Supplementary Materials for

Dynamic changes in genomic and social structures in third millennium BCE central Europe

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The PDF file includes:

Supplementary Text
Table S38
Figs. S1 to S9
Legends for tables S1 to S37
References

Other Supplementary Material for this manuscript includes the following:

Tables S1 to S37
Archaeological background

While this study is devoted primarily to archaeogenetic data it is important to briefly summarise the archaeological background and context of the presented datasets and research questions, namely in the „old fashioned“ and maybe „long-outdated“ (38) but still broadly accepted culture-historical way of “archaeological cultures“ (Table S38, Fig. 1; see the last handbooks to Bohemian prehistory (49, 50, 59)), by understanding them actually rather as “archaeological units of classification” (mainly of artefact styles, burial practices etc.) than in the sense of recently rightly criticised „distinct groups of people“ (21, 33, 37, 38, 40, 95, 96).

The region of focus concerns the northern part of Bohemia, the basins of the Elbe, lower Vltava and Ohře rivers and the Bohemian part of the Ore Mountains. South and west Bohemia were not settled densely before the EBA. Before the Neolithic, these mainly forested regions at higher elevations were occupied by late Mesolithic hunter-gatherer groups, who may have persisted for some time during the Eneolithic (97).

The Bohemian Stone Age prehistory is divided into two basic epochs: the Neolithic (ca. 5400–4400 BC) and Eneolithic (ca. 4400–2200 BC). The Neolithic is represented by the Linear Pottery (LBK, in Bohemia ca. 5400/5300–5000 BC) and Stroked Pottery cultures (STK, ca. 5000–4400 BC). There is broad consensus that the STK was derived from the LBK, without influence from outside (49).

The emergence of the Lengyel culture (ca. 4400–4200 BCE) (49) is regarded as a culture-historical turning point and marks the beginning of the Eneolithic in Bohemia (50) triggered by the arrival of a new population from the southeast (Moravia, Austria, Pannonia, southwest Slovakia). The Jordanów culture (ca. 4200–3900 BC) is also included in the initial proto-Eneolithic period. Although culturally tied to the preceding Lengyel development, elements from the western Michelsberg culture are strongly manifested in the later phase. The status of the Michelsberg culture in prehistoric Bohemia is unclear, as Bohemia is on the boundary of two cultural traditions/phenomenons, the eastern Lengyel and western Michelsberg. Consequently, some scholars considered Michelsberg an autonomous entity, others a foreign influence into local Jordanów and older Funnel Beaker (Baalberge) culture (98, 99). From Jordanów/Michelsberg contexts exist first evidence of burials under barrows (Březno u Loun (100)), assumed also for the Funnel Beaker period and later on a mass scale for the CW and BB (50), alternatively for the EBA (101).

The Early Eneolithic (ca. 3800–3400 BC) is represented by the Funnel Beaker culture (Baalberge, incl. Sřem-stage). More than one hundred single inhumation burials in a crouched position and tens of burials in settlement features are recorded. The single graves with skeletons in a crouched position are characteristic since neolithic (LBK, STK) and as such for the entire Bohemian Eneolithic and EBA. Collective graves, which are typical for the Funnel Beaker in northern Europe, are absent in Bohemia completely.

The Middle Eneolithic (ca. 3400–2800 BC) was a period of cultures associated with the Baden cultural complex. The earliest stage of Baden in Bohemia (Boleráz) is thought to present a new population from the core of the Baden cultural complex in Carpathian Basin (102). In the following horizon, the late Funnel Beaker culture (Salzmünde (103)) is replaced by the classic Baden culture, from which the local post-Baden cultures develop: Řivnáč in central and northwest Bohemia, Bošáca in east Bohemia and Cham in west Bohemia (all ca. 3100–2800 BC). Inhumation graves during this period were quite rare (e.g. Holubice in this study) and the available anthropological material comes mainly from settlement features (sunken pits, semi-sunken huts etc.).
The Globular Amphora culture (GAC) extended into Bohemia as a new entity during the final Middle Eneolithic and its bearers are unanimously regarded as newcomers from the north. The GAC was partially contemporaneous with post-Baden Řívnáč and Cham cultures (GAC pottery was repeatedly found in settlements of both) (56) and is manifested by few burials of individuals in a crouched position. Regarding the possible coexistence of Řívnáč and GAC in Bohemia two possible scenarios were discussed. Firstly, the contemporaneous occupation by exploitation of different territories by more or less complete replacement of the Řívnáč settlement by the GAC in the late phase, secondly infiltration of GAC-people into the Řívnáč society (56, 104).

A distinct turning point in cultural development was the emergence of Late Eneolithic Beaker phenomena: Corded Ware (CW; ca. 2900/2800–2400 BC) and Bell Beaker (BB; ca. 2500–2200 BC). Both had a large geographic distribution in Europe, with the CW in central and NE Europe and BB in central, north- and southwestern and southern Europe. The CW in Bohemia is almost exclusively limited to grave finds with skeletons in a crouched position in W-E orientation with females on their left side, and males on their right side. While the number of investigated graves is one of the highest in Bohemian prehistory (ca. 1,500 graves), human skeletal material has not been preserved in all of them. Views on the origin of the CW differed greatly, from migration models (57, 105) to a purely autochthonous emergence (106), as did opinions on the subsistence, which ranged from a culture of settled farmers (107), to a pastoral nomadic character (108). The CW in Bohemia was not uniform over time, and three phases can be distinguished archaeologically: early (A-horizon, Kalbsrieth-type graves), middle (“Fischgrätenbecherhorizont”) and late (local Bohemian Corded Ware) – material groups 1 – 3 after M. Buchvaldek (109).

The Bell Beaker phenomenon (BB) in Bohemia is represented by hundreds of documented inhumation and cremation burials (ca 10 %). The inhumation ritual stands in contrast to the Corded Ware with males mostly in a left-crouched position, and females mainly in a right-crouched position, in N-S orientation. Various interpretations exist about the origin of the BB in Bohemia, both allochthonous (Iberian Peninsula Northern Africa, Lower Rhine Region, etc.) and autochthonous, with advocates of both theories in Czech archaeology (58, 110, 111). A typo-chronology of BB should be compiled from graves containing decorated beakers (early stage) towards graves with so-called “associated pottery” – late stage. In Bohemia, this so-called “associated pottery” (“Begleitkeramik”) is very similar to the pottery of the early phase of the EBA Únětice culture, which has been interpreted as evidence of continuity in material culture between the two.

The central European EBA is characterised by the so-called Únětice culture, mostly known from thousands of inhumation graves in a N-S-oriented, right-crouched position facing east and with no apparent gender differentiation in orientation (unlike the CW and BB). Bohemia can be considered its core area. Traditionally it is separated into two main parts: early (proto-Únětice and pre-classic phases) and late (classic to post-classic) phases after ~2000 BCE (59, 112, 113). The late (classical) phase is characterised by large hoard finds, typical Únětice cups, eyelet pins (Ösenkopfnadeln) and large cemeteries with inhumation burials rich in bronze artefacts, amber and gold jewellery and other exotics (60, 75, 77, 114–117). There is no continuity at many cemetery sites from the early to the late phase. Early Únětice grave groups are smaller (mostly less than 10–15 graves), graves contain almost exclusively vessels, and only rarely copper wire artefacts.

The only one Middle Bronze Age (MBA) individual which we have incorporated in our study is that from the only one burial of this age from the important site Vliněves, grave 504 (VLI053), containing female
skeleton in age of 50+ years buried with two typical MBA bronze pins. In the qpAdm modelling we group this skeleton with Bohemia_Unetice_Classical samples.

Table S38. Chronological framework of the periods and archaeological cultures discussed in the text.

<table>
<thead>
<tr>
<th>Period</th>
<th>Archaeological culture</th>
<th>Phase</th>
<th>cal. BC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Neolithic</strong></td>
<td>Linear Pottery (LBK; Linearbandkeramik)</td>
<td></td>
<td>5400/5300-5000/4900</td>
</tr>
<tr>
<td></td>
<td>Stroked Pottery (STK; Stichbandkeramik)</td>
<td></td>
<td>5000/4900-4400/4300</td>
</tr>
<tr>
<td><strong>Eneolithic</strong></td>
<td>Lengyel</td>
<td></td>
<td>4400/4300-4300/4200</td>
</tr>
<tr>
<td></td>
<td>Jordanów / early Michelsberg</td>
<td></td>
<td>4300/4200-3900/3800</td>
</tr>
<tr>
<td></td>
<td>late Michelsberg / Funnel Beaker</td>
<td></td>
<td>3900/3800-3500/3400</td>
</tr>
<tr>
<td></td>
<td>Baden</td>
<td></td>
<td>3500/3400-3200/3100</td>
</tr>
<tr>
<td></td>
<td>Řivnáč / Cham / Bošáca</td>
<td></td>
<td>3200/3100-2900/2800</td>
</tr>
<tr>
<td></td>
<td>Globular Amphora</td>
<td></td>
<td>3000/2900-2900/2800</td>
</tr>
<tr>
<td></td>
<td>Corded Ware</td>
<td></td>
<td>2900/2800-2500/2400</td>
</tr>
<tr>
<td></td>
<td>Bell Beaker</td>
<td></td>
<td>2500/2400-2200/2100</td>
</tr>
<tr>
<td><strong>EBA</strong></td>
<td>Únětice (Aunjetitz)</td>
<td>early</td>
<td>2300/2200-2000/1950</td>
</tr>
<tr>
<td></td>
<td></td>
<td>late</td>
<td>2000/1950-1750/1700</td>
</tr>
</tbody>
</table>
Sampled sites in Bohemia

Site numbers correspond to numbers on the maps (Figures S1-S5) and in Table S2.

blue – published in (4, 5, 61, 62)

1. Bílina – published (61)
2. Blšany
3. Brandýs nad Labem
4. Brandýsek – published (5)
5. Březno u Loun
6. Čachovice
7. Droužkovice
8. Holubice
9. Hostivice
10. Chleby
11. Kněževes 1 – published (4, 5)
12. Kněževes 2
13–16. Kolín, road bypass, Sites I, II, VI and VII
13.2. Kolín, road bypass, Site I-7a – published (62)
13.3. Kolín, road bypass, Site I-7b
14. Kolín, road bypass, Site II
15. Kolín, road bypass, Site VI - Polepy
16. Kolín, road bypass, Site VII
17. Kolín - Šťáralka
18. Konobrže
19. Lochenice – published (4, 5)
20. Lovosice – published (4, 5)
21. Makotřasy
22. Mikulovice
23. Neratovice
24. Obříství
25. Plotiště nad Labem
26. Praha - Řáblice
27.1. Praha - Jinonice
27.2. Praha - Jinonice, Holman’s garden centre – published (5)
28. Praha - Jinonice, Butovická St. – published (5)
29. Praha - Kobylisy, Ke Stírce St. – published (5)
30. Praha - Malá Ohrada
30.1. Praha - Malá Ohrada (CW)
30.2. Praha - Malá Ohrada (BB) – published (5)
31. Praha - Miškovice
32. Praha - Nové Butovice
33. Praha - Ruzyně
34. Předměřice nad Labem
35.1. Radovesice
35.2. Radověsice – published (5)
35.3. Radověsice – published (61)
36. Roudnice nad Labem
37. Stadice
38. Tišice
39. Toušeň
40. Trmice
41. Tuchoměřice
42.1. Velké Prálepy
42.2. Velké Prálepy – published (4, 5)
43. Velké Žernoseky – published (61)
44. Vlíněves
44.1. Vlíněves – Eneolithic (pre-CW)
44.2. Vlíněves – Corded Ware
44.3. Vlíněves – Bell Beaker
44.4. Vlíněves – Early Bronze Age
45. Zeleneč
Radiocarbon dating

In this study we report 230 radiocarbon data in total from 197 skeletons found in 178 graves or settlement sunken features. We include previously published (n=90) as well as new data (n=140) generated in 12 different radiocarbon laboratories (Table S6):

- Curt-Engelholm-Zentrum Archaeometrie (MAMS) – 116
- Pennsylvania State University (PSUAMS) – 39
- Czech Radiocarbon Laboratory (CRL) – 32
- Leibnitz-Labor Kiel (KIA) – 11 and (KI) – 3
- Centre for Climate, the Environment and Chronology, Queen’s University of Belfast (UBA) – 10
- Utrecht van de Graaff Laboratorium (UtC) – 6
- Centre for Applied Isotope Studies, The University of Georgia (UGAMS) – 5
- Centre for Isotope Research, University of Groningen (GrN) – 3
- Poznań Radiocarbon Laboratory (Poz) – 3
- Bristol Radiocarbon Accelerator Mass Spectrometer (BRAMS) – 1
- Berlin (Bln) – 1

The 197 dated skeletons date to the Neolithic (n=5), preCW Eneolithic (n=33), CW (n=51), BB (n=37) and the EBA (n=71; 32 of them to the early and 39 to the late/classical stage of the Únětice culture). For Řivnáč, GAC, CW, BB and both stages of the EBA Únětice culture (AK1 and AK2) the 14C data were modelled to create time-intervals of duration of these cultural phenomena (Fig. S8).

In Table S6 we have collated all available 14C data relevant to individuals/graves represented in this study, including from human bones (n=220), animal bones (n=9) macro remains (n=1), and older (no AMS) as well as newer ones (AMS). For the sake of completeness, we also list samples that contained low ratios or no collagen (n=5), and one sample which was lost during the procedure. Table S6 also includes all supporting data such as \( \delta^{13}C \), C:N, C /\%/, collagen /\%/ and bone specifications where available.

In cases where dates from human and animal bones were available from the same grave, we used the date from human bones. Where both AMS and no-AMS data were available from the same skeleton, we used the AMS date. Dates that were not used (from animal bones or no-AMS data) are highlighted in grey. These were only taken into consideration when it was the only available data from the individual grave/skeleton. Where more than one AMS date from the same skeleton was available, we used the modelled mean value.

On the basis of the new results, we briefly comment on dates from three graves:

21. Makotřasy, settlement pit 51/61. From this settlement feature three 14C data were produced, one from human bone (PSUAMS-4404, 4228–3988 2-sigma cal BCE) and two earlier non-AMS dates from animal bones (GrN-6928, 3623–2926 2-sigma cal BCE; GrN-6929, 3635–3371 2-sigma cal BCE). The date from the human bone is significantly older than both earlier dates from animal bones. Although the dates from both animal bones would fit much better to the finds from the pit filling and also compared with the data from other skeletons from this site, we accept here the direct date from the human bones.

24. Obříství, grave 1. In grave 1 a female and a newborn child were buried (based on aDNA kinship analyses a first-degree mother/child relationship). Based on the first AMS dates of both individuals (MAMS-30794
– 4276 ±22 BP and MAMS-38471 – 3941 ±25 BP), the date from the newborn was significantly younger than the date from the mother (interval of 335 years BP) and the calibrated 2-sigma intervals showed no overlap (Fig. S9: green). Hence, we commissioned additional dates from both skeletons, in this case directly from the both petrous bones, from where aDNA was sampled, which documented the first-degree relatedness between both. However, also the second series of dates (MAMS-41363 and MAMS-41364) showed no overlap of the 2-sigma intervals (Fig. S9: orange). In this case the date from the newborn (3861 ±34 BP) was also younger than the date from the mother (4064 ±23 BP). For each skeleton we have modelled the mean value of both 14C data. The resulting 2-sigma intervals for the mother (2881–2674 cal BCE) and the child (2469–2305 cal BCE) show also no overlap. The fifth 14C AMS date was produced from a decorated bone disc found with the mother (BRAMS-2959) and shows a 2-sigma interval of 2617–2467 cal BCE. At this stage, we have not reached a final interpretation of the 14C data from this grave complex other than an in-depth evaluation of all lines of evidence will be necessary, especially since both dates from the mother (MAMS-30794 and MAMS-41363) have failed a chi-squared test with a less than 5% chance this being a good combination.

44.2. Vlíněves, grave 5790. The first 14C wider date (CRL-9201; 2861–2148 2-sigma cal BCE) was not generated with AMS. The newly created AMS (MAMS-41359; 2286–2138 2-sigma cal BCE) results dating to the EBA is considered too young/late in our opinion, as the grave is more in line with the CW period according to position of the body and the grave goods (upper part of big amphora). Thus, a third sample was taken directly from the petrous bone, which was sampled for aDNA. This produced a date (MAMS-46362; 2473–2311 2sigma cal BC), which is in line with the archaeological context and the genetic results.
**Detailed site descriptions and anthropological information**

1. Bílina, Titzler sandpit (Bílina, Teplice district, NW-Bohemia, Czech Republic)

*Published in (61)*

The site was being destroyed by sand pitting for a long time and a large number of graves from the Eneolithic up to the Early Middle Ages have been documented. However, many other graves have been destroyed without any evidence. Eneolithic graves were mostly uncovered at the beginning of the 20th century, when little attention was usually paid to anthropological material; therefore, any human remains rarely appeared in museum collections (118). The original number of Eneolithic graves on this site can be estimated at several dozen (119).

Grave from 1903. The skeleton was delivered along with three vessels belonging to the middle or late stage of the Corded Ware culture; the dating of skeletal material is, therefore, not very reliable. Only the skull has been preserved. Sex: archaeology – ?, anthropology – ?, aDNA – F. Age: adultus (30–40?). Grave goods: amphora, jug, small pot (potentially, there might have been more vessels). Archaeological dating: Corded Ware culture, middle/late stage. Radiocarbon dating: not available (61, 118, 119). Master ID and/or other aDNA signs: I6695, BILI_139. NM Prague Inv. No.: P7A 7564.


2. Blšany (Blšany u Loun, Louny district, NW Bohemia, Czech Republic)

*Contact persons: Miroslav Dobeš, Petr Velemínský*

An inhumation burial was investigated in the wall of the sandpit in 1957 (J. Šimůnek). The grave was entirely preserved; only its northern part was slightly disturbed by mining activities. In addition to the grave goods described below, the grave fill contained finds of settlement character (potsherds, animal bones, fragment of grinder stones, etc.), too. Among them, pottery of the Globular Amphora culture was identified. Although the skeleton originally identified as an adult male (see (121), based on skull traits), pelvic traits identified by modern investigation suggest it probably belongs to a female individual (P. Velemínský) which is consistent with the results of the aDNA analysis. The grave was published in full in (122, 123).

Grave 1. Grave with two burials


3. Brandýs nad Labem (Brandýs nad Labem – Vrábí, Prague-East district, central Bohemia, Czech Republic)

Contact persons: Michaela Langová, Alžběta Danielisová, Petra Stránská

The enclosed Early Bronze Age (BA2) settlement site in Brandýs nad Labem - Vrábí has been excavated by A. Danielisová, M. Pecinovská, K. Čuláková and D. Malyková (Institute of Archaeology of the Czech Academy of Sciences, Prague) between the years 2007 and 2016. Within the enclosed area, A. Danielisová uncovered an Early Únětice culture cemetery (BA1) in 2007. It contained multiple graves (33 skeletons in 13 graves), clearly earlier than the enclosure itself. Additional, isolated graves were spread over the site, along with some “irregular” burials in settlement pits. Ten individuals from two Early Únětice graves (nos. 63 and 76), two individuals from a tumulus (No. 690) and one individual from a settlement pit (No. 798) were analysed for aDNA. The cemetery, as well as the settlement, were analysed by M. Langová (124, 125) and already partly published (101, 126, 127).

Grave 63. Grave pit with four skeletons. Two child skeletons in crouched position (skeletons 3 and 4), apparently related, were found in a niche in the western part of the grave. A coincidental superposition of two independent graves cannot be ruled out.


Grave 76/204. Situated (in a superposition?) in (above?) the middle of a settlement pit (No. 76). Three people were gradually deposited here. Skeletons 2 and 3 were buried below skeleton 1. According to the find context, the original presence of a coffin or organic box is highly probable.


Grave 690. The settlement pit, secondarily enlarged and used for burying. It contained two skeletons in crouched position on their right side, heads towards the south. Skeleton 1 was situated above skeleton 2, separated by ca. 0.4 m of grave fill. Due to a circle of massive stones situated around the pit, the whole feature was originally reported as a tumulus.


4. Brandýsek (Brandýsek, Kladno district, central Bohemia, Czech Republic)

Published in (5)

The Eneolithic cemetery in the sandpit of Brandýsek was excavated by O. Kytlicová in 1955–1958. Before this excavation, many graves were destroyed by sand pitting, the known cemetery is, therefore, hardly
complete. According to Kytlicová, about one half of the graves were preserved. In addition to a Neolithic settlement, Roman Iron Age cemetery and medieval graves, the excavation area of roughly 0.15 ha revealed at least two inhumation graves of the Funnel Beaker culture (one analysed by aDNA), 5–6 inhumation graves of the Corded Ware culture (two analysed) and 22 inhumation graves of the Bell Beaker culture (9 burials from 8 inhumation graves analysed). The Eneolithic cemetery was published in full (128). For a spatial analysis of the site see (129).


Grave 19. Grave with two burials.


5. Březno u Loun (Březno u Loun, Louny district, NW Bohemia, Czech Republic)

Contact person: Miroslav Dobeš

The long-term (‘systematic’) excavation of a multicultural site (evidence of residential and burial activities from the Neolithic up to the Early Middle Ages) in 1966, 1969–1970 and 1973–75. Among other finds, remains of two Proto-Eneolithic megadendric long barrows (I. Pleinerová) were also uncovered. Although their above-ground parts were not preserved, their area was delimited by peripheral trenches cut into the subsoil. The first of these (barrow 62) was ca. 24 m long and 3 m wide, with two Eneolithic graves located inside along its axis. Based on 14C dates, the grave in the front of the barrow (LXXIII) was primary, while the grave in the middle was added later (LXXV). The second barrow (No. 86) was ca. 144 m long and 4 m wide. Primary grave (CXV) was located in its front. Elongated grooves found in the subsoil inside the barrow, parallel to its longitudinal axis, were interpreted as plough marks. According to the stratigraphic contexts, they could chronologically correspond to the period of the barrow construction. Large numbers of additional graves (Corded Ware culture, Bell Beaker culture, Únětice culture) were found ‘inside’ of both barrows, being also oriented along their longer axes, i.e. in the east-west direction. These later burials were apparently inserted into the mounds intentionally, when the mound bodies were still visible on the ground surface. Both barrows have been published in detail in (100, 131).


6. Čachovice (Čachovice, Chomutov district, NW Bohemia, Czech Republic)

Contact persons: Miroslav Dobeš, Petr Velemínský

The site was uncovered during a rescue excavation of Z. Smrž in front of an open-cast brown coal mine in 1980–1982. Next to the Neolithic settlement, remains of a Proto-Eneolithic or Early Eneolithic long barrow were found, as well as cemeteries of the Corded Ware and Bell Beaker cultures. The Corded Ware cemetery consisted of three clearly separated groups, with 59 graves and 60 inhumation burials altogether. In addition to pottery, the graves were furnished with lithic axes, axe-hammers and clubs, whetstones, chipped industry and even some bone and copper artefacts. According to the finds, the graves date to both the early and late periods of the Corded Ware culture. The Bell Beaker cemetery (21 inhumation graves) belonged to the late period of this culture; some of the graves clearly disturbed the Corded Ware grave pits. With the exception of the Neolithic settlement, all finds from this site were published in full (132). The cemetery was analysed for aDNA very selectively due to the poor preservation state of bones.


cup, copper spiral temple ring, copper bead. Archaeological dating: Corded Ware culture, local (late) stage. Radiocarbon dating: not available (132). Pandora No.: CAH004. NM Prague Inv. No.: P7A 38566.


7. Droužkovice (Droužkovice, Chomutov district, NW Bohemia, Czech Republic)

Contact person: Miroslav Dobeš
Rescue excavation above the seams of an underground brown coal mine (Z. Smrž) in 1982–1986. Three aceramic graves of the Corded Ware culture were found here, next to the multicultural prehistoric settlement remains (Funnel Beaker culture, Bell Beaker culture, Bronze Age, Early La Tène period). The graves contained either no finds or chipped industry only. Due to the state of bone preservation, only the following grave was analysed for the aDNA. The graves were published in full in (133).


8. Holubice (Holubice, Prague-West district, central Bohemia, Czech Republic)

Contact person: Miroslav Dobeš, Josef Hložek, Erika Průchová

Rescue excavation on the construction of roadways and utility lines for a new residential zone in 2008 (J. Hložek). Within an area of roughly 0.1 ha, a multicultural site was uncovered, in which an inhumation grave of the Únětice culture, eight cremation graves and one inhumation burial from the Late to Final Bronze Ages, two iron furnaces and other pits from the Roman Iron Age and the inhumation graves of the Funnel Beaker and Baden cultures (described below) were found. The Baden culture inhumation grave is among the first of its kind in Bohemia. The graves were published in full in (134).


Grave 24. Grave with two burials.


9. Hostivice (Hostivice, Prague-West district, central Bohemia, Czech Republic)

Contact persons: David Daněček, Jana Klementová, Miluše Dobisíková

Rescue excavation by J. Klementová and D. Daněček (Museum Roztoky) in 2007-2008. The excavated area covers 10 ha, more than 1,300 settlement pit features and a similar number of post holes have been found. The site was occupied during the Linear and Stroked Pottery cultures, the Funnel Beaker and Řivnáč
cultures, Hallstatt (Ha C-D1), Roman Iron Age and Early Middle Ages. More than 33 graves were also uncovered and burials were identified in sunken settlement features from the Funnel Beaker (Baalberge stage), Corded Ware, Bell Beaker and Knovíz cultures (B D – Ha A2), as well as from the La Tène period (Lt B1-C). A short report was published in (135). Anthropological research was performed by M. Dobisíková (National Museum). Four skeletons from eight graves belonging to the Bell Beaker culture (features 688, 689, 690 and 691) were sampled for aDNA.


10. Chleby (Nymburk district, central Bohemia, Czech Republic)

Contact person: Petr Kríšťuf, Ondřej Švejcar, Erika Průchová, Michal Ernée

In 2016, a grave with a single burial (no. 2035) and a collective inhumation grave (no. 2036) from the early stage of the Únětice culture were uncovered during the excavation by the University of West Bohemia in Pilsen. Collective grave no. 2036 contained skeletal remains of at least 15 more or less complete individuals.


Únětice collective grave, feature no. 2036

Skeletons: Collective grave no. 2036 contained more or less complete skeletal remnants of at least 15 individuals. Three skeletons were found in an anatomically correct position (2038, 2039 and 2077), three skeletons were partly disturbed and without skulls (2079-1, 2079-2 and 2080). There were also four separately deposited skulls (2041, 2075, 2076 and 2078) and a disarticulated deposition of human bones from other skeletons mixed with animal bones (2040). Grave goods: Five vessels, animal bones. Archaeological dating: stage 2–3 (early and middle stages) of the Únětice culture after Moucha (112).


11. Kněževs 1 (Prague-West district, central Bohemia, Czech Republic)

Published in (4, 5)

Rescue excavation before the construction of a family home (O. Kytlicová, AI Prague) in 1953–1954. Within an area of ca. 100 m², 12 inhumation and two bi-ritual Bell Beaker graves from the late stage of this culture were uncovered. The graves were published in full in (136) and (137). Two of them were sampled for aDNA (4, 5) and Sr (138).


12. Kněževs 2 (Prague-West district, central Bohemia, Czech Republic)

Contact persons: Lubor Smejtek, Michal Ernée
Rescue excavation by L. Smejtek (Archaia Prague) in 1998. Within an area of more than 10 ha, a total of 2,939 sunken settlement features were excavated, dating mostly (87.5%) to the Late and Final Bronze Ages. Completely published by L. Smejtek (139, 140). A total of 23 inhumation graves and some sunken settlement features from the early stage of the Early Bronze Age Únětice culture (140, 141) were recorded, too. A total of seven skeletons from five graves (features 2225, 2229, 2234, 2351 and 2767) were sampled for aDNA.

Grave 2225. Grave pit with two skeletons: A (above) and B (below, maturus, 40–60). Fragments of a willow-leaf-type earring made of bronze/copper were found near the skull of individual A. Six vessels belonged probably to the skeleton B. Archaeological dating: early stage of the Únětice culture (Early Únětice stage after the periodisation of V. Moucha).


Grave 2234. Archaeological dating: early stage of the Únětice culture (Early Únětice stage after V. Moucha).


13–16. Kolín, road bypass (Kolín, Kolín district, central Bohemia, Czech Republic)

Rescue excavation preceding the construction of the road bypass around the town in 2008-2010, directed by R. Šumberová and D. Malyková (Institute of Archaeology, Prague). The length of the excavated strip of land was about 8 km and an area of ca. 40 ha was completely uncovered. Excavated 7,000 features belong to most of the archaeological periods between the beginning of the Neolithic up to the Early Middle Ages. The excavation was divided into ten sections (Kolín I-X), treated as separate fieldwork events with their own context numbers. Finds have been published selectively so far, for information see (143, 144).

13. Kolín, road bypass, site I

Excavation by R. Šumberová in 2008–2010. Remains of a multicultural site with many settlement components (Neolithic, Funnel Beaker, Baden, Řivnáč, Globular Amphora, Únětice cultures, Middle Bronze Age, Hallstatt period) and burial areas (Únětice and Corded Ware cultures, Early Middle Ages) were uncovered.

13.1. Kolín, road bypass, site I-3

Published in (62)

The grave under study was discovered in the fill of the ditch of the Late Neolithic rondel 2, at the depth of 120 cm below the surrounding subsoil surface level. The analysis of the field situation indicates that the burial was laid down into an partially filled rondel ditch, still well visible from the landscape surface even several centuries after its abandonment.


13.2. Kolín, road bypass, site I-7a

Published in (62)

The grave described below was uncovered in a shallow 'building' pit alongside a Linear Pottery culture house. Most probably it represents a secondary intervention into an earlier feature.

13.3. Kolín, road bypass, site I-7b

Contact persons: Radka Šumberová, Hana Brzobohatá, Miroslav Dobeš, Michal Ernée

The aDNA analyses were performed on two inhumation burials in the fill of the a semi-sunken Řivnáč culture hut (feature 3790), one inhumation burial of the Corded Ware culture (feature 3013), three burials from the Únětice culture settlement pit (feature 3037, group A; two individuals from other settlement pits were not analysed) and, selectively, skeletons from the Únětice culture cemetery (a total of 67 graves with 75 individuals, from which six graves with seven skeletons have been selected – see below for details, group B). With the exception of the Řivnáč culture feature 3790 (146, 147), these finds have not been published yet (for preliminary information see (143, 144)).

Feature No. 3790. Two irregular inhumation burials in a semi-sunken hut.


Group A

Settlement pit, feature No. 3037. The settlement pit (round, diameter 235 cm, depth 30 cm) has been used for burying of three individuals, one adult male and two children. The skeletons were partly covered with fragments of vessels and grinding stones under a layer with a large amount of potsherds, stones and daub. One vessel was found under the skeletons in the middle of the pit.


Group B


Grave 4332


14. Kolin, road bypass, site II

Contact person: Radka Šumberová, Hana Brzobohatá

Excavation of R. Šumberová in 2008. A multicultural site, settlement components prevailing (Neolithic, Funnel Beaker, Řívnáč/Bošáca and Únětice cultures, Middle Bronze Age up to the La Tène period); a small number of graves (four Bell Beaker culture graves, one La Tène period grave). Three Bell Beaker (late stage) inhumation graves described below have been chosen for the aDNA analysis. All three were published in full (148).


15. Kolin, road bypass, Site VI – Polepy

Contact persons: Radka Šumberová, Hana Brzobohatá

Rescue excavation of R. Šumberová due to the construction of the Kolin road bypass in 2009, section VI (cadastre area Polepy). A multicultural site with prevailing settlement components (Řívnáč, Bell Beaker and Únětice cultures, Hallstatt period) and a small group of graves (eight Bell Beaker graves). Three Bell Beaker culture (late stage) inhumation graves described below were chosen for aDNA analysis. Publication of the finds is being prepared.


16. Kolín, road bypass, Site VII

Contact person: Drahomíra Malyková, Hana Brzobohatá

During the rescue excavation of the road bypass in 2009 (D. Malyková), a small cemetery of the early Únětice culture with nine graves was documented. Three skeletons were sampled for aDNA.


17. Kolín-Šťáralka (Kolin, Kolin district, central Bohemia, Czech Republic)

Contact persons: Miroslav Dobeš, Miloš Vávra

Rescue excavation due to the construction of an industrial hall in 2008 (M. Vávra, IAHCB). On an area of 0,15 ha, a settlement site from the Neolithic and Early Bronze Age was uncovered, burial activities being represented by 14 inhumation graves from the Baalberge stage of the Funnel Beaker culture and one Corded Ware grave. Samples for aDNA analysis were taken from Funnel Beaker culture skeletons, in cases the preservation state allowed it (a total of 7 graves). Roughly 40% of the graves were furnished with pottery,
while the others contained no finds: this means that their cultural affiliation can be deduced only from the form of the burial ritual. Given the condition of the bones, the cemetery was analysed only selectively; the results were published in full in (149, 150).


18. Konobrže (Konobrže, Most district, NW Bohemia, Czech Republic)

Contact person: Miroslav Dobeš

Rescue excavation in the forefront of an open-cast coal mine (P. Čech, M. Dobeš, D. Koutecký) in 1991–1994. The excavation area extended to ca. 1 ha. Settlement finds belonged to the Řivnáč, Knovíz and
Hallstatt cultures/periods, burial monuments were represented by an Únětice culture cemetery and 11 Corded Ware graves (early and later periods). In addition to pottery, the graves were furnished with chipped industry and bone and copper artefacts, including an antler belt clasp (see below). The Corded Ware culture cemetery was published in full in (151, 152); the analysis for the aDNA was selective.


19. Lochenice (Lochenice, Hradec Králové district, east Bohemia, Czech Republic)

Published in (5)

The site was excavated in two phases: in 1953–1954 (J. Tomský, Museum Hradec Králové) and in 1976–1983 (J. Zeman, Institute of Archaeology, Prague, in cooperation with M. Buchvaldek and J. Sláma, Charles University). A Neolithic rondel and graves from the Lusatian Urnfield culture, Migration Period and Middle Ages have been discovered, as well as a bi-ritual Bell Beaker culture cemetery with 23 graves (153). Human remains from only one grave (described below) have been subjected to aDNA analysis to date.

20. Lovosice (Litoměřice district, NW Bohemia, Czech Republic)

Published in (5)

Rescue excavation during the construction of the AOYAMA factory in the Lovosice industrial zone (M. Půlpán and V. Sušická, Institute of Archaeological Heritage Care, Most) in 2002. Besides a Řivnáč culture settlement, seven Corded Ware graves, 14 Iron Age graves and one (described below) Bell Beaker grave were investigated over an area of ca. 7 ha (unpublished to date).


21. Makotřasy (Kladno district, central Bohemia, Czech Republic)

Contact persons: Miroslav Dobeš, Petr Velemínský.

The site was discovered and largely excavated in 1961, due to the construction of the highway to Slaný, small trenching followed in 1973–1991 (E. Pleslová-Štiková, Institute of Archaeology, Prague). Excavations and geophysical surveys identified a 9-ha square enclosure delimited by ditch II. This square enclosure was interpreted as a cult feature and dated to the Siřem stage of the Funnel Beaker culture. Documented inside and outside the enclosure were more than 150 settlement pits that were to have been dug shortly after the end of the enclosure’s primary function (the settlement features again belong to the Siřem stage of the Funnel Beaker culture). The remains of ca. 50 human skeletons were found in ditch II and settlement features, twenty of which were subjected to aDNA analysis (listed below). Besides the dominant Funnel Beaker culture finds, occupation was also identified from the periods of the Jordanów, Řivnáč, Únětice (pit 143: Bln-3335, 3560±60 BP, 2119–1701 cal BC 2-sigma), Knovíz and La Tène cultures. Only the rescue excavation from 1961 (154) has been published in detail, while the others have been mentioned thus far only in the context of comprehensive articles (for the latest review, see (55).) P. Velemínský anthropologically evaluated the analysed skeletons using existing methods (for older assessments, see (155)).


Settlement pit 28/61. Skeletons: on the bottom of the feature, the remains of two disturbed (?) children’s burials, one of which was analysed (burial 2, skull on the left temple facing possibly towards the east). Sex: archaeology – ?, anthropology – child, aDNA – M. Age: infans (4–6). Without directly related goods (only settlement discard from the fill of the feature). Archaeological dating: Funnel Beaker culture, Širem stage. Radiocarbon dating: not available (154, 155). Master ID and/or other aDNA signs: I14174. NM Prague, Inv. No.: P7A 34185.


Settlement pit 51/61. Skeleton: right-sided crouched burial, head towards the north. Human bones of an additional two individuals found in the fill of the feature. Sex: archaeology – ?, anthropology – child, aDNA – M. Age: infans (6–8). Without directly related goods (only settlement discard from the fill of the feature). Archaeological dating: Jordanów (?) culture. Radiocarbon dating (data from the animal bones acquired from the fill of the same feature are not consistent with the radiocarbon date from the human bones): PSUAMS-4404 (5260±20) 4228–3988 cal BC 2-sigma (human bones); GrN-6928 (4550±110) 3623–2926 cal BC 2-sigma (0–20 cm, animal bones); GrN-6929 (4715±60) 3635–3371 cal BC 2-sigma (20–70 cm /bottom/, animal bones) (154, 155). Master ID and/or other aDNA signs: I7187, MKTY_51. NM Prague, Inv. No.: P7A 34191.


Settlement pit 96/61. The remains of four skeletons were found in the settlement pit. Burial No. 3 after (154) (inv. no. P7A 34195) was not analysed.


Beaker culture, Siřem stage. Radiocarbon dating: PSUAMS-4233 (4765±20) 3636–3521 cal BC 2-sigma (154, 155). Master ID and/or other aDNA signs: I7189, MKTY_96/1. NM Prague, Inv. No.: P7A 34196.


Test pit 27/81. Remains of at least seven individuals found on the east side of ditch II, at one of the entrances to the square enclosure. The skeletal remains rested at least partially in anatomical contexts on the bottom of the ditch, mostly in irreverential positions. A total of four burials were subjected to aDNA analysis. As such, the find situation supports a deposition of all individuals at the same time, most probably during a single burial event. The burials were not accompanied by goods, only settlement discard from the fill of the ditch.


22. Mikulovice (Mikulovice, Pardubice district, east Bohemia, Czech Republic)

Contact person: Michal Ernée

Rescue excavation in 2006–2012 (J. Frolík, R. Sedláček). Altogether, thousands of sunken settlement features and about 100 Early Bronze Age graves were documented in several groupings. With the exception of two Proto-Únětice graves (No. 95 and 96), the graves mostly belong to the Classic and Post-Classic stages of the Únětice culture after Moucha (112). The inhumation burials are very rich in so-called “exotics”, especially amber artefacts, which are present in 27 graves. The EBA cemetery has been completely analysed and published (60).


Grave 92


23. Neratovice (Neratovice, Mělník district, central Bohemia, Czech Republic)

Contact persons: Miroslav Dobeš, Petr Velemínský

An inhumation grave discovered in a trench dug for a sewer line at the local chemical factory (V. Spurný, Institute of Archaeology, Prague) in 1962.


24. Obříství (Obříství, Mělník district, central Bohemia, Czech Republic)

Contact persons: Miroslav Dobeš, Monika Pecinovská, Petra Stránská

Rescue excavation during the construction of roadways and utility lines for a new residential zone in 2011 (M. Pecinovská, Institute of Archaeology, Prague). The excavation area extended to ca. 3 ha and contained hundreds of settlement features (Neolithic, Bell Beaker culture, Bronze Age, Hallstatt period, Roman Iron Age) and the Corded Ware inhumation graves described below. The graves were 50 m from each other (grave 1 to grave 372), or 150 m from each other (grave 1 to grave 166). The site is probably part of a larger
cemetery that has not yet been investigated. The described features remain unpublished; a preliminary report appears in (156).

Grave 1. Grave with two skeletons.


25. Plotiště nad Labem (Plotiště nad Labem, Hradec Králové district, east Bohemia, Czech Republic)

Contact persons: Miroslav Dobeš, Petra Stránská

Large-scale research (´systematic´) excavation by A. Rybová and V. Vokolek in 1961–1970. Its area, in front of a brickyard, covered ca. 1 ha. The site was multicultural, with the Stroked Pottery culture settlement and cemetery; Funnel Beaker, Boštáca, Únětice and Silesia-Pláňnice culture settlement finds and a cremation cemetery from the Roman Iron Age). The lone Corded Ware culture grave, furnished with antler belt clasps (LX), was recently joined by another two graves (LIX and 221b) based on radiocarbon dating. These two graves had originally been regarded as Stroked Pottery graves (both inhumation graves without any additional finds). All have been published in detail; see (157-160).


26. Praha - Řídký Újezd (Řídký Újezd, Praha 8, central Bohemia, Czech Republic)

Contact persons: Michal Kostka, Lubor Smejtek, Michal Ernée

Excavated in 1993 during a rescue excavation (M. Kostka). A small cemetery from the early stage of the Únětice culture with 15 inhumation graves (14 in one group and one isolated grave). A total of 29 buried individuals were identified in the skeletal remains (7 men, 7 women, 9 children and 6 undeterminable). Multiple burials with two to five skeletons were also discovered. Ceramic vessels were mainly found as grave goods (one to five per grave). Two copper rings and some bone artefacts also sporadically occurred. The cemetery was completely analysed and published (162, 163).


Grave 22D. Inhumation grave containing one complete skeleton (1) and the anthropological remains of another four buried individuals (2–5). Archaeological dating: early stage of the Únětice culture (Early Únětice stage after periodisation of V. Moucha) (162, 163).


27.1. Praha - Jinonice (Jinonice, Praha 5, central Bohemia, Czech Republic)
Contact persons: Miroslav Dobeš, Katarína Petriščáková

Rescue excavation due to the construction of the Nové Butovice metro station in 1983 (J. Havel, J. Kovářík). A multicultural site extending to ca. 2 ha. Among other finds (Stroked Pottery, Jordanów and Únětice culture graves), seven Corded Ware culture graves were investigated. Based on the finds, the graves can be attributed to a lesser extent to the middle (Group II) and mostly to the late stage of the Corded Ware culture (Group III after (164)). Given the poor condition of the bones, only one skeleton was subjected to aDNA analysis. The graves were comprehensively published in (165) (grave nos. 1–7).


27.2. Praha - Jinonice, Holman’s garden centre (Jinonice, Praha 5, central Bohemia, Czech Republic)

Published in (5).

Rescue excavations during the construction of the Prague metro in 1984-1986. A cemetery of the early Únětice culture was discovered, with 29 graves and skeletal remains of 41 individuals (aDNA was analysed in eight cases; see below). However, the site was not excavated completely. Besides the numerically dominant Únětice culture component, a small number of graves from other periods were found: the Neolithic (three Stroked Pottery inhumation graves with five burials (166), see grave 70) and the Eneolithic (unpublished). Besides an evaluation of the relevant anthropological material (167), the Únětice culture finds have not been published in detail and are only mentioned in works (168). A monograph is being prepared (K. Petriščáková).


Grave 84. Grave with two burials.


28. Praha - Jinonice, Butovická St. (Jinonice, Praha 5, central Bohemia, Czech Republic)

Published in (5).

A part of a Bell Beaker culture bi-ritual cemetery. In 2007, a section of the cemetery was investigated during the rescue excavation before the construction of a family house (trenches of the house) in Butovická St., Prague-Jinonice. Six of the seven excavated features were inhumations, the last one was a funerary feature interpreted as an incineration place. Based on the skeleton position, three of the buried individuals were male, two female and one indefinite. One of female burials (grave no. 4) was probably placed in a wooden chamber. Burial assemblages consisted mainly of undecorated pottery (1–3 vessels), accompanied in one case by a flint arrowhead, in another grave by 11 antler buttons (169).


29. Praha - Kobylisy, Ke Stírce St. (Kobylisy, Praha 8, central Bohemia, Czech Republic)

Published in (5).

A part of a Bell Beaker culture bi-ritual cemetery excavated in 2005/2006 during the rescue excavation before construction work on residential houses in Ke Stírce St. in Prague-Kobylisy (for preliminary information, see (170). Eleven excavated features were inhumations, the last one (grave no. 6) was a cremation grave, probably with the place of incineration. One of the inhumations is probably a secondary burial. Based on the skeleton position, six of the buried individuals were male, one female and five undefined. The female burial (grave no. 14) was probably placed in a wooden chamber. The burial assemblages consisted mainly of undecorated pottery (1–3 vessels) accompanied by three antler buttons and animal bones. Two graves (grave nos. 11 and 12) consisted completely archery equipment (arrowheads, wristguards and, in one case, an antler flint-knapping tool and probably bow-covering made of animal bones). Eight of the excavated skeletons (graves) were well-preserved and sampled for aDNA analysis (grave nos. 4, 8–14, see (5)). The cemetery is not yet published but is currently being prepared for publication. There were also two Stroked Pottery/Lengyel culture inhumation burials in a settlement pit (feature 552) and two Únětice culture skeletons in settlements pits (feature 515 and 541).


Settlement feature (pit) 552 with two burials (17 and 18).


30. Praha - Malá Ohrada (Stodůlky, Praha 5, central Bohemia, Czech Republic)

Rescue excavation due to the construction of the “Lužiny" prefab housing estate (J. Kovářík) in 1979–1980. Uncovered at the multicultural site with more than 500 features scattered over an area of ca. 1.5 ha was a great deal of evidence of settlement activities (Funnel Beaker culture, Late and Final Bronze Age, Hallstatt period, Roman Iron Age) and burials (Jordanów culture, Corded Ware culture, Bell Beaker culture, Únětice culture, Early Middle Ages), from which Corded Ware and Bellbeaker burials have been subjected to aDNA analysis thus far.

30.1. Praha - Malá Ohrada (CW)

Contact persons: Miroslav Dobeš, Katarína Petriščáková, Petr Velemínský

Of four investigated Corded Ware culture graves (grave nos. 53–56), only two were analysed for aDNA due to the poor condition of the bones. These were comprehensively published in (165).


30.2. Praha - Malá Ohrada (BB)

Published in (5).

An isolated Bell Beaker inhumation grave was investigated at the site in 1979. The grave has not yet been published in detail.


31. Praha - Miškovice (Miškovice, Praha 9, central Bohemia, Czech Republic)

Contact person: Michal Ernéé

In 1999 and 2001, a part of the inhumation cemetery of the EBA Únětice culture was investigated during the rescue excavation before the construction of family houses. Wooden coffins were identified in some graves, while more burials were positioned under stone constructions. Burial assemblages consisted mainly of undecorated pottery, accompanied by bronze (in 19 graves; pins, earrings, necklaces, daggers, axe) and amber artefacts (in 12 graves; beads, spacer), in three cases by seashells, etc. The earliest graves are dated to the Proto-Únětice culture (grave nos. 1–6, 13–15, 29, 39–40; ca. 2300–2150/2100 BC; stage Bz A0). The majority of the graves are dated to the Classic Únětice culture (graves 7–10, 16–28, 30–38, 41–44; ca. 2000–1850 BC; stage Bz A2a) The latest grave, no. 27 of the Post-Classic (Late) Únětice culture, contains a pin with a globular head. The cemetery was completely published (114, 171–174).


(Late) Únětice culture. Radiocarbon dating: UtC-13188 (3410±40) 1877–1564 cal BC 2-sigma (114).
Pandora No.: PMI012. NM Prague Inv. No.: P7A 41133.

32. Praha - Nové Butovice (Stodůlky, Praha 5, central Bohemia, Czech Republic)

Contact persons: Miroslav Dobeš, Katarína Petriščáková

Rescue excavation on the building place of the Nové Butovice prefab housing estate in 1986 (J. Kovářík). Among other things (Stroked Pottery culture settlement, Únětice and Bylany culture graves), 32 Corded Ware culture graves were also investigated at the multicultural site over an area of ca. 7 ha. Based on the finds, the graves can be attributed exceptionally to the middle (Group II) and in the vast majority to the late stage of the Corded Ware culture (Group III after (164)). DNA analyses were conducted only selectively due to the poor condition of the bones. The graves were comprehensively published in (165) (grave nos. 19–50).


33. Praha - Ruzyně (Ruzyně, Praha 6, central Bohemia, Czech Republic)

Contact person: Milan Kuchařík

Rescue excavation due to the construction of family houses in 2011-2012 (J. Vávra, P. Zelená). Besides Eneolithic, Bronze Age (Knovíz) and Early Iron Age (Bylany) culture settlements and a grave from the La Tène period, seven inhumation graves of the Bell Beaker culture were also investigated at the multicultural site, six of which were analysed (see below). The cemetery has not been published in detail to date (for preliminary information, see (175)).


34. Předměřice nad Labem (Předměřice nad Labem, Hradec Králové district, east Bohemia, Czech Republic)

Contact persons: Miroslav Dobeš, Petr Velemínský

The inadequately documented inhumation grave was investigated in the wall of the brickyard in 1921 (F. Žaloudek). This is essentially the same site as in Plotiště nad Labem (see above), since the two brickyards are adjacent to one another. Only one of the accompanying skulls reportedly spread around the skull of the complete burial in a crouched position could be subjected to aDNA analysis. It was published in detail in (176, 177).

Collective grave without number.

Skeletons: right-sided crouched burial, head towards the north-east, and four skulls (one of them was analysed). Grave goods: amphora, jug. Archaeological dating: Globular Amphora culture, eastern group.


35 Radovesice (Radovesice, Teplice district, NW Bohemia, Czech Republic)
The cadastre area of the municipality, gradually destroyed by the activity of the open-cast brown coal mine, was investigated in the 1970s and 80s (J. Muška and P. Budinský, Teplice Museum). Evidence of settlement and burial activities from almost the whole prehistory was found at nearly twenty sites (Radovesice I to XIX). The Corded Ware and Bell Beaker graves described below were discovered at five sites. The sites were between 200 m to 1 km from one another.

35.1. Radovesice XVI

*Contact persons: Miroslav Dobeš, Petr Velemínský*

A Corded Ware grave was excavated by P. Budinský in 1983 at the “Pod Chlomkem” location and other features (mostly settlement features) from many other prehistoric periods (Neolithic, Funnel Beaker culture, Bronze Age, Hallstatt and La Tène period) were investigated at the site.

Grave 41/83, in the middle of a round ditch with a diameter of ca. 9 metres.


35.2. Radovesice III and XIII

*Published in (5).*

Bell Beaker culture graves were discovered in two positions approximately 800 m apart.

1. Two inhumation graves were explored in the “Za kostelem” site (Radovesice III) by J. Muška in 1978 (grave nos. 116 and 117/78). Both were richly equipped with vessels, copper daggers and an awl, stone wristguards and gold and silver jewellery. Both belong to the typologically earlier Bell Beaker culture.

2. Thirteen graves (here grave nos. 2, 53, 59, 67, 68, 69, 70, 71, 73 and 74/80), twelve inhumations and one cremation, were explored by J. Muška at the “U silnice do Kostomlat” site (Radovesice XIII). They were spread over an area of 100 x 25 m, but it was obviously only part of the cemetery. The vast majority of graves are of the typologically later Bell Beaker culture, for which is the incidence of so-called ‘associated pottery’ is typical. Only selected graves are published ((178), preliminary report (179)).


copper dagger, copper awl, chipped industry. Archaeological dating: Bell Beaker culture, early stage. Radiocarbon dating: KI-4448 (3860±45 BP) 2464–2205 cal BC 2-sigma (5, 58, 178). Master ID and/or other aDNA signs: I7283, RDVS_117/78. NM Prague Inv. No.: P7A 9321.


Beaker culture, late stage. Radiocarbon dating: PSUAMS-4347 (3835±20 BP) 2431–2202 cal BC 2-sigma (5). Master ID and/or other aDNA signs: I7213, RDVS_71/80. NM Prague Inv. No.: P7A 9333.


35.3-1. Radovesice III

Published in (61).

Grave 40/78 was excavated by J. Muška at the “Za kostelem” site.


35.3-2. Radovesice X

Published in (61).

Grave 5/79 was excavated by J. Muška at the “U bílinské silnice” site.


35.3-3. Radovesice XVIII

Published in (61).

Grave 4/81 was excavated by P. Budinský at the “Na vyhlídce” site.

In 2014, a collective inhumation grave from the early stage of early Únětice culture was uncovered during a rescue excavation prior to the construction of a private garden pool. Only one grave was uncovered. The grave was partially damaged by the scraper, causing two skulls to be extracted from the grave. Nevertheless, after the find context was cleaned, it was determined that a major part of the grave had not been affected by the activity of the scraper. The grave pit had an irregular rectangular plan with a length of 2.11 m and a width of 1.0 to 1.05 m. The depth of the grave was 0.7 m.

Únětice collective grave, feature no. 1/2014

Skeletons: The grave contained more or less complete skeletal remnants of at least 18 individuals (ten of which were children) which were not oriented in anthropological positions. On the contrary, the remnants were mixed together, so that it was not possible to identify parts of the skeletons belonging to the individual buried persons. In every case it was evident at first glance that only parts of the bodies had been secondarily buried in the grave.

Grave goods: Eight vessels or remnants thereof were already clearly visible during the excavation and final preparation of the grave. The remnants of eight other vessels were discovered during the removal of the bones. The grave also contained a fragment of a bone needle, a fragment of a silex blade, three shells and three animal teeth, two of which were perforated.

Archaeological dating: stage 2 (Early Únětice) of the Únětice culture after Moucha (112).


37. Stadice (Stadice, Ústí nad Labem district, NW Bohemia, Czech Republic)

Contact person: Miroslav Dobeš

Excavated in 1987 during the rescue excavation prior to the construction of the D8 motorway (D. Koutecký, M. Cvrková). In addition to settlement features from the Early and Late Bronze Age, three Corded Ware culture inhumation graves were also uncovered at the site. Based on the finds, the graves date to the early period of this culture (Group I and II after (164)). Samples for aDNA analysis were taken from all of them, and their complete publication is found in (180, 181).


38. Tišice (Tišice, Mělník district, central Bohemia, Czech Republic)

Contact persons: Miroslav Dobeš, Martin Kuna, Petra Stránská, Petr Velemínský

Rescue excavation in the sandpit area in 1996–2008 (D. Dreslerová, M. Kuna, P. Foster, J. Turek). The investigated area of ca. 25 ha produced settlement remains and burials from nearly all periods from the Neolithic up to the Early Middle Ages (a total of nearly 6,000 features), including the two Bell Beaker culture inhumation graves described below. They were discovered in different years (1999 and 2008), with a distance of ca. 450 between them. With the exception of a small amount of settlement evidence, no other artefacts of the discussed culture were found at the site. Only the first of the two inhumation graves (77/99) has been published in greater detail (178).


39. Toušeň (Lázně Toušeň, Prague-East district, central Bohemia, Czech Republic)

Contact persons: Miroslav Dobeš, Petr Velemínský, Jaroslav Špaček

Rescue excavation on the fortified hilltop “Hradiště” settlement at the edge of the left-bank Elbe River terrace (J. Špaček) in 1975–1982, 1997 and 2000–2003. Among settlement and burial finds of the Únětice culture and later periods, numerous Řívnáč culture features were documented, including two inhumation burials and four semi-sunken huts with more human bones. Grave (burial) nr. 15 (see below) has not yet been published in detail but only mentioned in (182, 183).


40. Trmice (Ústí nad Labem – Trmice, Ústí nad Labem district, NW Bohemia, Czech Republic)

Contact person: Miroslav Dobeš

Excavated in 1982 during the rescue excavation prior to the construction of a prefab concrete panel plant (M. Cvrková, grave no. 109/82 – TRM006) and the nearby D8 motorway in 1987 (D. Koutecký, M. Cvrková, other graves). Two Corded Ware culture graves were uncovered in 1982 (in addition to settlement features from the Late Bronze Age), in 1987 another 15 inhumation graves. Based on the accompanying finds (beakers, amphorae, stone battle-axes, stone flat axes, chipped flat axe, whetstones, chipped industry), all belong to the early phase of the Corded Ware culture (Group I and II after (164)), although a small number of the graves cannot be dated more precisely due to the absence of chronologically-sensitive artefacts (graves without finds, or containing only chipped industry). All of the graves were published in full in (180, 184), including anthropological evaluations in (181, 185).


chipped flat axe. Archaeological dating: Corded Ware culture, middle stage. Radiocarbon dating: not available (180, 181). Pandora No.: TRM002. NM Prague Inv. No.: P7A 38900.


41. Tuchoměřice (Tuchoměřice, Prague-West district, central Bohemia, Czech Republic)

Contact person: Miroslav Dobeš, Lucia Mattiello, Petra Stránská

Excavated in 1997–1998, 2000 and 2010–2012 during the rescue excavation prior to the construction of warehouse halls, over a total area of ca. 7 ha (I. Pleinerová, A. Veselá, P. Sankot, L. Šulová). A multicultural site (Linear Pottery, Jordanów, Řívnáč culture settlement, Middle Bronze Age, Hallstatt period and Early La Tène), from which two features with the occurrence of human bones are described below. The first of these was a Jordanów culture inhumation burial interpreted as a construction offering, the second a semi-sunken hut of the Řívnáč culture secondarily used for the deposition of six human bodies. These were not accompanied by any grave goods. Besides the skeletons, the hut fill contained common Řívnáč culture settlement discard (pottery, daub, animal bones, chipped industry, etc.). The two features were situated ca. 300 m from each other. The Jordanów culture grave was published in detail (186, 187), whereas only a preliminary report has been issued on the Řívnáč culture hut (188).


Feature 645. Six irregular inhumation burials in a semi–sunken hut. Without directly related goods (only settlement discard from the fill of the feature).


Archaeological dating: Řívnáč culture. Radiocarbon dating: not available (188). Pandora No.: TUC003. NM Prague Inv. No.: P7A 43317.


42.1. Velké Přílepy (Velké Přílepy, Prague-West district, central Bohemia, Czech Republic)

*Contact persons: Miroslav Dobeš, Petr Velemínský*

Excavated in 1994–1996 during the rescue excavation prior to the construction of 485 family homes, on a total area of ca. 10 ha (I. Vojtěchovská, L. Smejtek). This multicultural site was used with breaks for settlement and burials from the Eneolithic up to the early medieval period (c. 3700 BC to 1000 AD), including in the period of the Řívnáč culture, which is represented by four settlement features. In one of them (feature 193/95, see below), a human skeleton also accompanied common settlement discard (pottery, daub, animal bones, etc.). The Řívnáč culture settlement has not yet been published in detail, only as a preliminary report in (189).


42.2. Velké Přílepy (Velké Přílepy, Prague-West district, central Bohemia, Czech Republic)

*Published in (4, 5).*

The graves described below also come from the same site of Velké Přílepy. The first two samples (from grave nos. 182 and 185) belong to the Bell Beaker culture, the cemetery of which at the site was composed of eight inhumation graves in two groups, all of which can be attributed to the late stage of the discussed culture. One sample (grave no. 238) belongs to the early stage of the Únětice culture (a total of eight graves from this period were investigated at the site). The archaeological context was also preliminarily published
Three graves with bell beakers were analysed for the occurrence of strontium (nos. 143, 185 and 188), including two described below (138).


43. Velké Žernoseky (Velké Žernoseky, Teplice district, NW Bohemia, Czech Republic)

Published in (61).

The site is located on the right-bank terrace of the Elbe River and was explored at the turn of the 20th century. The burial grounds were damaged by the mining of porphyry. In addition to an isolated Corded Ware grave (see below), several dozen Funnel Beaker culture (c. 3700–3500 BCE) and Únětice culture (2200–1700 BC) graves were also found at the site.


44. Vlíněves (Mělník district, central Bohemia, Czech Republic)

Contact persons: Petr Limburský, Miroslav Dobeš, Petr Velemínský

Excavated in 1999–2008 during the rescue fieldworks in the area of a large sandpit (V. Salač, I. Pleinerová, Ž. Brnič, P. Limburský). An area of ca. 70 ha was investigated, with 30 ha providing traces of settlement activities and burials from many periods of prehistory and the Early Middle Ages. The earliest of them is a fortified Jordanów culture settlement with human burials in a ditch, followed by two graves from the Late Michelsberg/Early Baalberge, a Baden and Řivnáč culture settlement and one Globular Amphora culture (?) collective grave. The Corded Ware culture cemetery is composed of 75 inhumation graves (early to late stage), the Bell Beaker culture cemetery has 34 inhumation graves (late stage) and the Únětice culture cemeteries 304 inhumation graves (primarily from the classic period of the given culture). Settlement traces of varying intensity of the last three mentioned archaeological cultures were also identified at the site, i.e.,
the Corded Ware culture (only intrusions in later features), the Bell Beaker culture (two pits and intrusions in later features) and the Únětice culture (remains of multiple post houses and more than one hundred sunken features with the remains of 57 human skeletons). Finds of the following occupation of the site are represented by the Hallstatt and La Tène period settlements and 21 Migration Period graves.

One inhumation burial from the Jordanów culture ditch, a collective Globular Amphora culture grave (?) and selected human remains from Bell Beaker and Únětice culture graves were chosen for aDNA analysis. Samples were taken from all the skeletons of the Corded Ware culture for the given analysis (or as permitted by the state of preservation). With the exception of the Globular Amphora culture collective grave (feature 3512), the archaeological sources for the studied period were published in full in (116, 191–193); for a short review, see (194).

44.1. Vlinèves – Eneolithic Pre-Corded Ware cultures


44.2. Vliněves – Corded Ware culture


44.3. Vliněves – Bell Beaker culture


44.4. Vliněves – Early Bronze Age


Grave 437 (Group 9):


Grave 459 (Group 9):


dating: early beginning of the Middle Bronze Age Tumulus culture (BzA2/B1–BzB1). Radiocarbon dating: not available (116). Pandora No.: VLI053. NM Prague Inv. No.: P7A 41397.

Grave 514 (Group 12):


45. Zeleneč (Zeleneč, Prague-East district, central Bohemia, Czech Republic)

Contact person: Miroslav Dobeš

Rescue excavation prior to the construction of a group of family homes in 2004 (J. Špaček). The excavation area provided more than one-hundred graves from the Early Middle Ages also four graves from the Corded Ware culture, from which one skeleton described below was analysed for aDNA. The Corded Ware culture graves dated to its late phase were published in full in (195).

Supplementary Figures

Fig. S1. All Neolithic to EBA sampled sites. Site numbers correspond to site names listed above and in the site descriptions (Table S2). Green: Metropolitan area of Prague (capital city). Graphic M. Ernée, M. Dobeš.
Fig. S2. Pre-Corded Ware sampled sites. Site numbers correspond to site names listed above and in the site descriptions (Table S2). Green: Metropolitan area of Prague (capital city). Graphic M. Ernée, M. Dobeš.
Fig. S3. **Corded Ware sampled sites.** Site numbers correspond to site names listed above and in the site descriptions (Table S2). Green: Metropolitan area of Prague (capital city). Graphic M. Ernée, M. Dobeš.
Fig. S4. Bell Beaker sampled sites. Site numbers correspond to site names listed above and in the site descriptions (Table S2). Green: Metropolitan area of Prague (capital city). Graphic M. Ernée, M. Dobeš.
Fig. S5. EBA sampled sites. Site numbers correspond to site names listed above and in the site descriptions (Table S2). Green: Metropolitan area of Prague (capital city). Graphic M. Ernée, M. Dobeš.
Fig. S6. Ternary plot showing the percentage of ancestry of distal three-way models. Using qpAdm each ancient Bohemian individual is modelled as a mixture of ancestry sources ascribable to Anatolia_Neolithic and WHG (for individuals without “steppe” ancestry) and Anatolia_Neolithic, WHG and Yamnaya_Samara (for individuals with “steppe” ancestry). Shapes indicate sex of individual and colors indicate degree of model fits. List of outgroups and ancestry percentages are found in Table S9.
Fig. S7. Temporal variation in PC2 with loess regression curves. Colors indicate culture, and dashed vertical lines indicate grouping of cultures into early/late phases. Loess curves calculated independently for CW (excluding four CW females without steppe ancestry, green), BB (turquoise), and EBA (purple) cultural groups.
**Fig. S8. AMS 14C intervals.** Modelled intervals for Řívnáč, GAC, CW, BB and EBA early (pre-classical stages of the Únětice Culture) to EBA late (classical to post-classical phase of the Únětice Culture) AMS 14C data from Bohemia used in this paper. n = number of modelled radiocarbon dates. Graphic M. Langová.
Fig. S9. Radiocarbon dates of the CW grave 1 from Obříství. Graphic M. Langová.
Table S1-S37. (separate Excel spreadsheet)

Table S1: Chronology of archaeological cultures in Bohemia.

Table S2: Geographic and chronological information of published and newly reported sites.

Table S3: Contextual information, sequencing statistics and basic genetic results for all newly analyzed samples.

Table S4: Contextual and genetic overview of quality filtered ancient individuals from Bohemia analysed in this study.

Table S5: Contextual information for previously published samples used in analyses which appear in this publication.

Table S6: Summary table of newly reported (n=140) and previously published 14C dates.

Table S7: List of 1,141 modern West Eurasian individuals on which Principal Components Analysis was conducted.

Table S8: qpAdm modelling of each pre-CW individual from Bohemia as a two-way mixture of Anatolia_Neolithic and a hunter-gatherer source.

Table S9: qpAdm modelling of ancient Bohemians as either three-way mixtures of Anatolia_Neolithic, WHG and Yamnaya_Samara (individuals with steppe ancestry) or Anatolia_Neolithic and WHG (individuals without steppe ancestry i.e. pre-CW Eneolithic and Bohemia_CW_noSteppe).

Table S10: qpAdm modelling of each pre-CW cultural group in Bohemia as a three-way mixture of Anatolia_Neolithic, Loschbour and Koros_HG.

Table S11: DATES estimate of when hunter-gatherer ancestry was introgressed into each pre-CW cultural group in Bohemia.

Table S12: qpAdm modelling of Bohemia_PE (Jordanow) and Bohemia_EE (Funnelbeaker) as mixtures of Anatolia_Neolithic and different hunter-gatherer sources.

Table S13: Testing cladality between Bohemia_PE and Bohemia_ME using qpWave.

Table S14: qpAdm modelling of Bohemia_ME_Rivnac and Bohemia_ME_GAC (Globular Amphora Culture) as mixtures of Anatolia_Neolithic and different hunter-gatherer sources.

Table S15: Modelling Bohemia_CW_Early as a two-way mixture using proximal sources.

Table S16: qpAdm modelling Bohemia_CW_Early as a three-way mixture using distal sources.

Table S17: Modelling Bohemia_CW_Early using proximal sources.

Table S18: Modelling Bohemia_CW_Late using proximal sources.

Table S19: Modelling Germany_Corded_Ware using proximal sources.
Table S20: f4 statistics in the form of f4(Mbuti, CordedWare; Yamnaya, ancient northeast Europe).

Table S21: f4 statistics in the form of f4(Mbuti, ancient northeast Europe; Yamnaya, CordedWare).

Table S22: f4-statistics in the form of f4(W, X; Y, Z) showing that VLI009 and VLI079 carry significantly more hunter-gatherer ancestry than Bohemia_ME groups.

Table S23: f4-statistics in the form f4(W, X; Y, Z) showing that Bohemia_CW_Late has significantly more Middle Eneolithic-like ancestry compared to Bohemia_CW_Early (without the earlyCW with no "steppe" ancestry).

Table S24: f4-statistics in the form f4(W, X; Y, Z) showing that Bohemia_CW_Late has equal amount of Middle Eneolithic-like ancestry as to Bohemia_CW_Early (when Bohemia_CW_Early includes the early CW females without "steppe" ancestry).

Table S25: qpAdm modelling of Bohemia_CW_Late as mixtures of Bohemia_CW_Early and a local pre-CW source.

Table S26: qpWave modelling of Bohemia_CW_Late as being cladal with Bohemia_CW_Early (including individuals without "steppe" ancestry).

Table S27: Pairwise Fst values between 3 highest and 3 lowest early CW on PC2 and between modern European populations.

Table S28: qpAdm modelling of Bohemia_BB_Early using proximal sources.

Table S29: f4-statistics in the form of f4(W, X; Y, Z) showing that Bohemia_BB_Late as significantly more Middle Eneolithic ancestry compared to Bohemia_BB_Early.

Table S30: qpAdm modelling of Bohemia_BB_Late as a two-way mixture of Bohemia_BB_Early and a local Middle Eneolithic source.

Table S31: f4-statistics in the form of f4(W, X; Y, Z) showing that Bohemia_U netice_preClassical carries significantly more non-local ancestry compared to Bohemia_BB_Late.

Table S32: Admixture f3 statistics in the form of f3(A, B; C).

Table S33: qpAdm modelling of Bohemia_U netice_preClassical using proximal sources.

Table S34: f4-statistics in the form of f4(W, X; Y, Z) showing that VL1051 is a significant outlier compared to all Bohemian cultural groups.

Table S35: Testing cladality between Bohemia_U netice_preClassical and Bohemia_U netice_Classical using qpWave.

Table S36: f4-statistic in the form of f4(W, X; Y, Z) showing that Bohemia_U netice_Classical carries significantly less EHG and Yamnaya-like ancestry and more Neolithic-like ancestry.

Table S37: qpAdm modelling of Bohemia_U netice_Classical as a two-way mixture of Bohemia_U netice_preClassical and a local Middle Eneolithic source.
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