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New Evidence of Neolithic Funerary Monuments from the Eastern Margins of the Long Barrows Territory in Central Europe

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ABSTRACT

Late Neolithic long barrows are commonly found throughout Central and Northwestern Europe, within the Funnel Beaker Culture territory. The sites of this Culture are known from Bohemia covering a period between 3900 and 3400 BC. However, long barrows have not been detected in Bohemia for a long time. The main reason is that they are located in areas where they were affected by modern ploughing. A significant contribution to their recognition was the remote sensing of modern fields, especially aerial archaeology. Current research in Bohemia provided new evidence of dozens of long barrows of several types, significantly expanding our knowledge of this phenomenon in the southeastern margins of its distribution. A new type of long barrow has been identified in Bohemia using remote sensing and current excavation data. The characteristic parameters of the long barrows in Bohemia are an east-west orientation with the ceremonial place in the eastern front and the delineation of the perimeter by a palisade

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trough or a ditch. The mounds can be divided into at least two structural and chronological forms. The first is the narrow and sometimes extremely long mound with perimeter defined by a palisade trough dating to the 3900–3800 BC. The second type of barrow is enclosed by a trapezoidal ditch. Based on radiocarbon dating, these structures were constructed during the 3700–3600 BC. This type of monument is currently known exclusively from Bohemia.

Résumé: Les longs tumulus de la fin du Néolithique sont habituellement découverts à travers l'Europe centrale et du Nord-ouest, au sein du territoire de la Culture des vases à entonnoir. C'est en Bohème que les sites de cette culture sont connus et ils couvrent une période entre 3900 et 3400 av. J-C. Toutefois, de longs tumulus n'ont pas été découverts en Bohème depuis longtemps. La raison principale en est qu'ils sont situés dans des zones où ils ont été affectés par le labourage moderne. Le relevé à distance des champs modernes a contribué de manière significative à leur reconnaissance, en particulier l'archéologie aérienne. La recherche actuelle en Bohème a mis en évidence des indices nouveaux de douzaines de longs tumulus de types différents, élargissant de manière sensible notre connaissance de ce phénomène dans les limites sud-est de sa répartition. Un type nouveau de long tumulus a été identifié en Bohème en recourant au relevé à distance ainsi qu'aux données actuelles de fouilles. Les paramètres caractéristiques des longs tumulus en Bohème sont une orientation d'est en ouest avec un site de cérémonie placé sur la face est, ainsi qu'un périmètre délimité par une clôture ou un fossé. Les monticules peuvent au moins être divisés en deux formes structurelles et chronologiques. La première est la butte étroite et parfois extrêmement longue dont le périmètre est défini par une clôture datant de 3900 à 3800 av. J-C. Le second type de tumulus est entouré d'un fossé trapézoïdal. Au regard de la datation par radiocarbone, ces structures ont été érigées au cours des années 3700 à 3600 av. J-C. Ce n'est qu'uniquement en Bohème que ce type de monument est actuellement connu.

Resumen: Los túmulos largos del Neolítico tardío se encuentran comúnmente en toda Europa central y noroccidental, dentro del territorio de la cultura de los vasos de embudo. Los sitios de esta cultura se conocen en Bohemia y abarcan un período comprendido entre el 3900 y el 3400 a.C. Sin embargo, en Bohemia hace tiempo que no se detectan túmulos largos. La razón principal es que están ubicados en zonas donde fueron afectados por el arado moderno. Una contribución importante a su reconocimiento fue la teledetección de los campos modernos, especialmente la arqueología aérea. La investigación actual en Bohemia proporcionó nueva evidencia de

docenas de túmulos largos de varios tipos, ampliando significativamente nuestro conocimiento sobre este fenómeno en los márgenes sureste de su distribución. Se ha identificado un nuevo tipo de túmulo largo en Bohemia mediante sensores remotos y datos de excavaciones actuales. Los parámetros característicos de los túmulos largos en Bohemia son una orientación este-oeste con el lugar ceremonial en el frente oriental y la delimitación del perímetro mediante una empalizada o un foso. Los montículos se pueden dividir en al menos dos formas estructurales y cronológicas. El primero es el montículo estrecho y a veces extremadamente largo con un perímetro definido por una empalizada que data del 3900-3800 a.C. El segundo tipo de túmulo está rodeado por un foso trapezoidal. Según la datación por radiocarbono, estas estructuras se construyeron entre el 3700 y el 3600 a.C. Este tipo de monumento se conoce actualmente exclusivamente en Bohemia.

KEY WORDS

Long barrows, Late Neolithic, Bohemia/Czech Republic, Remote sensing

Introduction

Long barrows are an important type of monumental funerary architecture. They appear in central, northern and northwestern Europe from the 5th millennium to the 3rd millennium BC (eg. Sherratt 1997). These monuments can be distinguished into two basic forms. First are megalithic long barrows typical for the megalithic region of Britain, Sweden, Denmark, northern France, northern Germany and part of Poland (eg. Darvill 2016; Madsen 2014; Müller 2017; Pelisiak 2014). The second type, earthen long barrows, does not contain any large stone blocks in their construction. The construction of these barrows is rather made of wooden elements. This type is known from both megalithic as well as non-megalithic territories (Darvill 2010; Midgley 1985). The earthen long barrows are generally considered as earlier, preceding the megalithic constructions, however, only non-megalithic forms of long barrows are known from Bohemia. Many types of non-megalithic long barrows appear in Europe, which often differ region by region. These are, for example, the Cerny Culture barrows in northern France (Chambon 2020) or the Kujavian barrows in Poland (Chmielwski 1952). There is an ongoing discussion on the relation of these forms and their chronological relationship (Król 2021). We need to bear in mind that these differences are likely to be the result of local development,

which may be different in different regions but based on a similar principle. All types of monuments are represented by a variety of regional forms originating from the archetypes of Neolithic long houses (Midgley 1985).

In southern Scandinavia, Germany, Poland and Czech Republic long barrows are associated with the Funnel Beaker Culture (ca 4000–3500 BC). They represent the typical manifestation of the burial rites of this Culture (Midgley 2005). While in some regions of central Europe (Germany, Poland, Moravia) these barrows are still visible as upstanding monuments, in Bohemia, however, such cases are missing. Based on the earlier archaeological evidence, it almost seemed that the local communities of the Funnel Beaker Culture did not build long barrows in Bohemia at all. This was, however, a wrong assumption. Two ground plans of long barrows were excavated in the 1960s and 70s, in Březno (northwestern Bohemia; Pleinerová 1980). For a long time they remained the only evidence of the existence of such structures in Bohemia (Neustupný, 2001). Although there were speculations about the existence of some other similar sites, their interpretation was not secure (Krištuf 2004). Another relic of a long barrow was accidentally discovered in the city centre of Nymburk during a rescue excavation (Motyková 1998). The existence of such structures in Bohemia was confirmed by the analysis of earlier excavations (Krištuf and Švejcar 2013).

It appears that long barrows in most parts of Bohemia were probably destroyed by modern agricultural activities. Since the late 1990s remote sensing became crucial for their survey, especially the combination of aerial survey and geophysical survey (eg. Gojda 2019). Our study represents the first summary of the present state of knowledge on long barrows in Bohemia.

Our research project targeted specifically the questions of construction, development and chronology of use of these monuments. The current list of long barrows presented in this paper allows us to answer a number of important questions. First we try to answer the question whether the long barrows represent a uniform architectural tradition in Bohemia, or whether we can detect some typological development and chronological variability. Based on collected data, we attempt to distinguish the barrows into several types by their formal characteristics and discuss their chronology and relationship with similar monuments in Central Europe.

We also try to reconstruct the position of barrows in the landscape. We aimed to find out whether long barrows in Bohemia were part of larger burial sites such as in Central Moravia (eg. Křemela; Šmíd 2003), whether they form small groups such as in Poland (Kabała et al. 2019; Chmielewski 1952) or whether they remain as isolated monuments in the landscape.

Last but not least, we examined the function of long barrows in terms of the development of burial rites and their significance to the communities of their builders and the structuring of landscape.

Current State of Research

Neolithic long barrows are still a visible part of the cultural landscape in northern and northwestern Europe, so it is not surprising that they have been of interest since the formation of archaeology as a scientific discipline in the 19th century. However, intensive excavations of these barrows are mainly associated with the first half of the 20th century, when both megalithic (eg. Piggott 1962) and non-megalithic (eg. Ashbee 1966) structures were excavated in the British Isles and northern Europe, as well as barrows in Central Europe (eg. Chmielewski 1952). However, no above-ground remains of such barrows have been recorded in Bohemia, so they have not been of interest to archaeology for a long time, although their existence in Central Moravia has been known since at least the beginning of the 20th century (Houšťová 1960).

During systematic archaeological research of a multiperiod site near Březno (Louny District), the remains of two long structures defined by palisade troughs were discovered by Ivana Pleinerová in the 1960s and 1970s (Pleinerová 1980, 10). The origin of both structures is now dated to the beginning of the Funnel Beaker Culture. The two Březno structures became for a long time the main representatives of Neolithic long barrows in Bohemia (Neustupný 2001, 2013).

In the following years, other features were gradually discovered during rescue excavations, which can be classified with a varying degree of reliability as Neolithic long barrows. Since the 1990s, aerial archaeological research has been developing, focussing on the area of northwestern and central Bohemia. Although it was not focussed on the research of long barrows, it played a key role in the identification of these monuments in Bohemia. The mounds are not preserved in the relief of the terrain in Bohemia and aerial survey is able to detect their buried components on the basis of vegetation features. These are mainly the ditches and troughs that surround these mounds. The specific shape of these features makes them relatively easy to detect on aerial photographs. Although since the 1990s dozens of similar features have been discovered, they have not received systematic attention until recently and most of them have never been published.

A long-term programme of aerial archaeological survey based on the search of features of archaeological interest by means of cropmarks was systematically carried out by the Institute of Archaeology in Prague of the Czech Academy of Sciences in the densely settled lowlands of the Elbe,

Vltava and Ohře rivers. This work greatly expanded knowledge about the settlement topography, the density and qualitative representation of archaeological sites dated to the Late Neolithic (Gojda 2019).

Concerning cropmarking processes (Barber 2011; Czajlik et al. 2021; Gojda and Hejcman 2012; Rączkowski 2011), our experience has shown that the frequency, presence and quality of buried features, including long barrows, are most dependent on the thickness of the ploughed soil or on its decrease as a result of colluvial erosion. This is proven by measurements of ploughed soil thickness taken on the surface of some sites where cropmarks appeared annually (and with more than one kind of cereal), or just a few times per decade. What is less clear are the reasons for the absence of cropmarks for much of the aerial survey cycle at some sites, where the objective conditions for their presence were met (dry weather, suitable crops), but cropmarks were seen only rarely during survey performed over these sites.

The majority of these features discovered by the active (interpretational, observer-based) method of aerial survey (on the differences between active and passive methods of air- and spaceborne data, see Gojda 2020; Šmejda 2017; Verhoeven 2017; Verhoeven and Sevara 2016) are located in the region around the hill of Říp, in the flat landscape of the adjacent Mělník region and in the Lower Ohře River valley. The discovery of long barrows by aerial survey east of Prague in the Nymburk and Kolín regions is rather rare. It should be noted that this state of knowledge reflects to a certain extent the latest directions of aerial survey campaigns to these areas, ie. to the Mělník, Litoměřice, Louny, Nymburk, Kolín, Prague-East, Ústí nad Labem and Kladno districts.

It needs to be emphasised that most of the areas mentioned above are located on the sandy-gravel terraces that represent ideal substrata for the cropmark identification of sunken archaeological features. The airborne archaeological record may be affected by the variability of substrata properties and the archaeological features on loess substrata are much less visible. Therefore also the abundant evidence of long barrows in the north Bohemian Elbe/Ohře territory may be caused by the prevalence of the sandy-gravel substrata.

Some of the long barrow ground plans discovered by the aerial prospection were subsequently surveyed by geomagnetic prospection. Other sites were, however, discovered by systematic large-scale geophysical prospection. The first long barrows discovered by the geophysical survey were those detected during the prospection conducted by Roman Křivánek as part of the project Settlement pattern of Prehistoric Bohemia (GAČR 404/97/K024). The caesium magnetometer was used in this project (Smartmag SM-4g, Scintrex, with data density of 1 0.25 m or 0.5 0.2 m). After 2010

some other sites were confirmed by five channel survey, using the fluxgate gradiometers Magneto-arch, Sensys, in net 0.5 0.2 m.

The recent research on the Late Neolithic long barrows in Bohemia, which was carried out within the project "Eneolithic long barrows in Bohemia and reconstruction of the ritual landscape around the hill of Říp", shows that we can most likely expect the existence of more visibly preserved barrows from this period in Bohemia. The project represents the first effort to systematically investigate the phenomenon of long barrows in Bohemia. Three long barrows were excavated, namely in Dušníky, Vražkov and Račiněves. The combination of archaeological and natural science methods brought a number of fundamental findings. Among other things, there is evidence of the existence of an above-ground mound at the site of Dušníky.

Long Barrows in Bohemia

Out of 61 sites recorded in this work (Table 1), 42 sites (70%) were discovered through aerial archaeology (one of these sites is mentioned in the literature without any further information) and 2 sites (3.3%) through geophysical survey. The rest (16 sites) were discovered during rescue excavations, mainly in northwestern Bohemia. Most of the sites discovered by aerial archaeology have not been excavated so far and their interpretation is therefore based on a formal similarity with sites excavated in other regions. The exceptions are the sites of Dušníky1 and Vražkov1. These barrows were partly excavated within our targeted project in 2021. Their interpretation has been confirmed in both cases and the monuments were dated to the Funnel Beaker Culture and the Michelsberg Culture.

All long barrows that have been identified by aerial survey show cropmarks as closed line features. They are most likely filled ditches. They were presumed to be foundation trenches for a wooden palisade (cf. Pleinerová 1980). They are of a rectangular or trapezoidal ground plan. They are usually the most visible cropmarks of long barrows detected by remote sensing. Internal individual features have been identified in the longitudinal axis of some barrows. They are mostly of rectangular ground plan measuring about 2 1 m and could be most likely interpreted as grave pits. Such features have been identified at 15 sites.

An important discovery is the variability of several types of long barrows in Bohemia based on their formal properties. The basic division of the monument is into rectangular barrows (34) and trapezoidal barrows (23). The longer axis of barrows is mostly oriented in the E–W direction or with a slight deviation (39), 13 features are oriented in the direction SE–NW, 3 features are oriented in the direction NE–SW and only 2 in the direction

Table 1 List of long barrows in Bohemia

ID	Site	District	Coordinates	Method of discovery	Type	Date	Shape	Orientation
1	Březno-62	Louny	50.3592151N, 13.7468878E	Excavation	A:1	3957–3797 BC	Rectangle	E-W
2	Březno-86	Louny	50.3592151N, 13.7468878E	Excavation	A:1	Late Michelsberg/ Funnel Beaker Culture	Rectangle	E-W
3	Březno 3	Louny	50.3665081N, 13.7504478E	Airplane prospection	C:1		Rectangle	ESE-WNW
4	Březno 4	Louny	50.3664686N, 13.7514083E	Airplane prospection	A:2		Rectangle	SSW-NNE
5	Březno 5	Louny	50.3504347N, 13.7235242E	Airplane prospection	B:2		Trapezoid	E-W
6	Březno 6	Louny	50.3508044N, 13.7233311E	Airplane prospection	B:2		Trapezoid	E-W
7	Břežany	Louny	50.3385536N, 13.4648997E	Airplane prospection	B:2		Trapezoid	E-W
8	Ctiněves	Litoměřice	50.3758950N, 14.3085336E	Airplane prospection	B:2	Globular Amphora Culture	Trapezoid	SE-NW
9	Čachovice	Chomutov	50.37865N, 13.3831864E	Excavation	C:2		Rectangle	E-W
10	Čížkovice	Litoměřice	50.4821883N, 14.0225786E	Airplane prospection	n/a		Trapezoid	E-W
11	Dušníky 1	Litoměřice	50.4180725N, 14.1902497E	Airplane prospection	B:1	3633–3522 BC	Trapezoid	ESE-WNW

Table 1 continued

ID	Site	District	Coordinates	Method of discovery	Type	Date	Shape	Orientation
12	Dušníky 2	Litoměřice	50.4187639N, 14.1903864E	Airplane prospection	C:2		Rectangle	ESE-WNW
13	Dušníky 3	Litoměřice	50.4216858N, 14.1956617E	Airplane prospection	A:1		Rectangle	E-W
14	Dušníky 4	Litoměřice	50.4238922N, 14.1800814E	Airplane prospection	A:2		Rectangle	ESE-WNW
15	Havraň	Most	50.4403100N, 13.5967325E	Airplane prospection	B:2		Trapezoid	E-W
16	Chlumín 2	Mělník	50.2912067N, 14.4509233E	Airplane prospection	B:2		Trapezoid	E-W
17	Chrášťany	Kolín	50.0660886N, 14.9239303E	Geophysical prospection	A:2		Rectangle	SE-NW
18	Chudeřín 1	Louny	50.3414503N, 13.4360792E	Excavation	A:1	Funnel beaker culture	Rectangle	E-W
19	Chudeřín 2	Louny	50.3382047N, 13.4318519E	Excavation	A:1	Funnel beaker culture	Rectangle	E-W
20	Klučov	Kolín	50.098202N, 14.910244E	Excavation	A:1	Jordanow culture?	Rectangle	S-N
21	Kněžívka	Praha-západ	50.1260569N, 14.2668736E	Excavation	A:3		Trapezoid	ENE-WSW
22	Kolín 1	Kolín	50.0353003N, 15.1663867E	Excavation	A:1		Rectangle	ESE-WNW
23	Kolín 2	Kolín	50.0350867N, 15.1662686E	Excavation	A:1		Rectangle	ESE-WNW

Table 1 continued

ID	Site	District	Coordinates	Method of discovery	Type	Date	Shape	Orientation
24	Levonice	Louny	50.3460417N, 13.6654592E	Airplane prospection	B:1		Trapezoid	E-W
25	Libenice	Kolín	49.9902031N, 15.2615139E	Excavation	C:2		Rectangle	SE-NW
26	Lišany 1	Louny	50.3460444N, 13.6654414E	Airplane prospection	B:1		Trapezoid	E-W
27	Lišany 2	Louny	50.3462567N, 13.6376381E	Airplane prospection	B:2		Trapezoid	SW-NE
28	Milčice	Nymburk	50.1075917N, 14.9651647E	Airplane prospection	B:1		Trapezoid	E-W
29	Mradice (Skupice)	Louny	50.3363919N, 13.6843025E	Airplane prospection	B:2		Trapezoid	SW-NE
30	Nelahozeves	Mělník	50.2709184N, 14.2922928E	Airplane prospection	n/a		n/a	n/a
31	Nížebohy	Litoměřice	50.4163803N, 14.1758033E	Airplane prospection	B:2		Trapezoid	ESE-WNW
32	Nová Ves 1	Mělník	50.3165722N, 14.2975325E	Airplane prospection	B:1		Trapezoid	SE-NW
33	Nová Ves 2	Mělník	50.3167197N, 14.2948886E	Airplane prospection	C:2		Rectangle	SE-NW
34	Nová Ves 3	Mělník	50.3201528N, 14.2945211E	Geophysical prospection	A:1		Rectangle	ESE-WNW

Table 1 continued

ID	Site	District	Coordinates	Method of discovery	Type	Date	Shape	Orientation
35	Nová Ves II	Kolín	50.0654708N, 14.8258922E	Airplane prospection	C:1		Rectangle	E-W
36	Nové Benátky	Mladá Boleslav	50.2949944N, 14.8087589E	Airplane prospection	B:2		Trapezoid	ESE-WNW
37	Nymburk	Nymburk	50.1865406N, 15.0440739E	Excavation	D	Funnel Beaker Culture	Rectangle	E-W
38	Obora	Louny	50.3666214N, 13.8717156E	Airplane prospection	n/a		Trapezoid	ENE-WSW
39	Plotiště nad Labem	Hradec Králové	50.1211225N, 14.9611547E	Excavation	A:3		Trapezoid	E-W
40	Počedělice	Louny	50.3729764N, 13.8902444E	Airplane prospection	N/a		Rectangle	ENE-WSW
41	Postoloprty 1	Louny	50.3738361N, 13.7112353E	Airplane prospection	B:1	Funnel Beaker Culture	Trapezoid	E-W
42	Postoloprty 2	Louny	50.3730997N, 13.7329692E	Airplane prospection	C:1		Rectangle	E-W
43	Račiněves	Litoměřice	50.37588886N, 14.2395315E	Excavation	A:1	3981-3770 BC	Rectangle	E-W
44	Roudnice nad Labem 1	Litoměřice	50.4074969N, 14.2406303E	Airplane prospection	A:2		Rectangle	SE-NW
45	Roudnice nad Labem 2	Litoměřice	50.4079583N, 14.2412900E	Airplane prospection	A:2		Rectangle	SE-NW

Table 1 continued

ID	Site	District	Coordinates	Method of discovery	Type	Date	Shape	Orientation
46	Roudnice nad Labem 3	Litoměřice	50.4090969N, 14.2434733E	Airplane prospection	A:2		Rectangle	SE-NW
47	Roudnice nad Labem 4	Litoměřice	50.4081858N, 14.2439186E	Airplane prospection	A:2		Rectangle	SE-NW
48	Rybňany	Louny	50.3325911N, 13.6159142E	Airplane prospection	B:2		Trapezoid	ENE-WSW
49	Soběsuky	Chomutov	50.3527305N, 13.4293194E	n/a	n/a		n/a	n/a
50	Staňkovice	Louny	50.3577508N, 13.5610878E	Airplane prospection	C:2		Rectangle	E-W
51	Škrle	Chomutov	50.4114572N, 13.5306267E	Airplane prospection	C:2		Rectangle	E-W
52	Třebestovice	Nymburk	50.1211225N, 14.9611547E	Excavation	A:4	Jordanow Culture?	Rectangle	ESE-WNW
53	Údlice	Chomutov	50.4331981N, 13.4482311E	Airplane prospection	B:1		Trapezoid	SE-NW
54	Velké Žernoseky	Litoměřice	50.5322883N, 14.0710836E	Excavation	D	Funnel Beaker Culture	N/a	E-W

Table 1 continued

ID	Site	District	Coordinates	Method of discovery	Type	Date	Shape	Orientation
55	Vražkov 1	Litoměřice	50.3794219N, 14.2520725E	Airplane prospection	B:1	Late Michelsberg Culture	Trapezoid	ESE-WNW
56	Vražkov 2	Litoměřice	50.3769794N, 14.2644389E	Airplane prospection	C:2		Rectangle	ESE-WNW
57	Všechlapy 1	Nymburk	50.2261139N, 15.0201192E	Airplane prospection	A:1		Rectangle	SE-NW
58	Všechlapy 2	Nymburk	50.2278828N, 15.0192017E	Airplane prospection	A:1		Rectangle	NE-SW
59	Všechlapy 3	Nymburk	50.2204533N, 15.0329950E	Airplane prospection	C:2		Rectangle	SE-NW
60	Žatec	Louny	50.3175458N, 13.5356283E	Excavation	C:2	Funnel Beaker Culture?	Rectangle	SE-NW
61	Holešice	Most	50.5019358N, 13.5508514E	Excavation	A:4	Funnel Beaker Culture?	Rectangle	SW-NE

Table 1 continued

ID	Length (m)	Width-east (m)	Width-west (m)	Rounded corners	Interruption	Mound	Grave	Antechamber	Palisade/trench
1	24	3	2.5	No	Yes	No	2	No	Palisade
2	Min. 144	4	4	Yes	Yes	No	3	Yes	Palisade
3	20	15	15	No	No	No	1	No	n/a
4	Min. 28	5	5	Yes	Yes	No	0	No	Palisade
5	41	18	9	Yes	No	No	0	No	Ditch
6	Min. 28	n/a	9	Yes	No	No	0	No	Ditch
7	16	9	7	No	No	No	0	No	Ditch
8	14	10	8	No	No	Yes	0	No	Ditch
9	24	15	14	No	No	No	0	No	Ditch
10	35	n/a	n/a	n/a	n/a	No	0	No	n/a
11	86	26	17	No	No	Yes	1	No	Ditch
12	18	15	15	Yes	Yes	No	0	No	Ditch
13	n/a	7	7	n/a	n/a	No	Min. 1	No	Palisade
14	15	5	5	Yes	No	No	0	No	Palisade
15	50	26	17	n/a	No	No	0	No	Ditch
16	26	8	6	n/a	No	No	0	No	Ditch
17	Min. 20	10	10	Yes	n/a	No	0	No	Palisade
18	36	7	7	Yes	Yes	No	1	No	Palisade
19	66	3	3	n/a	Yes	No	1	Yes	Palisade
20	20	3	3	No	n/a	No	0	Yes	Palisade
21	22	14.5	10	No	No	No	1?	Yes	Palisade

Table 1 continued

ID	Length (m)	Width-east (m)	Width-west (m)	Rounded corners	Interruption	Mound	Grave	Antechamber	Palisade/trench
22	Min. 116	6	Yes	No	No	No	0	No	Palisade
23	Min. 13.5	4	4	N/a	No	No	0	No	Palisade
24	20	11	8	Yes	No	No	1	No	Ditch
25	80	20	20	Yes	No	No	0	No	Ditch
26	20	11	8	Yes	No	No	1	No	Ditch
27	20	13	10	No	No	No	0	No	n/a
28	36	20	11	Yes	No	No	1	No	Ditch
29	17	12	9	Yes	No	No	0	No	Ditch
30	n/a	n/a	n/a	n/a	n/a	No	0	No	n/a
31	47	21	14	Yes	No	Yes	0	No	Ditch
32	27	12	7	No	Yes	No	1	No	Ditch
33	47	26	26	n/a	No	No	0	No	Ditch
34	Min. 100	8	8	n/a	n/a	No	0	No	Palisade
35	22	16	16	No	No	No	1	No	Ditch
36	18	12	7	Yes	No	Yes	0	No	Ditch
37	Min 6.5	5	5	No	No	Yes (stone)	1	No	n/a
38	13	8	7	Yes	No	No	1	No	n/a
39	Min. 26	n/a	7	No	n/a	No	0	No	Palisade
40	15	5	5	No	No	No	0	No	n/a
41	14	9.5	5	Yes	Yes	No	1	No	Ditch
42	26	14	14	n/a	No	No	1	No	Ditch
43	About 122	6	6	Yes	Yes	No	2	No	Palisade

Table 1 continued

ID	Length (m)	Width-east (m)	Width-west (m)	Rounded corners	Interruption	Mound	Grave	Antechamber	Palisade/trench
44	34	7	7	Yes	Yes	No	0	Yes	Palisade
45	22	7	7	Yes	Yes	No	0	No	Palisade
46	21	7	7	Yes	Yes	No	0	No	Palisade
47	Min. 23	6	6	Yes	Yes	No	0	No	Palisade
48	Min 11	9	n/a	Yes	No	No	0	No	Ditch
49	n/a	n/a	n/a	n/a	n/a	No	0	No	n/a
50	18	12	12	No	No	No	0	No	Ditch
51	18	11	11	n/a	No	No	0	No	Ditch
52	11	6.5	6.5	No	No	No	0	No	Palisade
53	30	14	11	No	No	No	1	No	Ditch
54	Min. 10	Min. 4	Min. 4	No	No	Yes (stone)	5	No	n/a
55	30	10	7	Yes	No	No	2	No	Ditch
56	25	11	11	n/a	n/a	No	0	No	Ditch
57	Min. 137	8	8	n/a	n/a	No	0	No	Palisade
58	Min. 108	5	5	n/a	n/a	No	1	No	Palisade
59	14	9	9	No	No	No	0	No	n/a
60	17	10	10	No	No	No	0	No	Ditch
61	11	8	8	No	n/a	No	1	No	Palisade

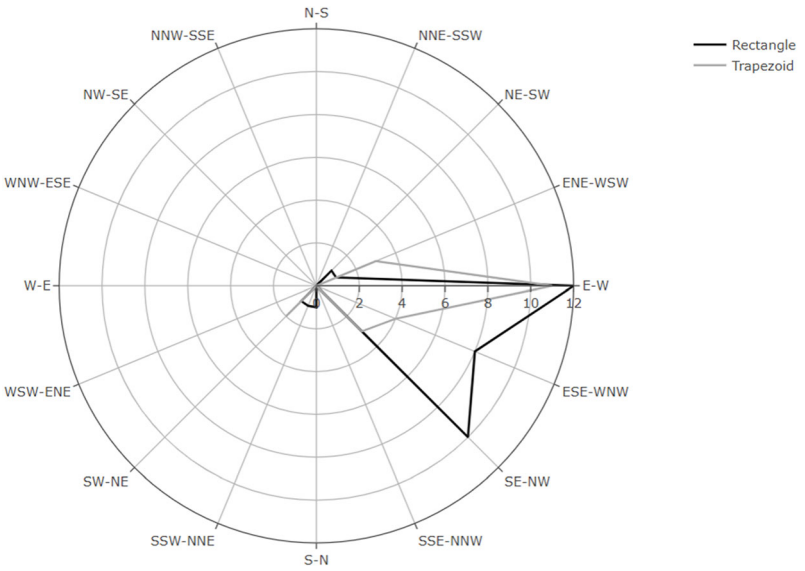

Figure 1. Orientation of long barrows in Bohemia. Black: rectangular ground plan; Grey: trapezoid ground plan

S–N (Figure 1). These 2 features were discovered during large-scale excavation and their classification among the long barrows is still not clear. All barrows are outlined by linear features, the primary characteristic for this type of monument. Based on the width of these features and on the knowledge from excavation records, we can divide the linear features into 2 categories: pointed ditch (25) and palisade trench (21). The record of the cropmarks was not conclusive enough for the rest of the features. Importantly, 20 features with an identified palisade have a rectangular ground plan and only one is trapezoidal. All barrows longer than 100 m (5 features) are rectangular.

The length of the barrows is quite variable (Figure 2). The average length of the studied barrows is 36.5 m, but SD 32.6 indicates a relatively large variance of values. The longest barrow is in Březno (Louny District). Its length exceeded 144 m but the overall length was not recorded as the feature is truncated by the Ohře River. The shortest feature was only 11 m long. It is a building on the site of Třebestovice, which belongs to the category of uncertain barrows. Most barrows (77%) are of length less than the average. Only 12 structures are longer than the average and 7 of them are longer than twice the average. The longest barrows (over 100 m) are rectangular structures with a width of between 4 and 8 m. Shorter rectangular structures can also be wider. The maximum recorded width is 26 m.

Figure 2. The length (m) and width (m) of long barrows in Bohemia. Black: rectangular ground plan; Grey: trapezoid ground plan

Trapezoid features are generally shorter (Figure 3). Their length is mostly within the average of the whole set. Only 4 structures are longer, including the barrow at Dušníky 1, which has an exceptional length (86 m). The maximum width of trapezoidal structures is between 8 and 26 m.

Grave pits were recorded at 23 barrows. These are mostly barrows that have been discovered by excavation. Although, point features have been discovered on some barrows, which we interpret as grave pits, even by aerial archaeology. They always lie in the main axis of the structure and their interpretation has been verified by excavation of some barrows (eg. Vražkov1). In some cases the possibility of identifying graves by aerial archaeology is limited. Graves have been identified only by subsequent magnetometric prospection in some cases (eg. Dušníky1, Račiněves). As a rule, only one grave pit is identified in each barrow. In three cases there were two grave pits discovered and only in one monument (Březno 86) there were three grave pits recorded.

All recorded long barrows lie in central and northwestern Bohemia (Figure 4). This is partly due to the fact that aerial prospection has focussed on these areas. These are gravel-sand terraces of large rivers. These terrains are extremely suitable for aerial archaeology. Currently, we have identified three main regional concentrations of long barrows. The first area is the

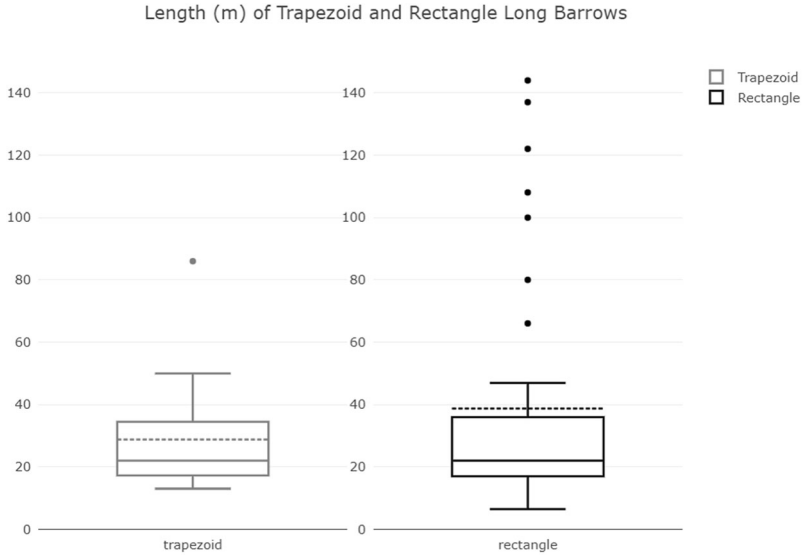

Figure 3. The length of long barrows in Bohemia. Grey: rectangular ground plan; Red: trapezoid ground plan

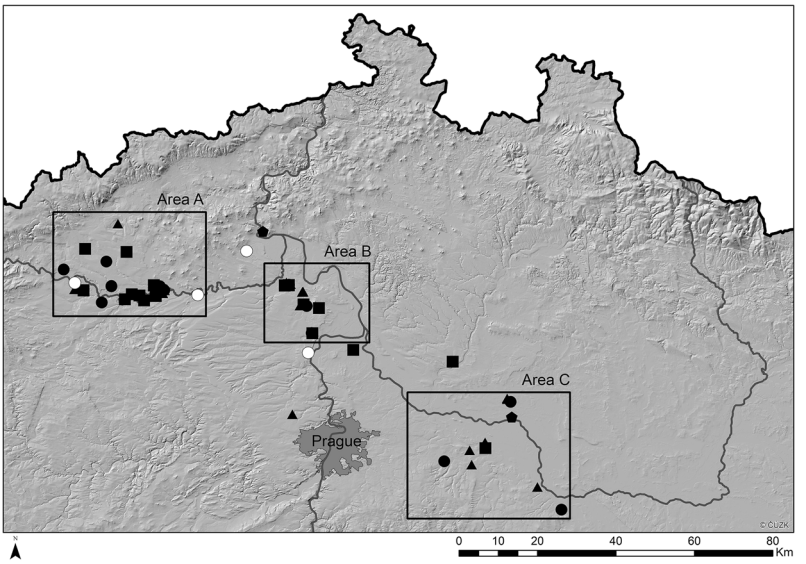

Figure 4. Distribution map of all types of Neolithic long barrows in Bohemia. Triangle—type A, square—type B, circle—type C, pentagon—type D and white circle—other barrows

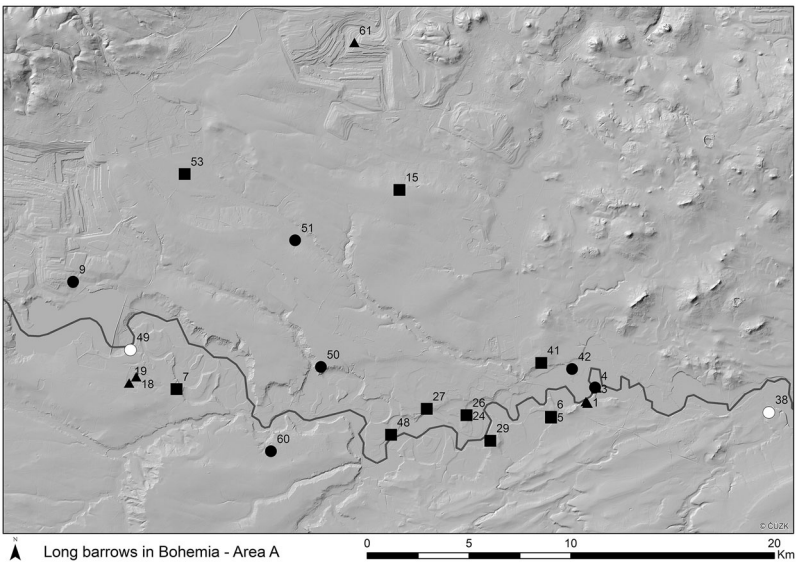

Figure 5. Distribution map of long barrows in the Ohře River region in Northwest Bohemia. Triangle—type A, square—type B, circle—type C, pentagon—type D and white circle—other barrows

Ohře River basin (Figure 5), the second area around Mount of Říp north of Prague (Figure 6) and the third area lies east of Prague in the Elbe River basin (Figure 7). Especially in the first two areas it is evident that the typical position for long barrows is the edges of river terraces. The barrows lie mostly isolated in the landscape, although in some areas their concentration was separated by a distance of only a few hundred metres; some barrows are in direct visual contact.

Discussion on Chronological and Formal Variability

The basic question we asked was whether the long barrows in Bohemia represent a uniform architectural tradition, or whether we can observe some typological development and variability. Based on the collected data, we report the existence of several types of long barrow constructions in Bohemia. It seems that at least one (type B) is not yet identified in any of the neighbouring regions and it is thus unique to the area of our research.

Typology

The first type is Earthen long barrows with palisade construction (type A; Figure 8). They are structures with the circumference defined by a trench, which formed the foundation for a palisade. We distinguish four subtypes of these features. Structures of subtype A:1 have mostly rectangular ground plans and their corners are commonly rounded. Another typical characteristic is their considerable length. Most of them reach over 100 m in length, although there are some shorter examples. The palisade trench is usually interrupted in the eastern side. It is thought that in this part was located an entrance to the interior of the construction in the frontal part of the barrow. An analogy can be seen in the so-called "houses of the dead" of some Polish barrows (Socha 2015). This similarity is furthermore supported by the fact that in the case of three barrows, an entrance hall separated by a palisade from the barrow was identified on the eastern side. Burials are usually located in the axis of the barrow. The maximum number of registered burials within a single structure is two. These structures are not usually delimited by a ditch. The analogies for such structures can be found in northwestern Europe (Fussels Lodge), although here they mostly have a trapezoidal ground plan. Despite the fact that Ivana Pleiner-

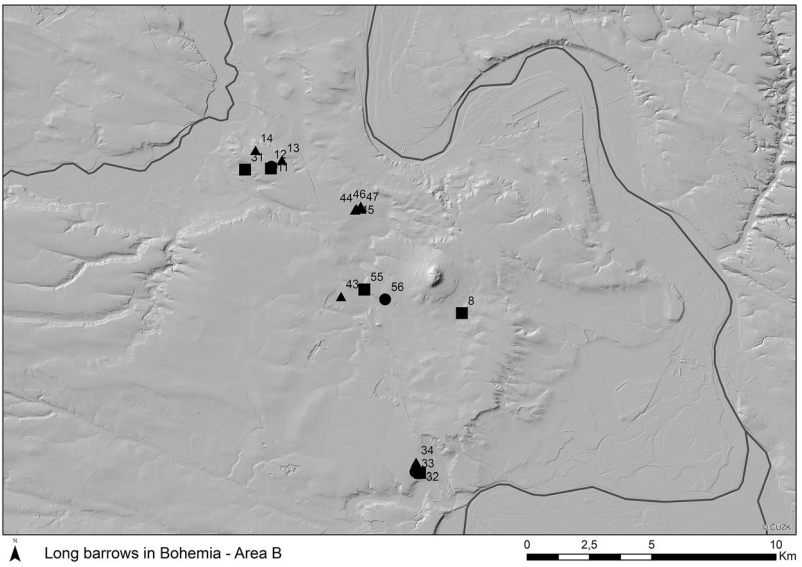

Figure 6. Distribution map of long barrows in the Mount of Říp area. Triangle—type A, square—type B, circle—type C, pentagon—type D and white circle—other barrows

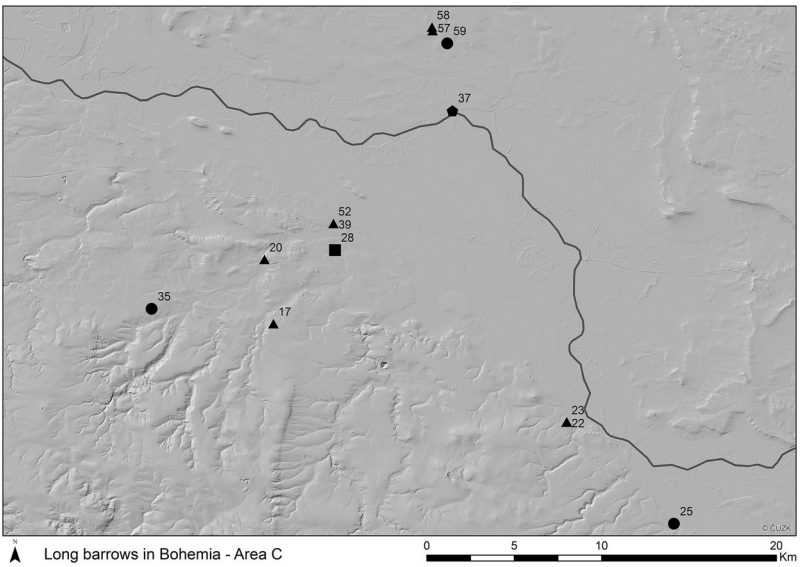

Figure 7. Distribution map of long barrows in the middle Labe River area in the eastern part of Central Bohemia. Triangle—type A, square—type B, circle—type C, pentagon—type D and white circle—other barrows

ová (1980) reconstructed the mound embankment covering these constructions, remains of such mounds have not been documented anywhere in Bohemia. It is not inconceivable that they were only funerary enclosures without a mound, which are documented in other regions (Socha 2015). There is indirect evidence that indicates the existence of mounds. These are mainly secondary graves that were later inserted in partially eroded remains of mounds, eg. in Březno or Račiněves.

Subtype A:2 is again features defined by a palisade trough, which is arched on one shorter side. The other shorter side is usually open. The features are therefore U-shaped. We have identified 7 such features. They range in length from 15 to 34 m and in width from 5 to 10 m. At the site of Roudnice nad Labem, 4 of these features were identified close to each other. Two of them even seem to be interconnected by a linear cropmark, but the relationship of these features needs to be further investigated. The similar features occurred separately. None of them has been examined by excavation so their interpretation is unclear. Due to their formal similarity, they may be examples of preserved ends/terminations of A:1 type mounds, but the fact that we recorded a large number of them indicates that they may be a separate type of structure. However, without further research we cannot exclude the possibility that they are features of a residential nature.

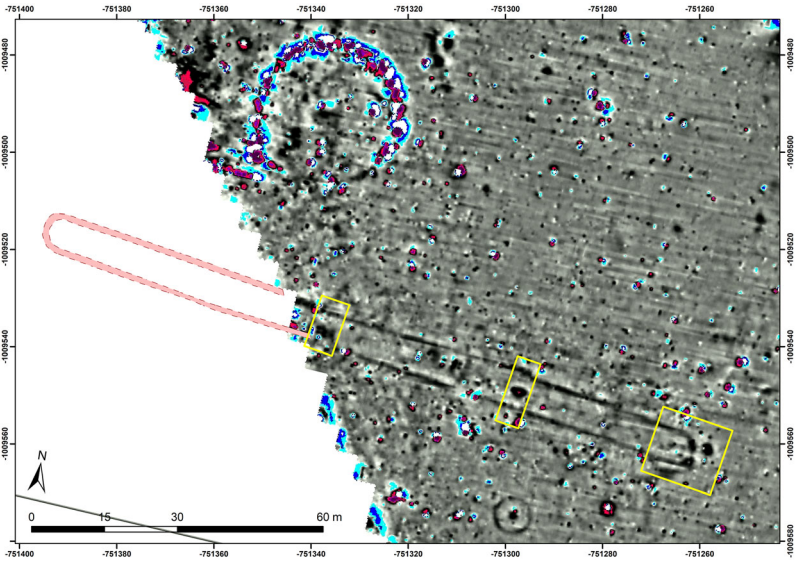

Figure 8. Račiněves (Litoměřice District). Neolithic long barrow (type A) in geophysical survey (by R. Křivánek) with a distinctive round structure of the Iron Age tomb

Most of the Type A structures are rectangular in plan. Only one exception has been recorded in Bohemia. It is the mound in Kněžívka. It is surrounded by a palisade (originally embedded in a trench densely filled with small blocks of local siltstone), but has a distinctly trapezoidal plan. Subtype A:3 has been allocated for this kind of feature.

Similarly, two palisaded rectangular structures were discovered, but they are significantly shorter and their corners are not rounded. One of them was identified at the site of Třebestovice in the context of a Jordanów Culture burial site. However, it is not certain that it is a long barrow either, although it has been examined in its entirety by excavation. The Jordanow graves may not be related to the building (Čtverák and Rulf 1989). However, another similar structure at the site of Holešice contained a Funnel Beaker Culture burial (Dobeš 1991). Subtype A:4 has been reserved for this structure.

The second type (type B; Figure 9) is trapezoidal earthen long barrows with outline ditch. This type is characterised by a trapezoidal ground plan surrounded by a ditch, commonly over 2 m wide. The 2021 excavations at Dušníky1 and Vražkov1 provided evidence of such ditches with pointed bottoms sunken about 1 m deep. The ditch outlines the barrow continu-

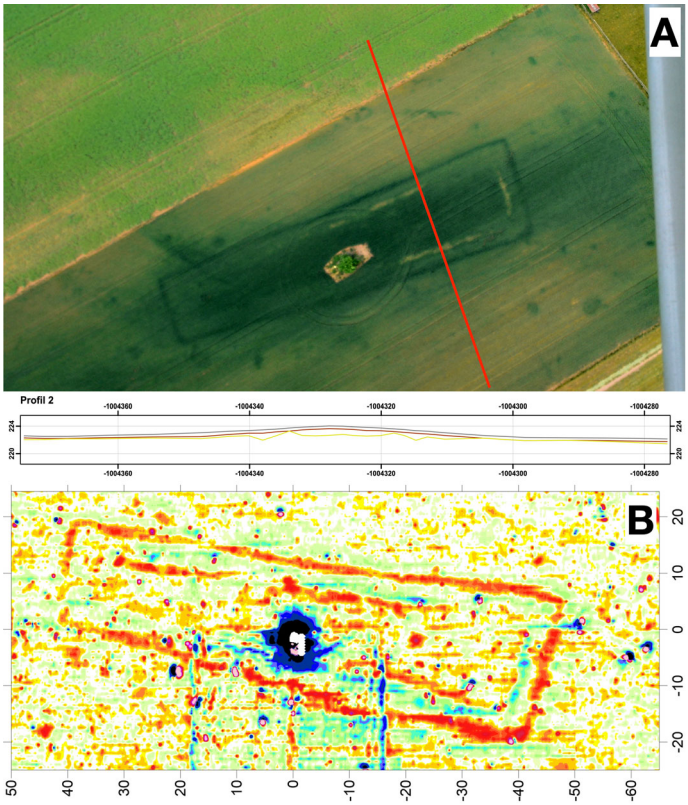

Figure 9. Dušníky1 (Litoměřice District). **A** Aerial photograph of trapezoid long barrow (type B; photo by M. Gojda) with red line pedological coring profile showing the height of the barrow and depression caused by exploitation of dark soil for piling up the mound. **B** Geophysical survey (by R. Křivánek)

ously all round without any interruptions. The barrow probably did not have any inner construction and was piled up only with soil. We distinguish two subtypes of these barrows. First (B:1) with evidence of sunken burial pits (Figure 10B). The graves are usually located in the axis of the barrow in its eastern half. In all known sites there was always only one burial recorded. The exception is the barrow in Vražkov, where the second discovered burial was in fact of the Early Bronze Age date, so the barrow was originally also constructed for one primary burial. The second subtype (B:2) is constructions without visible traces of burials, but on the basis of their shape similarity we can assume that they are also long barrows. All of the barrows of this subtype have been discovered by aerial survey and none have yet been investigated. Thus, the absence of a burial pit may be due to

Figure 10. A Nové Benátky (Mladá Boleslav District) aerial photograph of the long barrow type B with remains of mound and **B** Údlice (Chomutov District) aerial photograph of the long barrow type B with grave pit (both photographs by M. Gojda)

poor conditions for the formation of cropmarks or the burial was not sunken to the substrata. Trapezoidal long barrows are quite common in Europe. Generally it is the most common shape for long barrows. However, most of them were outlined by a wooden or stone construction. There are no traces of such construction in the case of the barrows of type B in Bohemia. Similarly, the ditch outlining the whole barrow has no analogies elsewhere in Europe. In the case of the British Isles we only encounter

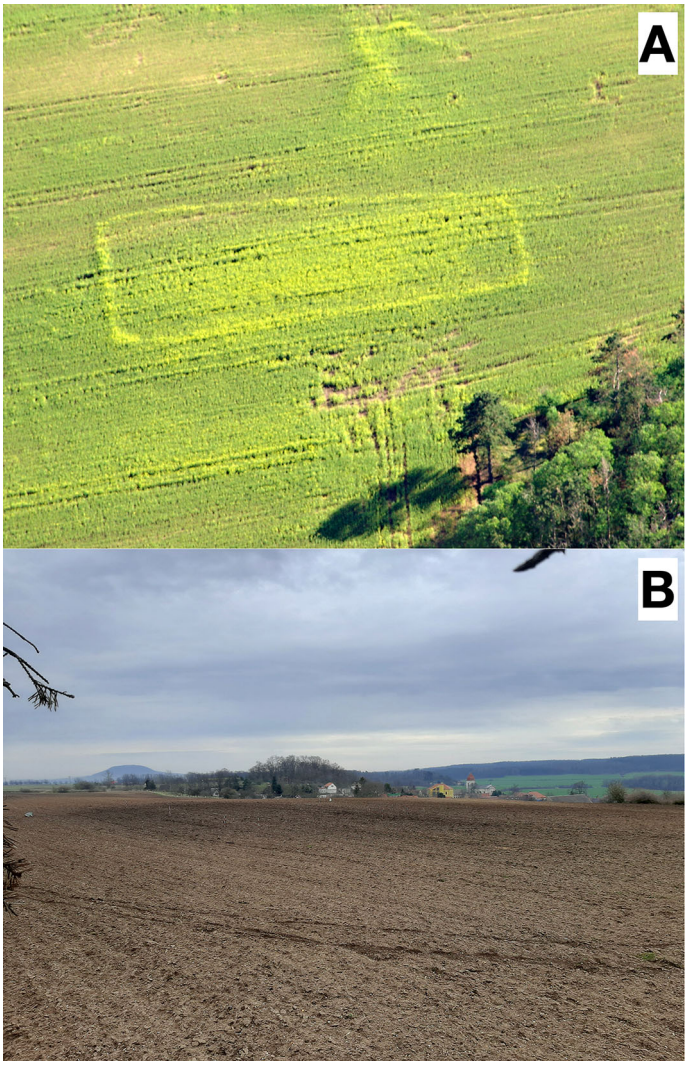

Figure 11. Nížebohy (Litoměřice District) **A** aerial photograph (by M. Gojda) showing the outlining ditch and remains of the mound. **B** ground photograph (by P. Krištuf) with visible dark soil of remaining mound

ditches along the longer sides of barrows. These specifics make the type B structures typical so far only for central and northwestern Bohemia.

Based on the stratigraphic record from Dušníky1 barrow, we assume that the barrow itself was free standing for some time and the trapezoidal

ditch was added to the structure perhaps several decades later (2021 excavation).

The third type (type C) represents barrows surrounded by a pointed ditch, as in the case of type B, but their plan is rectangular. Their length does not usually exceed 26 m, but there are also two longer specimens. Some contain burial pits (subtype C:1) but most of them have no indication of burial traces (subtype C:2). Three features of type C:2 have been investigated by excavation. Despite this, however, it has not been possible to reliably demonstrate that these are the remains of long barrows. The indirect evidence is that they are often found in the context of Eneolithic cemeteries or directly adjacent to reliably interpreted long barrows.

The last type of long barrows recorded in Bohemia is those with stone construction (type D). These are structures with a mound constructed entirely or partially of rubble stone. These cannot be considered as megalithic architecture, but rather as structures that have parallels in the mounds of the Funnel Beaker Culture in Central Moravia (Šmíd 2003). In Bohemia, a part of such a mound was discovered during rescue excavation in Nymburk (Motyková 1998) and confirmed by a revision of an earlier excavation in Velké Žernosky (Krištuf and Švejcar 2013). It is possible that significantly more similar barrows were found in Bohemia, but in contrast to the previous types they do not have a peripheral linear feature (ditch/trough). Thus, only the grave pit is preserved when the entire mound was destroyed. In addition, the graves in this type of mound are often located directly in the above-ground part of the mound and after its destruction, there is nothing remaining of the original barrow.

Of the 61 recorded features that can be considered as long barrows with varying degrees of probability, 35% were excavated. In several cases, however, the research did not lead to a reliable interpretation or dating of the feature. Only 11 features have been reliably dated. For the other four, dating is probable. Of these 7 features, only three have been radiocarbon dated. For the others, only the cultural classification is known.

Chronology

So far the earliest mounds in Bohemia date to 3900 BC. These are specifically structure 62 from Březno (Pleinerová 1980) and the mound from Račiněves (3981–3770 cal. BC). Both belong to the A:1 type. Their dating corresponds to the earliest long barrows in Poland (Król 2021). Although we do not have absolute dates from other structures of this type, we can assume that Structure 86 from Březno, which is related to structure 62, is of similar age (Pleinerová 1980). The structure from Klučov, which was classified as a long barrow by Plenerová (1980), also seems to be of an

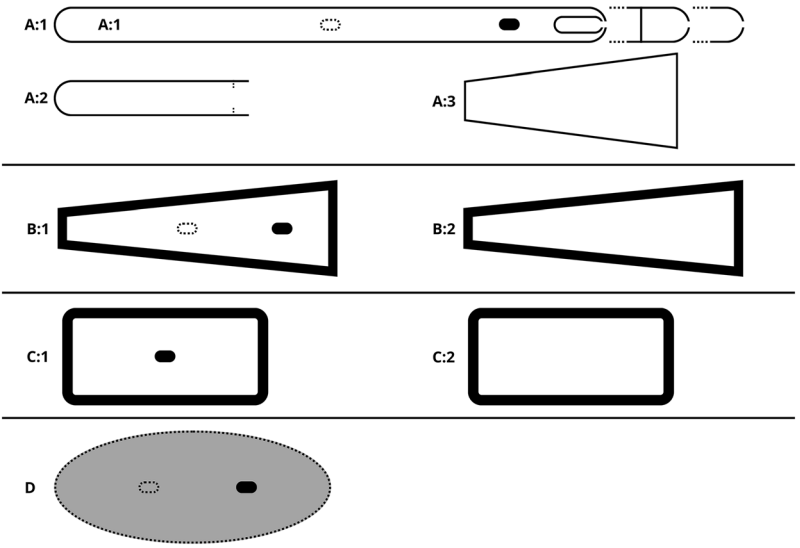

Figure 12. Types of long barrows in Bohemia. Thin lines represent palisade trench, thick lines ditches, and grey are stone structures. Black rectangles represent grave pits. Dashed lines indicate other possible features or construction variants

early date. On the basis of the ceramics classification in the vicinity of the building, Neustupný dated it to the Jordanów Culture (Neusutpný 2001), which would mean that it may be even earlier than the above-mentioned buildings. Thus, it seems that the beginning of long barrows in Bohemia is associated with the construction of long mounds reinforced by a palisade, which we refer to as type A:1. However, this type probably continues further into the Funnel Beaker Culture, as shown by the finds of the mounds from Chudeřín (Holodňák 2006).

The trapezoidal mounds surrounded by a ditch (type B) are absolutely dated only in one case. The mound in Dušníky dates 3633–3522 cal.BC (DeA-36753). It is culturally classified as a Funnel Beaker Culture. It would therefore seem that these mounds are later but the discovery of a tulip-shaped cup of the later phase of the Michelsberg Culture from the mound in Vražkov shows that we have to take into account also an earlier dating of this type of mound. According to the absolute chronology of the Michelsberg sites in Bohemia (Krištuf 2012), this should be the period between 3800 and 3700 BC, suggesting the possible survival of this type of structure until the 3500–3300 BC. This also applies to both mounds of type D. These also belong to the Funnel Beaker Culture. We also have a radiocarbon date from the barrow at Nymburk that places the burial

between ca 3630 and 3140 cal. BC (Motyková 1998). The interval is very wide but shows the chronological relationship of the stone barrows to the type B trapezoidal barrows, supported by the dating of the stone cairns in Central Moravia, where the earliest barrows of this type date from 3600 to 3300 BC (Šmíd 2017).

Despite the fact that we still have very little data available, we believe that the earliest type of long barrow in Bohemia comprises structures with length of several tens of metres reinforced by a palisade. They appear in Bohemia around the same time as in other Funnel Beaker Culture regions in Central Europe.

Results and Discussion

We asked whether the long barrows are part of burial sites in Bohemia, as is the case for example in Poland, or whether they stand independently in the landscape. It is necessary to emphasise that we have not been able to find any concentration of long barrows in close proximity, as occurs in Poland—Sarnowo, Wietrzychowice (Chmielewski 1952), Muszkowice (Przybyl 2014) or in Central Moravia (Šmíd 2003), in the immediate vicinity of Bohemia. In several sites a maximum of two long barrows were identified in Bohemia, but even these are separated by hundreds of metres (Březno, Chudeřín, Vražkov) or their interpretation is uncertain (Všechlapy). It is also interesting that such pairs consist of rectangular barrows with a palisade, thus always type A. It is also worth mentioning the concentration of four A:2 features at the Roudnice nad Labem. But as we have already noted, their interpretation will require further investigation. The other barrows stand independently, isolated in the landscape. This is typical for long barrows in Bohemia, although in some cases the neighbouring sites are in visual contact and the barrows are less than 1 km apart (Dušníky1–Nížebohy, Vražkov1–Vražkov2, Nová Ves1–Nová Ves2). Nonetheless, we cannot consider them to be part of one burial site. This situation is rather similar to the megalithic long barrows in Great Britain, which also do not form groups but are often in visual contact (Darvill 2016).

We have to ask whether this situation may be caused by the data collection method. More than 70% of all these sites in the Czech Republic have been discovered by aerial archaeology. The main attribute for the identification of the long barrows was the ditch. If it was not present, the barrow would not be visually identified by remote sensing. The long barrows in Central Moravia form both smaller and larger burial groups and have no ditches or trenches. In some cases, construction consists of stacked stones that are not buried underground (Šmíd 2017). In many cases, even grave pits are not sunken and burials are located in the mound. There are almost

no traces of this type of barrow in the landscape that was ploughed over a long time. This type of barrow, which could be classified as the type D, was not recorded by aerial archaeology. The spatial analyses of some previously excavated burial sites of the Funnel Beaker Culture (Krištuf and Švejcar 2013) or the unique discovery of a stone barrow in Nymburk (Motyková 1998) indicate their existence in Bohemia. Moreover, the situation in Velke Žernoseky shows that these barrows formed small burial sites, as it is in Moravia (Krištuf and Švejcar 2013).

Remote sensing of long barrows in Bohemia led to a striking discovery. Based on the cropmarks, several long barrows were discovered including still preserved mounds. As we have already mentioned, all currently known long barrows in Bohemia are located in the fields. It has been assumed for a long time that their mounds are irretrievably destroyed by ploughing. But at the sites of Dušníky 1 (Figure 9), Nížebohy (Figure 11) and Nové Benátky (Figure 10A), the positive cropmarks were identified within the inner area surrounded by the ditch. We believe that they are caused by the remains of the mound embankment, which was piled up using the humus horizon acquired in the immediate vicinity of the barrow. This hypothesis was confirmed by subsequent pedological probes at the sites of Dušníky1 and Nížebohy (Krištuf et al. in press) as well as the darker shade of the topsoil within the area of the barrow (Figure 9A). The prospection sequence of aerial and geophysical prospection was accomplished by sections of pedological coring samples recording the stratigraphic structure of analysed barrows. Thanks to this approach the levels and thickness of the mound were recorded at Dušníky1. The coring profile also proved the existence of depressions along the barrow, identifying the areas of chernozem extraction for piling up the mound. The analysis of chemical imprint of soil samples collected in the system of coring did not identify any anomalies connected to the creation of the barrows but proved isolation of the monuments from the habitation sites (Krištuf et al., in press). Remains of the mound built of the humus horizon were also discovered when the Globular Amphora Culture barrow in Ctiněves was uncovered (Krištuf et al. 2010). On the aerial photographs of the cropmarks on the mound at Dušníky 1, a distinct belt of vegetation of a lower stature than above the ditch or the body of the mound itself was recorded. Geophysical prospection also provided the same record of a different deposit. Subsequent excavation in 2021 demonstrated that this was redeposited sand deliberately relocated from the ditch to the foot of the mound.

Generally the remote sensing shows that the preservation of some long barrows in Bohemia is better than we expected. In the case of the barrow in Dušníky, the mound has been preserved to a height of 1 m and it can be identified on the DTM (Digital terrain model), which was created using

LiDAR. This allows further research to focus on the construction of mounds and their further use.

The dataset of long barrows is mainly based on the remote sensing evidence. Only 14 sites were partly excavated, out of which three sites were excavated within our recent research project. As most of the excavated sites are situated on the acidic sandy-gravel substrata, the preservation of artefacts and human remains is rather poor. The dating of excavated sites is mainly based on stylistic features and associated material culture. The radiocarbon dates are available only from four sites and they were obtained from human bones.

Conclusion

The great potential of remote sensing in the investigation of long barrows is obvious. Our study shows that in regions where these monuments have not been reliably documented, they are being discovered thanks to this method. This is not only the case for Bohemia. The DTM analysis led to the identification of long barrows in the region of Silesia (Poland), whose interpretation was confirmed by excavation (Przybyl 2014); however, it is a wooded area. Also in other regions of Poland, where long barrows were already known, the methods of non-invasive exploration brought much wider evidence (Papiernik et al. 2018, 2020). Our contribution, on the other hand, shows the great potential of remote sensing in the agricultural landscape, which is largely ploughed. Without the use of aerial archaeology, the evidence of long barrows in Bohemia would be very limited and much more fragmentary.

Detailed analysis of the cropmarks and subsequent detailed DTM analysis based on the data of the aerial laser scanning shows that even in the agricultural landscape it is possible to identify the remains of burial mounds that were long thought to have been destroyed. On the other hand, we can see that some types of long barrows, recorded by other archaeological methods, were not detected by remote sensing.

Our dataset also allows research on the shape of long barrows. Especially on the basis of remote sensing data, it was possible to define a new type of barrow that is specific to the region of Bohemia. This confirms that although the tradition of long barrows is a phenomenon that connected most of Central and Northwest Europe in the 4th millennium BC, we can find many local variants of these monumental constructions. There seem to be some differences in the context of use between the Bohemian long barrows and their counterparts in Western and Northern Europe. The "western" long barrows and similar megalithic monuments usually contained collective burials (Ashbee 1970), while all barrows in Bohemia pro-

vided evidence of single burials and subsequent ceremonial non-funerary activities. From this point of view our project provided new data extending the interpretation of long barrows in Europe. The new discoveries are suggesting existence of variability of their original purpose in different parts of Europe. The same phenomenon of monumental architecture was perhaps perceived in different way by the communities of Central Europe and for instance the British Isles and some other parts of megalithic Europe.

Recent discoveries show that most of the long barrows in Bohemia are located separately in the landscape. Thus, they do not constitute form accumulations in the form of necropolises as is the case with the Passy monuments in Paris Basin (Chambon 2020), in Kuyavian mounds in Poland (Chmielwski 1952) or the Funnel Beaker Culture/Ohrozim type mounds in Central Moravia (Šmíd 2003).

Our study provided data for the creation of a basic formal typology of long barrows in Bohemia (Figure 12). In principle, there are two basic types of mounds with some variability of subtypes. Some mounds of type A reach considerable lengths (over 100 m) and are probably chronologically earlier. A characteristic feature of some mounds of this type is the structural allocation of a kind of "antechamber" on the eastern side of the structure, which we tentatively interpret as ancestral shrines. Another achievement of the project is the definition of the Type B mounds, which can be characterised as specifically Bohemian mortuary enclosures. Based on the excavation of two mounds of this type (Dušníky1 and Vražkov1), we found that the trapezoidal-shaped ditches around the mound were excavated after a certain time lag and may have been a symbolic end of the ritual function of the monument.

The spiritual continuity of long barrows recently discovered in Bohemia consists in repeated sacrificial activities carried out over a period of at least several decades. The funerary function thus remains only one, initiatory phase of the use of these monuments. Subsequent activities may have been related to some form of ancestral cult, but the primary burial was not followed by other funerary events. All the evidence of later burials are at least one thousand years later than the time of the barrow construction. The primary funerary function of the monuments then appears to have been transformed into more of an ancestral shrine. The functioning of some long barrows as communal monuments appears to have been completed by the excavation of trapezoidal ditches that enclosed not only the area of the shrine but also the period of its use. It is as if the excavation of the moat closed an epoch in the life of the community, which continued to relate to a new monument subsequently built on a different site. Evidence from the excavations of all four monuments studied in northern Bohemia suggests subsequent funerary use of the mound even after millennia

(Corded Ware Culture, Early Bronze Age, Iron Age) but not during the Culture of their builders (Funnel Beaker Culture).

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