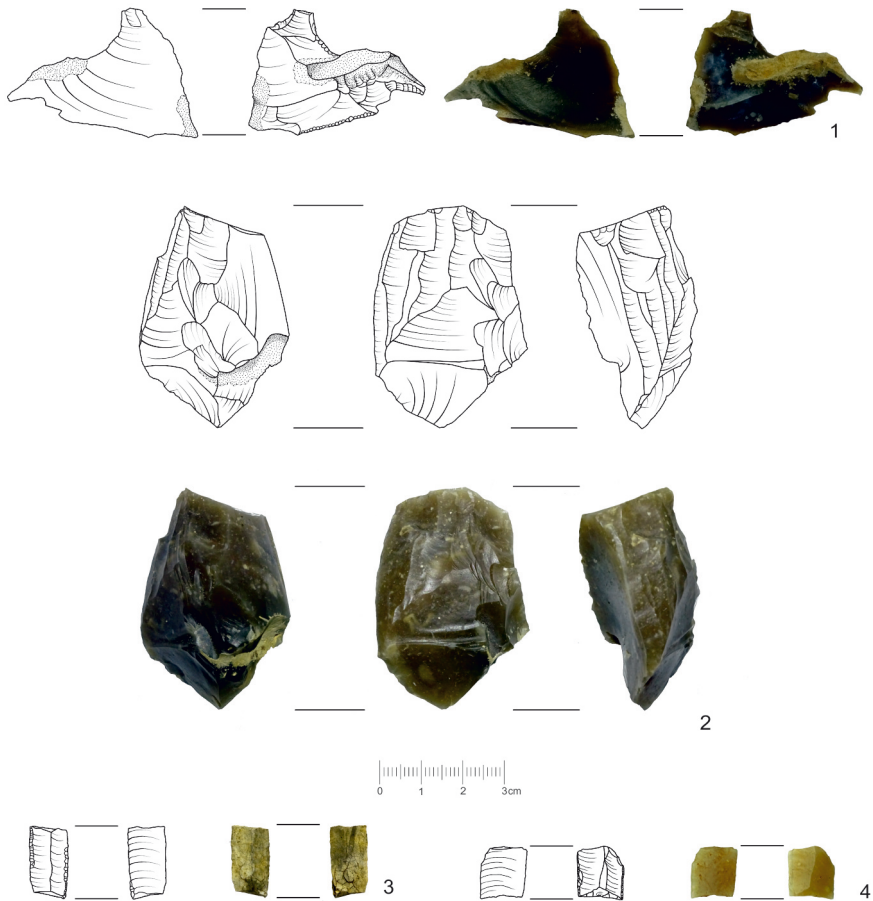


Fig. 6. Sobota, Site 52, Greater Poland. Flint artefacts recovered in test excavations: 1 – Mound of Barrow M5; 2 – Feature 1; 3 – M4 subsoil horizon; 4 – Feature 6

#### Pavement – stone envelope

This structural element of the mound is the least preserved due to its destruction by the activities of the PC community around the barrow. The evidence for the existence of stone pavement lies in its presence in the undisturbed sections of excavation trench. The compactly arranged stones were positioned within the current subsoil, especially in the northernmost margin of Barrow M5 and documented in both sections (W and E; Figs 3; 4: 1).

If this interpretation is correct, the width of the base of the original barrow mound, measured between the edges of the foundation ditches, may be estimated at approx. 12.2 m (relying on the measurement of the W profile). The present-day mound width, following from the contour-line plan of the feature and oscillating around 15.5 m, is the effect of the

degradation of the original mound that, once the foundation ditches had been filled, expanded to reach today's dimensions.

#### Long Barrow M4

The feature's total length is approx. 140 m while its axis deviates NE by about 23.5 degrees from the W-E line and coincides with the axis of Barrow M5 in the tail portion. Barrow M4, within the grid, was covered by Trench 3 and Trench 4, which run 2.6 m from its head at a maximum. At the northern and southern extremities, within the E section of the test excavation, both trenches cut across the barrow head (Figs 1; 2).

The particular structural elements of Barrow M4 resemble those of Barrow M5. These are foundation ditches (Features 6 and 7), the mound layer and portions of a stone pavement (Fig. 7). In addition, a single FBC feature was recorded underneath the mound, the function of which is difficult to interpret (Feature 3). The mound width, measured between the inner edges of the foundation ditches, is 9.6 m while the mound height, as it is determinable in the profile, reaches approx. 0.71 m (from the undisturbed soil/hardpan stratum to the top of the humus). It seems that in all likelihood a so-called 'cultural layer' is connected to Barrow M4. This is a cluster of boulders, single PC and FBC pottery sherds, flints and numerous small burnt (animal?) bones (Łukasik 2020).

#### Feature 6 – northern enclosure of Barrow M4

Its maximum width is 1.22 m while its depth measured from the level of subsoil is about 1.63 m. The feature was documented in the W and E profiles of the barrow and in AL V-VI (Figs 8; 4: 3). The feature backfill varies within the 2-m-wide investigated space. In its W part, it consists of brown silty sand with an intensive layer of small boulders, while in the E portion, the feature is filled with similar brown sand with a high organic content. The feature yielded two FBC pottery sherds (Figs 5: 4; 5: 6) and a single fragment of a flint blade (Fig. 6: 4). The bottom of Feature 6 is dug approximately 0.27 m into the undisturbed soil level.

#### Feature 7 – southern enclosure of Barrow M4

The feature resembles Feature 6 in many respects. However, the distribution of boulders in the E profile of Trench 4 is much less compacted, making it necessary to mark a slightly wider, measuring 1.43 m, section of the feature (Figs 2; 4: 4; 7). Its fill resembles that of Feature 6 as well: in the W profile: light grey silty sand with boulders; while closer to the E profile – brown silty sand with a higher organic content. The feature's base extends 0.28 m below the level of undisturbed soil. At the southern edge of the feature, several fragments of burnt, probably animal, bones were documented. They were found also in a higher arbitrary level (AL IV) where the limit of the feature was not yet noticeable.

The difficulties in the interpretation of the course of ditches and their construction arise from the rather less favourable location of trenches vis-à-vis the identifiable outlines of Barrow M4. While the W profile of Trench 3 and Trench 4 probably still cuts across the structures of a side stone enclosure, the E profile should rather expose the layers of the barrow head.

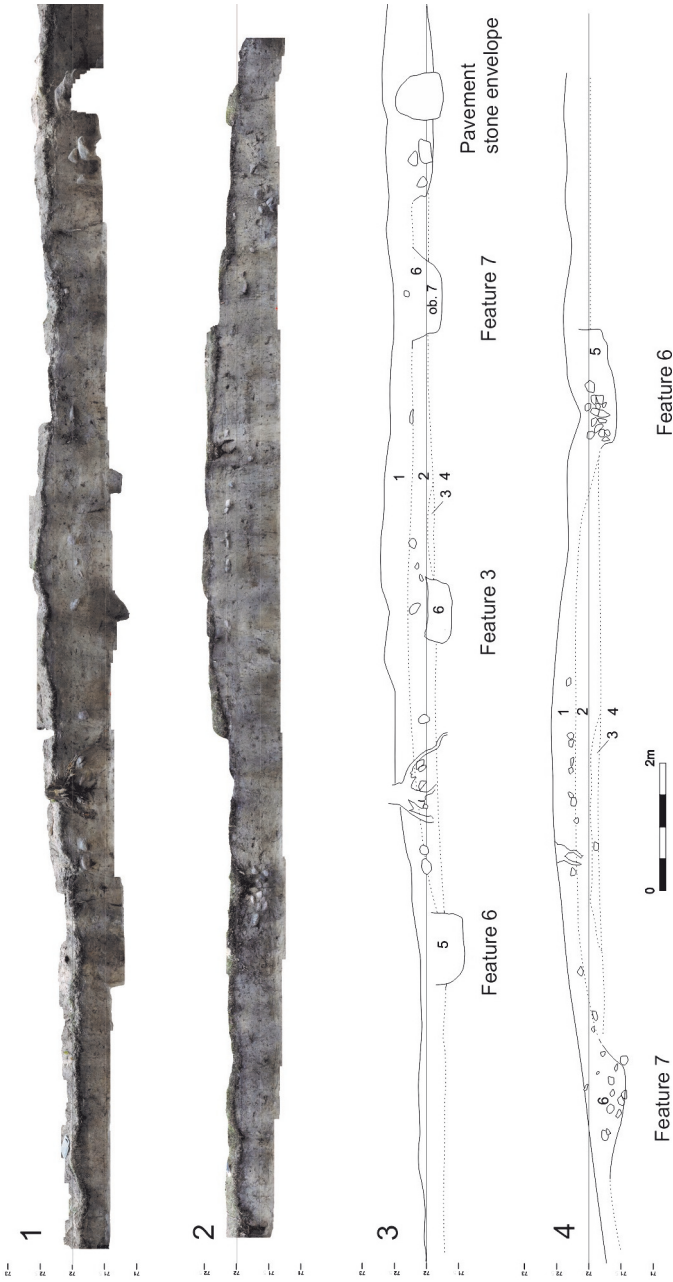
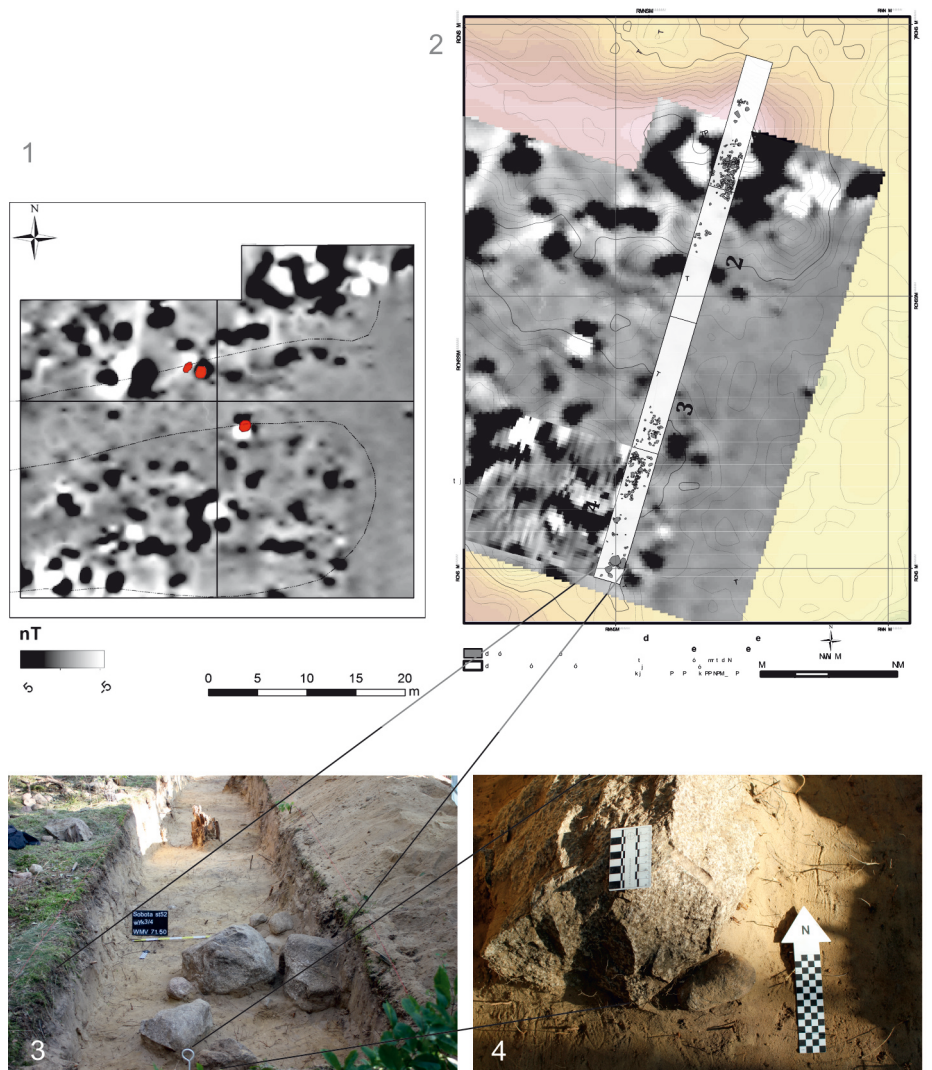


Fig. 7. Sobota, Site 52, Greater Poland, Barrow M4. 1, 3 – E profile; 2, 4 – W profile. Legend: 1 – subsoil horizon, yellow sandy silt; 2 – mound – dark yellow sandy silt with boulders; 3 – hardpan and original soil layer; 4 – undisturbed soil, yellow fine-grained sand – upper surface of glaciofluvial sand layer; 5 – dark grey sandy silt with organic content; 6 – light yellow sandy silt with organic content; 7 – dark yellow silty sand; 8 – yellow medium-grained sand

## Mound of Barrow M4

The barrow mound is built of dark yellow silty sand with boulders. It is thickest at the barrow's top, where it can be estimated at approx. 0.38 m (Figs 2; 4; 5; 7). From the level of the undisturbed soil – the top of the glaci-fluvial sand – it is separated, as in Barrow M5, by a hardpan stratum, recordable at a length of approx. 3.36 m in the central sector of



**Fig. 8.** Sobota, Site 52, Greater Poland. Results of magnetometry survey of Barrows M5 and M4 and their excavation verification. 1 – Narrow value range (5/-5 nT) of magnetometry survey result image prior to test excavations; 2 – verification of magnetometry survey by test excavations; 3 – Trench 4, stone structure in the head of Barrow M4; 4 – traces of a tool use on a boulder

Barrow M4 profile. From all the levels of exploration of the mound the following artefacts were recovered: two FBC potsherds (Fig. 5: 2, 3), two PC potsherds, a single burnt re-touched blade (Fig. 6:3) and charcoal.

Pavement – stone envelope encasing Barrow M4

Within Barrow M4, a stone pavement is recordable (a) in the feature sections, (b) within the planigraphy of AL III and IV and (c) on results of the magnetometry survey.

(a) In the sections of Trenches 3 and 4, less compact, horizontal arrangements allow to draw the limit of the mound's top, separating it from the subsoil stratum (Fig. 4: 5).

(b) Rock fragments, visible in the planigraphy of Barrow M4, were recorded already during the removal of the turf. Their considerable concentration was recorded in the first arbitrary level explored in this feature (AL III), covering the subsoil. Another major accumulation was found within the mound, however boulders were clearly concentrated in its higher portions.

(c) The magnetometer survey preceding the excavation showed that the line of Trenches 3 and 4 did not cover anomalies of a particularly high intensity (Żurkiewicz *et al.* 2020). Nevertheless, in the exact spots of registered anomalies, the excavations exposed boulders (Fig. 8); and vice-versa, where no anomalies were recorded within the magnetic image, there were no boulders recorded in the course of excavations (area between M5 and M4). The verification of non-invasive investigation justifies the hypothesis about the connection between all recorded anomalies and horizontal accumulation of stone fragments at small depths (distal, western portion of Barrow M4).

Feature 3

The feature was recorded in AL V. Its fill was made up of light grey sand with a high organic content. In terms of lithology, the fill strongly resembled a layer in Feature 6 – in the northern ditch of Barrow M4, identifiable in the same section (Fig. 4: 6). The feature was documented in the horizontal plane and in the E section of Trench 4 (Figs 2; 8). Its fill was dug approximately 0.25 m below the level of undisturbed soil and yielded two FBC potsherds.

Cultural layer 1

Due to the limited field of observation in the southernmost section of Trench 4 and the presence of numerous archaeological artefacts, it was decided to distinguish a cultural layer at this spot. Lithologically the layer was a mixed subsoil horizon, consisting of yellow sandy silt. Its distinct limits coincide with the mound's edge; one level down –with the southern line of the foundation ditch (Feature 7) of Barrow M4. South of this feature, in AL IV-VI, the following artefacts were discovered: a cluster of burnt bones, most likely animal ones, four PC potsherds, one FBC potsherd, one uncharacteristic iron object and two flints (splintered piece flake). Their distribution across the arbitrary levels is shown in Table 1. Additionally, many large stones were also recorded within the layer.

Data gathered from Trench 4 (the outline of the largest boulders protruding into the E profiles of Trench 4) can be compared to the results of magnetometer survey (Fig. 8). The

latter suggest that a structure, taking the form of a cist, or stone-lining, continues outside the excavated area. The structure may have been more complex and perhaps a neighbouring magnetic anomaly is its prolongation towards W (the authors would like to thank Cezary Bahyrycz for support in carrying out magnetometry survey). The feature backfill was non-homogeneous as it contained both FBC and PC materials. Its cultural attribution was defined by two radiocarbon dates obtained from burnt animal bones (see below). However, materials were linked also to the PC and there were characteristic traces shaped like very distinct flutes on a large boulder (Fig. 8).

### FBC pottery from the Site

The assemblage of FBC pottery comprises eight finds of a total weight of 59 g. Most (7 sherds) are connected to Barrow M4 and were found within features: two sherds in Feature 3, two sherds in Feature 6 and one sherd in the barrow's mound. In addition, a single sherd was recovered from a stone concentration in the southern section of Trench 4 (Feature 8). A single sherd was also retrieved from a dump unequivocally linked to the exploration of Barrow M4 (Fig. 2; Table 1). Only one sherd was connected to Barrow M5 and was recorded in its southern stone enclosure ditch. Such a small collection should be associated with the rescue character of the excavations.

The seven sherds are uncharacteristic and unornamented parts of bellies of various vessels. Moreover, the assemblage comprises one handle (in two pieces), probably representing a lumpish type, horizontally perforated (Fig. 5: 5). They were assessed technologically and stylistically (based on Czebreszuk *et al.* 2006).

The thickness of walls was predominantly 8 mm (4 pieces), with single specimens being 9 mm or 6 mm thick. The sherds were made using the technology known as A or possibly AB, which means that their body was tempered with fine sand and fine and medium grog. There are doubts, however, if the sand was intentionally used. Their inner and outer surfaces are smooth and even, in one case (C071), the outer surface may bear the traces of rough-casting. This is the only sherd whose fracture is distinctly two-coloured. The fractures of the others are either navy blue or black.

The claim about the homogeneity of this assemblage, if any, may be based solely on technological evidence. The domination of type A or AB technologies in it assigns this assemblage to the technologies of classical FBC.

### Flints from the Site

Excavation produced 26 potential flint objects. However, only seven were classified as bearing traces of knapping or being flint waste left after producing a proper tool.

Two flints were recorded within the Barrow M5: in a secondary context, one in the last arbitrary level of Feature 1 and the other in the barrow mound. Two flints were found in



the cultural layer distinguished next to Barrow M4 while another two – in Feature 6 (northern foundation ditch of Barrow M4). A single blade was recovered from the subsoil horizon, covering the mound of Barrow M4 (Table 1, Figs 2; 6).

These are mostly small uncharacteristic artefacts that bear traces of burning in three cases. Despite lack of distinguishing attributes, all flint artefacts fall within the ambit of FBC knapping tradition in terms of production technology, typology and raw material selection. They also correspond with other FBC assemblages from the Polish Lowlands (Domańska 1995; Dmochowski 2005; Jankowska and Pyżewicz 2006; Domańska 2016). Therefore, in the absence of any other chronological references at the site, the artefacts might be assigned to the FBC. The only questionable artefact is a single-platform core which technologically corresponds with Mesolithic knapping tradition (Dmochowski 2019, 83, 86, figs 2, 3). Nevertheless, it shall be stressed that there are similar finds of single-platform cores from FBC context in Greater Poland (Kabaciński and Sobkowiak-Tabaka 2019, 46, fig. 13: 1, 3) and Kuyavia (Domańska 2013, 26, fig. 6: 1). Moreover, described core was found in a PC feature, therefore it must have occurred there with redeposited soil.

### Chronology

Three samples derived from excavations were dated: two fragments of burnt bones from the cultural layer from two levels (Sobota 52\_Co69 and Sobota 52\_Co98): one corresponding to the floor of the northern foundation ditch (Feature 7), the other lying 0.18 m higher, and a soil sample (palaeosoil) from the central sector of the W profile of Barrow M5 (Sobota 52\_To22). The following dates were obtained:

Sobota 52_Co69	Poz-141328 0.0%N 0.3%C carbonate 4780±30 BP
Sobota 52_Co98	Poz-141332 0.0%N 0.3%C carbonate 4750±35 BP
Sobota 52_To22	Poz-141104 0.7mg C 4120±35 BP

The dates set two distinct time horizons. The two obtained for the burnt bones from the cultural layer jointly set an interval of 115 years from 3635 to 3520 with a 95.4% probability (Fig. 9). Meanwhile, the third date, obtained for the original humus (palaeosoil) found underneath the mound of Barrow M5, is much younger. Its extreme values related to a probability of 95.4% set a time range between 2871-2576 BC, which might be the result of charcoal migration along the soil profile of the mound.

The last-cited date, obtained for a sample of palaeosoil, extends beyond the age of barrow-raising. The excavations did not produce any evidence that could culturally justify the placement of the dated material at that time. Hence, it may be assumed that post-depositional factors of soil processes must have produced this inversion. In turn, the dates obtained for the burnt bones may be considered satisfying, but it must be stressed they came from a feature extensively disturbed by later PC population actions. This is evidenced, for instance, in PC pottery found on the floor of the dated layer (Table 1), which alas prevents an analysis of the stratigraphic context of the samples with respect to the barrow.

## Sequence of barrow raising

The descriptions of particular structural elements of the barrows provided so far are sufficient to draw conclusions as to their size and appearance. Although they differ slightly in size, both structures were erected using similar techniques.

Barrow M5, its head being approx. 12.2 m wide, is slightly larger than Barrow M4. The width of the latter, measured at its excavated head portion is almost 9.6 m (the excavation trench did not cut across the barrow head where it was the widest). The overall lengths of the barrows are mere estimates, based on available contour plans and were not verified during the excavations. A similar limitation applies to conclusions as to the design of the barrows. What is being said about their design and manner of construction refers solely to the investigated portions of side stone enclosures and does not rule out different construction techniques in other portions.

A reconstruction of the barrow building scenario suggests that at an initial phase, perhaps on an original ground level from which humus had not been removed (traces of soil in the W profile of Barrow M5), the entire cemetery was laid out. The space could have been originally used by FBC communities (Feature 3, underneath the mound of Barrow M4). The arrangement of the barrows argues for the opinion that the entire cemetery was laid out and built over a short time. Namely, the symmetry axes of all barrows intersect in a manner far from being accidental. This strongly suggests that the cemetery was the effect of a carefully thought-out, planned or even designed action.

Next, at least in the head sectors, side foundation ditches were dug, with the excavated earth partially also used to build mounds. The lithology of the mound layers does not vary in any significant manner, hence it can be presumed that the earth necessary to bring mounds to the desired height was taken from the immediate surroundings of the site.

At a further construction stage, the side foundation ditches were filled with boulders of various sizes, forming thus a kind of trim, or a foundation supporting pavement — a stone envelope that must have covered the mounds that were originally not very high. In theory, such a design had many technical advantages. It isolated rather loose mound layers of silty sand and sandy silt from excessive precipitation and water penetration. Furthermore, it safeguarded the mounds in the event of a periodical water-table rise (the barrows lie on the bottom of a river valley in the immediate vicinity of an area that is water-logged today). Finally, the stone facing of the mound surface had an undeniable symbolic effect — it showed off this material. If this design was followed in other parts of the Sobota barrows, it would explain why no distinct side stone enclosure (large boulders) was recorded along the walls of all the barrows.

Advancing with time, the destruction of such barrows would start nowhere else but with the stone envelope. It would first lose its compactness due to various natural causes (burrowing animals, plant roots, *etc.*) and anthropogenic ones (PC features), letting water

into the mound layer. As a result, the mounds would gradually spill and cover foundation ditches with time, slowly adopting the barrow outlines we see today.

What evidence was gathered shows that this structural design cannot be assumed to have been used with all barrow parts. Relying on the observations concerning Barrow M4 related earlier, where the line of trenches cuts across a part of its head, it can be tentatively presumed that this part of the barrow was differently designed. The difference may lie in not only construction traits, but also in the material from which the head wall was built. Its design could have employed a characteristic break in the wall outline, known from other long barrows. Alternatively, it could have been built of wooden elements, concluding from the accumulation of organic matter in foundation ditches, which are recordable here (E profile, Barrow M4). This concept needs however, further research. The results of excavations do not support any claims either concerning burials in these imposing structures. Nor do the results rule out the possibility that both barrows originally had megalithic side stone enclosures that were completely removed later. The present-day state of preservation of the entire cemetery prevents archaeologists from recording any larger pieces of rock inside the outlines of the barrows. After some 3500 years, the top of the mound of Barrow M5 and the southern slope of Barrow M4 again attracted human interest, this time by a PC community.

## ANALOGIES AND REFERENCES

The Sobota dates may be referred to a set of about 30 determinations obtained for 11 sites with unchambered long barrows, belonging to the FBC Eastern group (Król 2021, 99 fig. 33; Papiernik *et al.* 2018). In the interval set by the extreme values of the Sobota determinations (3640-3379 BC at the probability of 95.4%), it is very likely that phenomena dated at the following sites could have taken place as well: Jastrzębiec 4 (Poz-25823 4840±50 BP; Poz-25550 4790±40 BP; Rzepecki 2011, 23-36) and Sławsko Dolne 34 (Ki-5071 4790±80 BP; Koško 2006, 23). Whereas, features dated in Zbierzyn, Site 3A (Lod-159 4720±110; Gorczyca 1989) and Gaj, Site 1 (Poz-83418 4700±50 BP; Poz-83419 4700±50BP; Papiernik *et al.* 2018) could have been contemporaneous or slightly younger. Most of these determinations (except for Zbierzyn) were made for short-lived material (animal and human bones) and direct our attention to three main types of unchambered long barrow design (Fig. 9).

The Sobota Barrows compared with FBC Eastern group of unchambered long barrows. In the area covered by the FBC Eastern group, unchambered long barrows are found in several distinct clusters that are not co-extensive with the territorial range of this cultural unit. They are the most numerous in Kujawy where the largest number of their types were distinguished as well (Chmielewski 1952; Jażdżewski 1970; Koško 2000). The second-

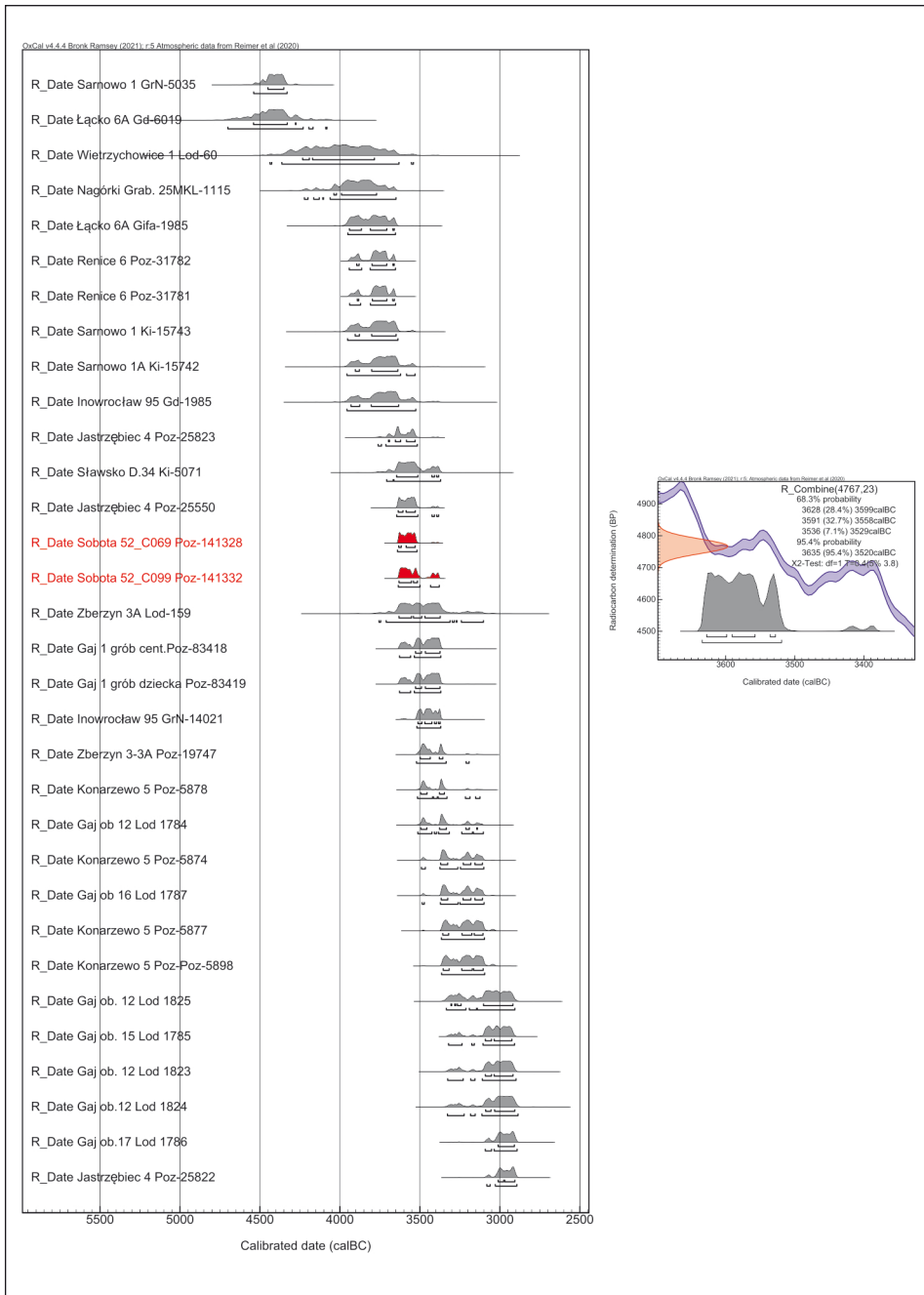


Fig. 9.  $^{14}\text{C}$  determinations made for the cultural layer in Sobota Site 52 compared to other available  $^{14}\text{C}$  determinations of the earthen long barrows in the FBC Eastern group

largest cluster is found on the middle and lower Oder River and in West Pomerania (Chłodnicki 1997; Rzepecki 2011; Matuszewska and Szydłowski 2011), while the Central Pomerania cluster is smallest (Siuchniński 1969; 1972; Czarnecki 1971; Jankowska 1980; Weber 1983; Wierzbicki 1999). Single sites are known from Mazovia (Jażdżewski 1936, 191, 192, 294, 295), Silesia (Wojciechowski *et al.* 2002, 177–186) and Greater Poland (the discovery described in this article, Żurkiewicz *et al.* 2020).

The unchambered long barrow clusters are dominated by the Kujawy type (Jażdżewski 1970, 15–16). This groups trapezoidal barrows with stone enclosures made of large pieces of rock; rectangular, round and oval ones, although very rare, do occur too. It is possible to include the structures from Zberzyn and Gaj (Gorzycza 1989; 2005; Papiernik *et al.* 2018) in this type. In the FBC Eastern group, they account for more than 80 percent of the structures so far discovered. In the regions where unchambered long barrows were fewer (Silesia, Mazovia), this was the only barrow type recorded (Król 2021).

In Western Pomerania and Kujawy, rare discoveries of barrows with a foundation ditch and wooden enclosure have been made (about 10% and 6% of barrows, respectively) (Rzepecki 2011). To this type should be assigned the discovery from Jastrzębiec, Site 4 (Rzepecki 2011, 23-36), mentioned earlier in the context of an absolute age determination similar to that for the Sobota barrows.

Other barrow types are only encountered in Kujawy, within the Eastern group, and in Central Greater Poland. They include barrows with stone enclosures built of small boulders supplemented with a pavement/stone envelope or having only the last-mentioned element (Kośko 2006). A barrow from Sławsko Dolne that is dated similarly to the Sobota barrows may also be assigned to this type.

Much fewer in number, barrows with mixed stone-wooden enclosures are either trapezoidal or rectangular (Łącko, Site 6-6A; Domańska and Rzepecki 2004, 419-433; Domańska 2006, 289-299); Nagórkach Grabowskich, Site 25 (Kittel *et al.* 2012; Król *et al.* 2012, 167-182).

A major parameter characterizing long barrows, making for their imposing appearance, is their length. The longest, discovered in the Eastern group, attain as many as 170 m (Kujawy, Rzeszynek, Site 1, Łebski 1888, 36; Chmielewski 1952, 95). They always represent the Kujawy type and concentrate in the eponymous region. There, the average length of barrows with a large-boulder enclosure is 74.5 m. The average length of such barrows in other regions where they occur in the FBC Eastern group is 64.3 m in the Chełmno Land (max. length: 68 m, Narva-Plebanka, no site no., Chmielewski 1952, 97), 29.9 m in Central Pomerania (barrow in Łupawa, Site 18, was the longest in this region – 56 m; Weber 1983: 7), 42.3 m in West Pomerania (barrow in Kurcewo, Site1, was the longest in this region – 157 m; Dorka 1939, 154), 27.5 m in Lower Silesia (Barrow II in Muszkowice, Site 18, was the longest in this region – 36 m; Wojciechowski and Cholewa 2006, 227). From Mazovia, a single long barrow is known – Rybno, Site 1 – which is 50 m long (Chmielewski 1952, 97).

For the other barrow types, dimensions are available only for barrows from Kujawy and West Pomerania. The type of a barrow with a wooden enclosure placed in a foundation

ditch is not more than 80 m long in Kujawy (Redecz Krukowy, Site 20; Król 2021, 59; Table 1), with the average length being 24 m. West Pomeranian barrows are considerably smaller. The longest one, exposed in Renice, Site 6, was 34 m long (Rzepecki 2011, 75). The average length for this region is 10 m. Among the mixed, stone-wooden structure barrows, known only from Kujawy, the longest one was discovered in Nagórki Grabowskie, Site 25. It was 30 m in length (Król *et al.* 2012).

## CONCLUSIONS

The comparison of the Sobota barrows with similar structures in their nearest vicinity in the FBC Eastern group in terms of construction, size and chronology allows their preliminary classification. A review of available chronometric data shows that barrows of various types could have been built in a relatively short span of time. As regards their design, within the explored space, the Sobota barrows are distinguished by rather deep foundation ditches, partially filled with stones. Formally, this characteristic makes them resemble barrows with a foundation ditch and a wooden enclosure, for instance, Jastrzębiec, Site 4. However, in Sobota, the ditches appear to have been much deeper and wider; in addition, they were filled in part with compact rock arrangements. However, no clear traces of wooden structures were noticed within them, possibly due to the porous sandy material in which the organic remains were dissolved. Barrows combining wood and stones in their design are known only from two sites in the Polish Lowland. In Nagórki Grabowskie, Site 25, in identifiable ditch sections, only single stones and postholes were recorded (Kittel *et al.* 2012). In Łącko, Site 6-6A, in turn, a foundation ditch could not be discerned; only single postholes were found in the stone enclosure of Barrow 2 (Domańska and Rzepecki 2004, 419-433; Domańska 2006, 289-299).

Furthermore, it transpires that an important design characteristic of the Sobota barrows is a stone envelope/pavement, covering the earthen mound. In barrows known from the FBC Eastern group, this element is noticeable best in those whose enclosure/edging was built of smaller rock fragments or those whose stone envelope/pavement was all that had been left of them. These characteristics are shared by a barrow from Sławsko Dolne, Site 34, but it is not certain if it was covered by an earthen mound protected by a stone envelope. Other locations where it can be presumed that such an envelope existed include: Inowrocław 95, Barrow I (Feature 482), Kijowiec 4 and Łupawa, Site 2 (Czerniak and Koško 1993, 5-50; Gorczyca 2005, 117-132; Wierzbicki 1992; 1999). The closest to the Sobota barrows in terms of distance, the structure at Konarzewo, Site 5 (Feature 2242) yielded burnt human bones from within the stone envelope (Wierzbicki 2008, 25-55; 2013, 234-236). A stone pavement/envelope is a characteristic shared by many single graves dug into barrow mounds.

The dimensions of particular barrow types, when compared with the size of the Sobota barrows, show that the latter fit best into the size category typical of megalithic (Kujawy) barrows. However, it must be remembered that the overall lengths of other, less numerous barrow types, are not known and are currently impossible to determine for various reasons.

## SUMMARY

The dimensional and morphological uniformity of the Sobota barrows makes them classifiable, with a measure of caution, to the Kujawy type. An argument in favour of this is supplied by the recording of rather large boulders in the foundation ditches (*e.g.* Feature 5 – the southern enclosure of Barrow M5). The uniqueness of the Sobota barrows lies in the very fact of recording ditches filled with boulders. This is a characteristic that simply cannot be found in any other excavated long barrow in the FBC Eastern group. Only barrows that have a foundation ditch are always connected to a wooden enclosure and their maximum length stays below 100 m (Słonowice, Site 5, FBC Southeastern group; Tunia 2006, 336). In terms of dimensions, the Sobota cemetery is consistent with the suggested type of unchambered barrows whose average length, verified in excavations, is 74.5 m in Kujawy. If in field investigations, the estimated lengths (145 m and 140 m) are going to be confirmed, these would be the third-longest barrows, among published ones, in the FBC Eastern group and the only ones located outside Kujawy (Rzeszynek, Site 1 – 170 m in length and Ziemięcín, site no. unknown – 160 m (Łebiński 1888; Chmielewski 1952, 51).

An unequivocal interpretation of the Sobota field discoveries is made harder by the limited space that could be excavated. A research project that is currently underway attempts to verify whether the design and chronological characteristics revealed in Sobota have analogies in other unchambered long barrows in the middle Warta River basin.

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