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Beaver as Proof of the Change of Natural Environment and Economy of the First Half of the 10th Century AD

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Abstract
The collapse of the Great Moravian early medieval fortified centre at Pohansko near Břeclav triggered some changes. These changes became evident in the development of the alluvial plain environment, as well as in the settlement, subsistence, and economic strategies of the population. One particularly prominent phenomenon was an unprecedented increase in the proportion of hunted animals appearing in osteological assemblages from the 10th century AD. They were found among the features and the cultural layers of the former northeastern suburbium of the Great Moravian centre at Pohansko and a new settlement known as Břeclav-Na Včelách. Remains of the European beaver (*Castor fiber*) predominate or are strongly represented among the wild species, which might be the result of specialised hunting or even breeding. The joint analysis by palynologists, archaeobotanists and archaeozoologists seeks to explain the significant presence of a specific species in terms of the evolution of the natural environment and the economy.

Keywords
Beaver (*Castor fiber*), hunting, natural environment, Pohansko, early Middle Ages, Great Moravia

Zusammenfassung – *Biber als Beweis für den Wandel der natürlichen Umwelt und der Wirtschaft in der ersten Hälfte des 10. Jahrhunderts n. Chr.*

Der Zusammenbruch des großmährischen frühmittelalterlichen befestigten Zentrums in Pohansko bei Břeclav brachte einige Veränderungen mit sich. Diese Veränderungen sind in der Entwicklung des Naturraums der Schwemmlandebene sowie in der Siedlungsweise, dem Lebensunterhalt und in ökonomischen Strategien der hiesigen Bevölkerung zu beobachten. Zu den deutlichsten Phänomenen gehört eine beispiellose Erhöhung des Anteils an Jagdtieren in osteologischen Fundverbänden aus dem 10. Jahrhundert n. Chr. Diese fanden sich zwischen einzelnen Objekten und Kulturschichten der ehemaligen nordöstlichen Vorburg des großmährischen Zentrums in Pohansko und in einer neuen Siedlung, die als Břeclav-Na Včelách bekannt ist. Die völlige Dominanz bzw. der zumindest starke Anteil des Europäischen Bibers (*Castor fiber*) unter den Wildtieren könnte auf spezialisierte Jagd oder sogar Zucht zurückzuführen sein. Eine gemeinsame palynologische, archäobotanische und archäozoologische Analyse bemüht sich, die bedeutende Präsenz einer konkreten Tierart in Hinsicht auf die Entwicklung des Naturraumes und der Ökonomie zu erklären.

Schlüsselbegriffe
Bieber (*Castor fiber*), Jagd, Naturraum, Pohansko, frühes Mittelalter, Großmähren

1. Introduction

Pohansko near the town of Břeclav was an early medieval hillfort and an economic centre lying above the confluence of the Morava and the Dyje rivers in the Czech Republic. The site has been systematically investigated since 1959. This long-term research has yielded a wealth of material, much of which has been analysed over the years. Unfortunately, complete and high-quality analysis of certain aspects of material culture is still missing. For example, animal bones are included in this category and they have been processed only in terms of taxonomy, without regard to the dating and origin of the fragments.[1]

Newly analysed archaeozoological assemblages from part of Pohansko and two other chronologically and spatially related settlements, Břeclav-Na Včelách (BNV) and Kostice-Zadní hrúd (KZH) (see Fig. 1), show that at a certain stage, a radical change occurred in the composition of the fauna.[2] In the 10th century AD, wild animals were hunted, exploited, and consumed to a considerably higher degree than in the 9th century AD. The presence of beaver bones in the 10th century AD is particularly significant compared to the 9th century AD, where such assemblages are not

1 Kratochvíl 1968. – Kratochvíl 1969. – Kratochvíl 1980.
2 Dreslerová, Hajnalová, Macháček 2013.

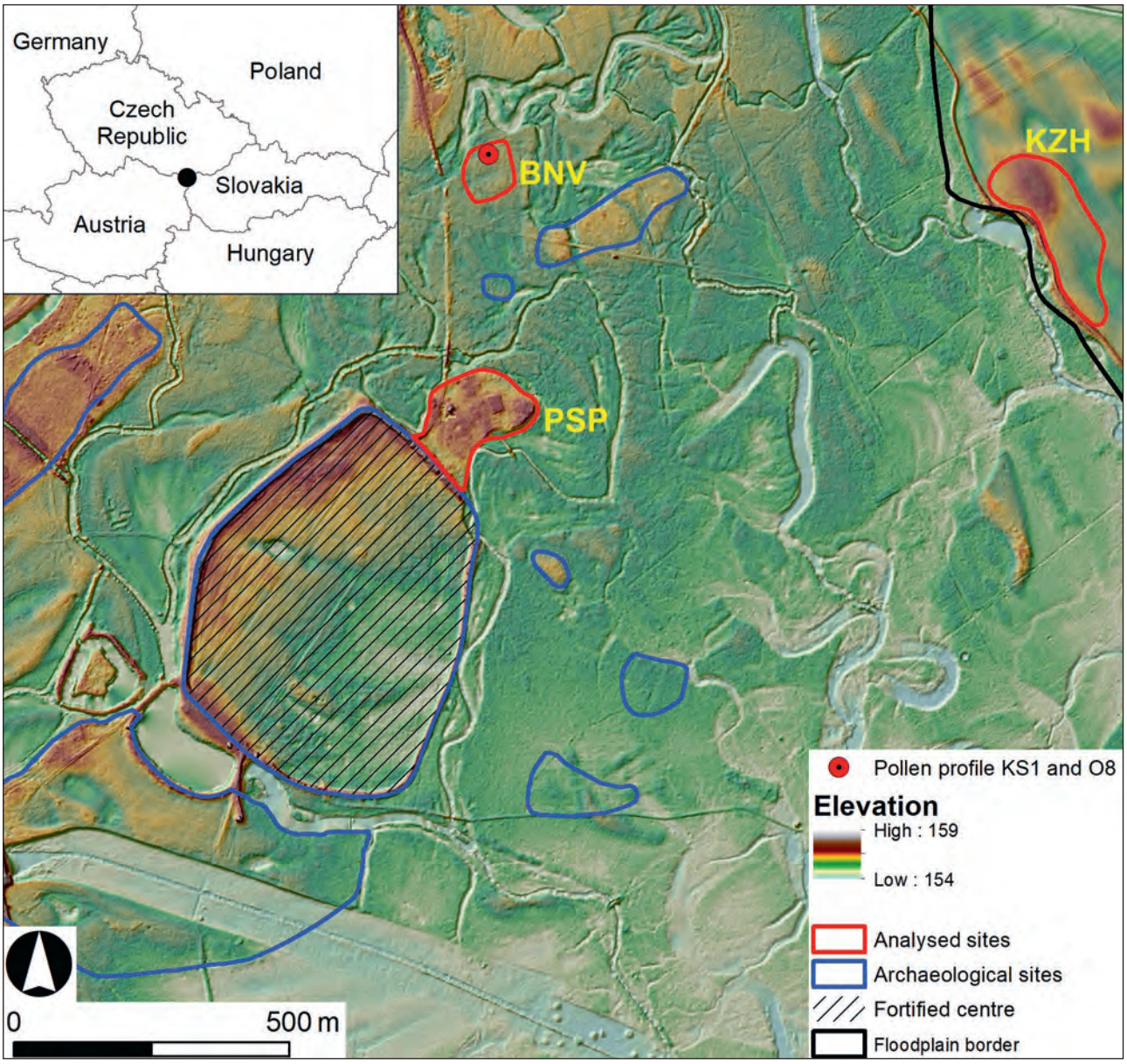

Fig. 1. Location of analysed sites. PSP – Pohansko northeastern suburbium; BNV – Břeclav-Na Včelách; KZH – Kostice-Zadní hrúd (Map: P. Dresler).

featured. This interdisciplinary contribution seeks to investigate possible reasons for the occurrence of beaver bones in the osteological assemblages and to elucidate why beavers were hunted on such a massive scale.

The newly discovered housing estate and the significant changes in osteological assemblages gives rise to the following questions that we will try to solve in the text that follows. How does the natural environment change when Pohansko is abandoned? Was the natural environment suitable for the return of wild animals and their subsequent hunting? Who could profit from fur hunting?

1.1. Archaeological Background

Starting in the Early Slavic period – RS1[3] (later 6th century – early 7th century AD) – the local settlement was connected to the alluvial plain of the River Dyje. The settlement, including a burial site, was located on sandy elevations within the floodplain and at its edge. A link with the alluvial plains of major rivers is typical of the early Slavs in the

3 Abbreviations are explained in Tab. 1.

Abbreviation	Archaeological culture	Date
RS1	Early Slavs / Prague-type C	550–700
RS2	Early Hillfort period	700–800
RS3	Middle Hillfort period	800–950
RS4	Late Hillfort period	950–1200

Tab. 1. Explanation of abbreviations of archaeological phases and their absolute time span.

whole of central and eastern Europe.[4] This link continued into the Early Hillfort period – RS2 (later 7th century – end of the 8th century AD) – but the settlement expanded into the surrounding area. The clearest link to the alluvial plain, in terms of fortified centres, may be observed in the Middle Hillfort period – RS3 (9th century – early 10th century AD) – which also encompassed Great Moravia and when fortified settlement at Pohansko emerged. The floodplain still contained settlements, yet the settlement structure in the terraced areas and along small, more distant watercourses grew markedly denser. After the end of Great Moravia (early 10th century AD), the alluvial plain in the Pohansko area and its surroundings was settled only sporadically, and during the 10th century AD, it became abandoned. Since the 11th century AD (RS4), settlements and villages in the floodplain have been the exception; nonetheless, local administration centres such as Břeclav, Podivín and Hodonín were located directly in the middle of the floodplain and are still there today. Economic exploitation of the floodplain in the river basin was intense from the 6th century until the late 10th century AD, when the settlement in the observed area moved to the floodplain's borders or beyond.[5]

Pohansko near Břeclav is situated on a sandy elevation in the middle of the floodplain of the River Dyje basin (Fig. 1). Although the elevation was settled as early as the Neolithic, archaeological finds pre-dating the Early Slavic period (6th and 7th centuries AD) have only been sporadic. In the 6th century AD, the elevated area was settled by one farming community, possibly two, which were absorbed by an extensive, densely settled, fortified, 55 ha-large centre in the later 9th century AD. Pohansko was settled rapidly, in three main areas: the centre, the southern suburbium and the northeastern suburbium. It probably had as many as 2400 inhabitants in its heyday.[6] The centre, covering 28 ha, was fortified with a wood-earth rampart with a shell frame and a stone outer wall.[7] Inside was the magnate's court (Pohansko velmožský dvorec – PVD) bounded by a palisade, with residential and communal buildings and outbuildings, as well as a stone church and an adjacent burial site.[8] The northeastern suburbium (Pohansko severovýchodní předhradí – PSP) was not fortified and contained sunken and above-ground features organised into homesteads. Since a stone church was constructed there, it may be presumed that it also contained the court of a magnate, the owner of the church.[9] Southern suburbium inhabitants mostly lived in sunken dwellings and were buried in the space between them. Existing analyses of the centre, including the court and the southern suburbium (Pohansko jižní předhradí – PJP), indicate that it was occupied mainly in the later 9th century AD. The settlement was abandoned in the late 9th century or early 10th century AD; however, the burial site associated with the first church was still in use, and in the late 10th century and the beginning of the 11th century AD, the church site was briefly inhabited by a small group of people, perhaps a family. The settlement in the northeastern suburbium probably lasted until the mid-10th century AD, while burials continued around the second church until the same time.[10]

The Břeclav-Na Včelách settlement (BNV) is located 300 m north of the northeastern suburbium of Pohansko, in the inundation zone of the Dyje. Spatially limited excavations have revealed a cultural layer, very small sunken features and possibly the remains of a house built on the original surface. Based on archaeological and radiocarbon data, the site was inhabited in the mid-10th century. The cultural layer and house debris were buried under sterile flood sediments at some unspecified later date.[11]

The Kostice-Zadní hrúd (KZH) settlement is located outside of the floodplain. The site was inhabited from the 6th to the 12th century AD, with a brief interruption at the time of the most developed settlement period of Pohansko in the last quarter of the 9th century AD.[12]

2. Materials and Methods

Explaining the high presence of beaver necessitated cooperation from the natural sciences, which primarily tried to reconstruct the natural environment of the monitored

4 Kuna, Profantová 2004.
5 Dresler, Macháček 2013.
6 Dresler 2016, 52.
7 Dresler 2011.
8 Dostál 1975.
9 Macháček et al. 2016.
10 Čáp et al. 2012. – Macháček et al. 2016.
11 Dresler 2016.
12 Balcárková 2017.

localities in relation to the management of the animal component of the diet. The archaeozoological analysis was carried out by Gabriela Dreslerová, the palynological analysis by Nela Doláková, the anthracological analysis by Romana Kočárová, and the palaeobotanical analysis by Petr Kočár.

2.1. Palynology

Two profiles from the Břeclav-Na Včelách settlement were processed: test pit KS1 and the fill of archaeological feature O8, both of which are in sector G51-43. Profile KS1 contained the cultural layer representing the same period as the main fill of the feature O8. Comparison of these profiles with different deposition processes enabled better specification of the vegetation environment.[13]

For palynological purposes, samples were processed in the laboratory by means of the maceration method (HCl, HF, KOH) and acetolysis (H_2SO_4 +$(CH_3CO)_2O$). To enhance the detection of palynomorphs from the sediments of lower organic content, heavy liquid $ZnCl_2$ was employed to concentrate the organic component. Determination of the palynomorphs was conducted with a Nikon Alphaphot 2 optical microscope (200×, 400× and 1000× magnification), largely following the work of Hans-Jürgen Beug[14] and Maurice Reille.[15] Both profiles were relatively rich in terms of palynology (all samples contained over 100 identified grains), which enabled the creation of pollen diagrams. The pollen diagram (Fig. 4) was processed using the POLPAL programme.[16]

2.2. Archaeobotany and Anthracology

The sampling strategy at Břeclav-Na Včelách is based on the excavation grid system. There is one 15-litre sample per 4 m² and one sample of the same size for feature O8. The researchers had twelve anthracological samples from the Břeclav-Na Včelách site at their disposal, from which 41 charred seeds and fruits were identified, as well as 401 charcoals. The samples were floated through a system of sieves with the smallest hole perforation at 0.25 mm and dried at room temperature. The plant remains (seeds and fruits and the fragments of charcoals) were removed and sorted out under a stereoscopic microscope.

The archaeobotanical material (plant seeds and fruits) was identified by means of a reference collection of plant diaspores. The charcoals came from samples obtained from the sediments with a fraction over 2 mm. After making fresh fractures (transversal, radial and tangential), the charcoals were observed under an optical microscope adjusted for observation in overhead light magnified by 50×, 100× and 200×. The numbers of charcoal fragments in the processed samples were recorded and standard literature on the determination of wood and charcoals was employed.[17]

2.3. Archaeozoology

Preliminary research into the extensive fortified settlement complex and its vicinity divided the acquired osteological material into eight groups, which have been analysed (Tab. 2). Combining material from all the assemblages studied, over 66,000 bone fragments were recorded in full, including over 21,000 identified to species. The osteological assemblage was derived from the Pohansko excavations since 1959, therefore some specimens are hand-collected and some of them are sieved. The osteological assemblages were analysed by means of standard procedures consisting of the determination of anatomy, species[18] and age,[19] as well as side determination and sex, together with taphonomy, pathological manifestations[20] and metrics.[21] For determination, the comparative collections of the Moravian Museum and the University of Veterinary and Pharmaceutical Sciences in Brno were used. Due to the absence of a comparative fish collection, we did not make a detailed species identification of the findings in this category. All identified bones and their attributes, as well as the number and weight of unidentified bone fragments, have been collected in the database. Fragment weight monitoring is a quantification method that measures relative abundance based on weight rather than counts. It relies on raw weight itself or estimations of the potential edible output represented by faunal remains. Bone weight quantifications aim to interpret the relative importance of food animals based on their potential meat output rather than numerical frequency.[22] The osteological assemblage analysed in text is based on material from the Pohansko northeastern suburbium from 150 pits; from Břeclav-Na Včelách from eight pits and the excavated cultural layer, representing a total area of 116 m²; and from Kostice-Zadní hrúd from 150 pits.[23]

13 Primary data published in Doláková et al. 2020, Tab. 1.
14 Beug 2004.
15 Reille 1995.
16 Walanus, Nalepka 1999.
17 Schweingruber 1978. – Primary data published in Doláková et al. 2020, Tab. 1.
18 Schmidt 1972.
19 Habermehl 1975. – Fandén 2005.
20 Baker, Brothwell 1980.
21 Driesch 1976.
22 Reitz, Wing 2008, 171.
23 For additional information, see Dreslerová 2018.

Site	Pohansko-Lesníhrúd / homestead	Pohansko rampart R18 / base of fortification	Pohansko north-eastern suburbium	Pohansko magnate's court / seat of elite	Břeclav-Lány / rural settlement	Břeclav-Na Včelách / rural settlement	Kostice-Zadní hrúd / rural settlement	Pohansko north-eastern suburbium / rural settlement
Taxon	**PLH**	**PR18**	**PSP**	**PVD**	**BL**	**BNV**	**KZH**	**PSP**
	RS3	RS3	RS3–4	RS3	RS1–2	RS3–4	RS1–RS4III	RS2
Sus scrofa f. *domestica*	1906	866	2427	1756	92	166	543	25
Bos primigenius f. *taurus*	1715	308	2188	685	84	552	421	25
Capra aegagrus f. *hircus*	74	12	23	10	1	4	9	
Ovis ammon f. *aries*	157	105	78	135	1	4	12	
Ovis/Capra	545	379	524	891	33	45	277	7
Equus ferus f. *caballus*	56	5	83	6	4	3	34	3
Equus caballus x *asinus*	2						0	
Equus sp.	1		1				0	
Canis lupus f. *familiaris*	150* (29)	3	19	83*	4	5	577* (19)	
Felis silvestris f. *domestica*	3	1	4	3			65* (4)	
Gallus gallus f. *domestica*	54	46	96	3	7	21	259	1
Anser anser f. (?)	21	15	10	3	1		149	
Domestic animals	**4713* (4563)**	**1740**	**5453**	**3575* (3492)**	**227**	**800**	**2363* (1727)**	**61**
Bos primigenius			1	3		1		
Cervus elaphus	26	1	52	21	2	9	56	
Capreolus capreolus	7		37	2		1	11	
Sus scrofa	4		824	20		49	27	2
Ursus arctos			6	1		3	2	
Vulpes vulpes	1						18* (1)	
Mustela putorius							1	
Meles meles	3						1	
Castor fiber			387			142	1	
Lepus europaeus	4	1	9	1	1	4	35	
Accipiter gentilis	1		2					2
Anas platyrhynchos			36	12				
Aquilla sp.					1			
Columba livia/oenas			2			1		
Garrulus glandarius							1	
Emys orbicularis							9	
Esox lucius			2					
Piscis			246		1	18	83	2
Anodonta sp.							1	
Wild animals	**46**	**2**	**1604**	**60**	**4**	**228**	**246* (229)**	**6**
Bos sp.			1			1	1	
Sus sp.	4		30	3		4	1	
Aves	14	3	44	3	4	17	161	3
Domestic/wild animals	**18**	**3**	**75**	**6**	**4**	**22**	**163**	**3**
Cricetus cricetus	9		3				10	3
Microtus sp.	1		2		1		11	1
Talpa talpa							12	
Arvicolinae	2							
Recent	**12**	**0**	**5**	**0**	**1**	**0**	**33**	**4**
Homo sapiens sapiens	10		61			1	9	17
NISP-total	**4799**	**1745**	**7196**	**3641**	**236**	**1051**	**2761**	**91**

Tab. 2. Analysed osteological assemblages from recent excavations.

3. Results

3.1. Environment and Agriculture

The current archaeobotanical research was carried out both in the form of pollen analyses and the study of plant macroremains and charcoals. The interpretation of the vegetation cover and farming activities at the site and in its proximity follows on from previous research.[24] The vegetation of the wider surroundings of the floodplain close to the confluence area of the Morava and the Dyje rivers was made up of a mosaic of both forested and open areas. Forest growth consisted of mesophile hornbeam woods with linden trees and alluvial woods in the form of hardwoods (mainly alder and elm) and softwood species near watercourses and their overgrown branches (willow, ash, poplar). Forest edges and glades consisted of mixed shrub complexes (*Cornus*, *Euonymus*, *Corylus*, *Rubus* and *Pomoideae*). Open meadow areas consisted of sections ranging from very to slightly wet, with various proportions of grasses (Fig. 4). Marsh vegetation around the watercourses was plentiful (*Cyperaceae*, *Typha*, *Potamogeton*, *Caltha*, *Valeriana*). Human activity was observed in all the sample areas studied (earliest 8200 BP), in the form of deforestation, grazing, cultivation of crops and the presence of weeds.[25] According to Emanuel Opravil,[26] the vegetation in the surroundings of early medieval hillforts was, in contrast to the present, more diversified and of different quantitative proportions resulting from the higher morphological diversity of the sites. According to Vojen Ložek[27] and Emanuel Opravil,[28] the increase in precipitation in the lower Atlantic led to increased erosion and the first levelling of low-lying niches in the floodplain area. The landscape started to adopt its modern characteristics in this period. Spatial and temporal distributions of vegetation have recently been studied in the work of Nela Doláková and colleagues.[29] The current archaeobotanical research was carried out both in the study of plant macroremains (seeds and charcoals) and in the form of pollen analyses.

The small assemblage of charred plant seeds/fruits (Fig. 2) largely contained caryopses of crops with a preponderance of millet (*Panicum miliaceum*) (49 % of plant macroremains analysed) and wheat (*Triticum aestivum*) (34 %), while barley (*Hordeum vulgare*) was present in the form of a single caryopsis (2 %).

Weed species included the *Chenopodium hybridum*, a typical weed of the ploughed soils of spring cereals, gardens and ruin sites.

For Pohansko, only the results of the analyses of manually selected charcoals have been published to date.[30] However, these assemblages are now considered less reliable, with possible selection bias during archaeological excavation in favour of tree species with more resistant, less disintegrable charcoals (especially oak). Consequently, an extensive assemblage of charcoals obtained by flotation was newly acquired for the anthracological comparison from the Břeclav-Na Včelách site as well as for the locations in the Pohansko hillfort region.

Oak (*Quercus*) predominated in the anthracological spectrum from the Břeclav-Na Včelách site (Fig. 3) (52.6 % of analysed charcoals), which also showed an unusually high proportion of elm (*Ulmus*) (17.9 % of charcoals) and maple (*Acer*) (9.6 %). Further species present were poplar (*Populus*) and willow (*Salix*) (4.9 %), hornbeam (*Carpinus*) (3.9 %), plum (*Prunus*) (3.9 %), alder (*Alnus*) (3.4 %) and the subfamily *Pomoideae* (2.8 %). Taxons of fir (*Abies*), dogwood/cornel (*Cornus*), hazel (*Corylus*) and spruce (*Picea*) featured only sporadically.

Hydrophilic elm woodland was thus the main source of firewood: hardwood (oak, elm), oak-hornbeam woodland (oak, maple, hornbeam) and softwood (alder, poplar, willow). Some of the firewood was also obtained from glades and forest edges (hazel, plum trees, *Pomoideae*).

Two profiles were processed from the Břeclav-Na Včelách site to investigate its palynology. The first came from archaeological feature O8 (ten samples, 10 cm each). The deepest sample (test pit 99 cm below the surface) came from the underlayer of the feature, while samples from the upper section of the profile (29 and 19 cm) represented its backfill and from 9 cm, the topsoil layer. The fill of the feature was found between 39 and 89 cm. Test pit KS1 (six samples from a depth of 75 cm) was made *c.* 3 m from the feature, in natural sediments. A cultural layer was detected at a depth of 32–57 cm (mapping by Jan Petřík, 2018). Overlying and underlying beds consisted of flood loams.

The composition of pollen complexes from the two profiles was relatively unified. The palynological analysis shows that the vegetation in the area was typical of a floodplain close to a watercourse (with old channels). The pollen spectra are marked by a high proportion of hard (*Alnus,*

24 Svobodová 1990. – Opravil 1998. – Opravil 2000. – Doláková, Roszková, Přichystal 2010. – Dreslerová, Hajnalová, Macháček 2013.

25 Doláková, Roszková 2006.

26 Opravil 1978. – Opravil 1983. – Opravil 1999.

27 Ložek 2007.

28 Opravil 1999.

29 Doláková et al. 2020.

30 Opravil 1966.

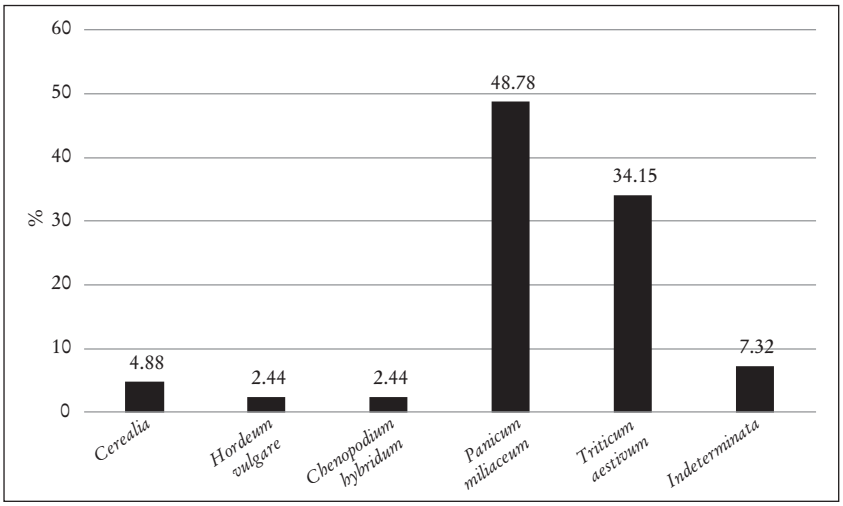

Fig. 2. Břeclav-Na Včelách. Results of archaeobotanical macroremains analysis. Percentage of identified assemblage (N=49) (Graphics: P. Kočár).

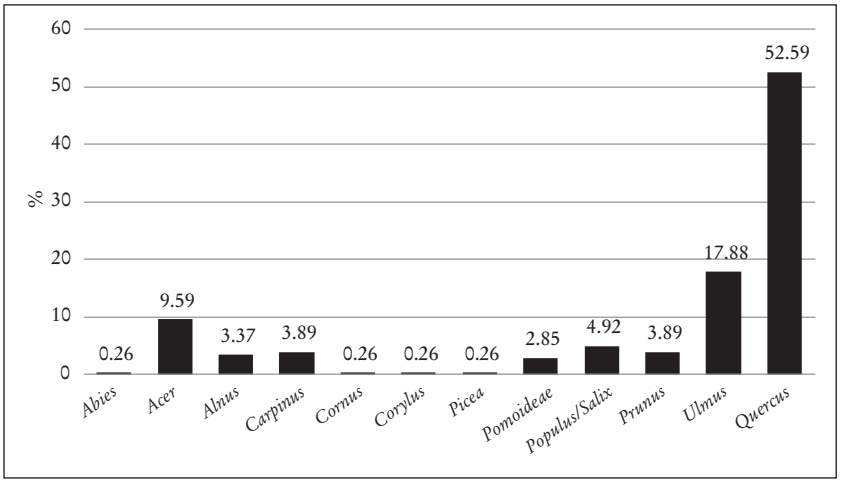

Fig. 3. Břeclav-Na Včelách. Results of anthracological analysis. Percentage of identified assemblage (N=286) (Graphics: R. Kočárová).

Ulmus) and soft timber (*Salix, Populus, Fraxinus*), as well as marsh plants (*Cyperaceae*, *Typha*, *Potamogeton*). There was a variety of mesophytic growth and a high proportion of ferns. The Břeclav-Na Včelách site was relatively forested – about 50 % – in the earliest segments, below the cultural layer and in the underlayer of the features (Fig. 4). The same held true of the sediments from the topsoil of the feature and test pit KS1, which originated after the decline of the settlement. A decrease in trees was observed in the feature fill and the upper section of the cultural layer. The composition of the tree and herb elements varies, with no clear increase in nitrophilic components traceable in other parts of Pohansko (*Chenopodiaceae*, *Artemisia*, *Asteraceae/Liguliflorae*). These indicators of a high proportion of nitrogen are more concentrated in the fill of feature O8, in contrast to the overlying and underlying sediments and the cultural layer in test pit KS1. Feature O8 also shows a slightly higher percentage of cereals. Several pollen grains of *Vitis* (grapevine) appeared. The occurrence of walnut (*Juglans* pollen grains, from 49 cm, 10 % of all grains identified) was notably high. They were at their richest (including previous profiles from Pohansko) on the Břeclav-Na Včelách site.[31] Such high

31 Svobodová 1991. – Macháček et al. 2007. – Doláková, Roszková, Přichystal 2010.

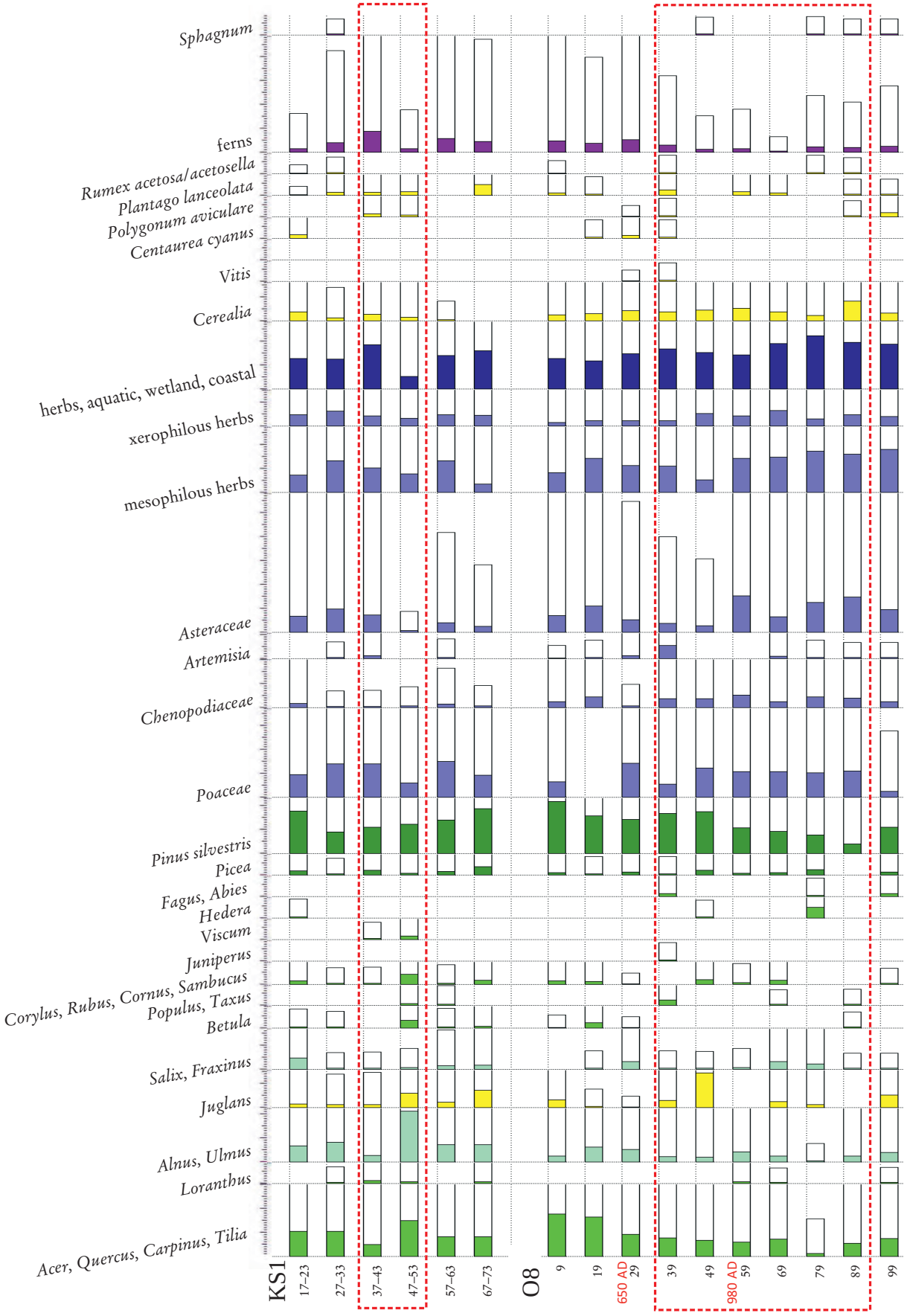

Fig. 4. Břeclav-Na Včelách. Palaeobotanic combined pollen diagram: Test pit KS1 and feature O8 (Graphics: N. Doláková).

occurrence might indicate cultivation in the surrounding area. However, the presence of the *Juglans* on the site has not been confirmed by finds of the matching plant macroremains. Nearby in Mikulčice, macroremains of walnut from the early Middle Ages were documented by Opravil.[32] The presence of several notably large pollen grains from the family *Chenopodiaceae* in feature O8 is also interesting. These are presumably *Chenopodium bonus-henricus*, mentioned as a cultivated plant (spinach substitute) as early as the Bronze Age from Roztoky nad Vltavou.[33] In Pohansko, the occurrence of these pollen grains was documented regularly in the fill of the Great Moravian features of the northeastern suburbium (PSP).

Grains of spruce (*Picea*) were fewer but occurred regularly. Spruce is traditionally considered an import from higher altitudes. In central Europe spruce forests cover wide areas of the montane (mostly planted) and the sub-alpine zones, in lowlands it is more mixed with other species.[34] In the Subatlantic *Picea abies* occurred occasionally in locally suitable habitats, including in the lowlands.[35] Slavomil Hejný and Bohumil Slavík[36] mentioned exceptional local occurrences of *Picea* in the field of thermophytics and the Pladias database[37] mentions its possible occurrence in alluvial forests and oak-hornbeam groves. The issue of the occurrence of *Picea* in the lowlands and its higher representation in pollen diagrams than in charcoals was discussed by Jan Novák and colleagues.[38]

Information from the cultural layer of the test pit KS1 is based on two samples from the upper and bottom sections of the layer. In the bottom section, a marked increase in the concentration of elm (*Ulmus*) pollen grains was observed, accompanied by a decrease in the diversity of plants. The upper section was characterised by a decrease in tree species, no longer discernible in the overlying sample. It was only in this layer that a few pollen grains of mistletoe (*Viscum*) were detected.

In comparison to the Great Moravian cultural layer uncovered inside Pohansko,[39] the Břeclav-Na Včelách layer shows a higher proportion of mesophile trees (especially oak), a lower representation of nitrophile plants and generally a more varied composition.

3.2. Animals

The archaeozoological data enabled a spatial and chronological comparison of animals at the site. The comparison showed differences, and not only in the composition of species. There was little evidence of wild animals hunted at Pohansko and its surroundings since the 6th century AD, except for the northeastern suburbium (PSP) and Břeclav-Na Včelách (BNV) sites (Tab. 3). At these sites, the high proportion of identified bones of wild animals is related to the hunting of beavers and wild boars (Fig. 5).

Beaver bones and teeth occurred in the observed assemblages in two forms. The first form may be termed "random occurrence" and is illustrated by the situation from horizon KZH RS4III at Kostice-Zadní hrúd with the find of 1 beaver fragment in a total of 359 identified fragments in the horizon, i.e. 5.55 % of the fauna hunted (except fish bones), and at Mikulčice-Valy (MIV) with 151 fragments of beaver in a total of 239,386 identified fragments, i.e. 0.06 % of total and 1.8 % of the fauna hunted.[40] The second form reflects the situation at the two discussed sites which is markedly different in terms of quantity. In the Pohansko northeastern suburbium (PSP), the number of beaver bones from 45 features amounted to 387 (3802 g) out of a total of 7196 identified fragments, which makes up 28.5 % of the fauna hunted (1358, except fish bones). In Břeclav-Na Včelách (BNV), beaver fragments amounted to 142 (1011 g) out of 1152 identified fragments, which approximates to 67.6 % of the fauna hunted (210, except fish bones). Some 529 fragments of finds of this animal come from dated archaeological contexts in the Pohansko northeastern suburbium (PSP) and in Břeclav-Na Včelách (BNV), which exceeds the total of all 319 finds of the bones of this rodent reported from 230 archaeological sites across prehistory in the entire Czech territory.[41] The occurrence of beaver bones was accompanied by an increase in the bones of wild pigs, parallel at both sites, while the proportion of traditionally hunted species such as red deer, roe deer and hare were negligible (Tab. 2).

The sheer number of beaver bones and teeth enabled analysis in terms of anatomical parts. The parallel occurrence of beaver at the two sites (PSP, BNV) enabled comparison and the description of possible differences in frequency. The first comparison is based on the number of finds (Fig. 6).

32 Opravil 1998.
33 Tempír 2007.
34 Caudullo, Tinner, de Rigo 2016.
35 Pokorný 2002. – Chytrý 2012.
36 Hejný, Slavík 1988, 557.
37 Pladias 2014–2022.
38 Novák et al. 2017.
39 Doláková, Roszková 2006. – Macháček et al. 2007. – Doláková et al. 2020.
40 Kratochvíl 1978.
41 Kyselý 2005, Tab. 9.

Site	Period	Date	Domestic animals	Wild animals	*Castor fiber*
Břeclav-Lány (BLN)	RS1	6th cent.	72	1	
Břeclav-Lány (BLN)	RS2	7th–8th cent.	79	2	
Kostice-Zadní hrúd (KZH)	RS1/2	6th/7th cent.	10		
Břeclav-Líbivá (BLI)	RS2	7th–8th cent.	169	2	
Pohansko northeastern suburbium (PSP)	RS2	7th–8th cent.	61	4	
Břeclav-Lány (BLN)	RS3	8th/9th cent.	57		
Kostice-Zadní hrúd (KZH)	RS3	8th/9th cent.	406	1	
Břeclav-Líbivá (BLI)	RS3	9th cent.	1010	27	2
Mikulčice-Valy (MIV)	RS3	9th cent.	231,686	7549	151
Pohansko southern suburbium (PJP)	RS3	9th cent.	409	4	
Pohansko-Lesní hrúd (PLH)	RS3	9th cent.	4563	46	
Pohansko rampart R18 (PR18)	RS3	9th cent.	1740	2	
Pohansko magnate's court (PVD)	RS3	9th cent.	3492	60	
Pohansko northeastern suburbium (PSP)	RS3/4	9th–10th cent.	5453	1356	387
Břeclav-Na Včelách (PNV)	RS3/4	10th cent.	800	210	142
Kostice-Zadní hrúd (KZH)	RS4	11th–13th cent.	472	31	
Kostice-Zadní hrúd (KZH)	RS4I	11th–13th cent.	203	41	
Kostice-Zadní hrúd (KZH)	RS4II	12th cent.	296	54	
Kostice-Zadní hrúd (KZH)	RS4III	13th cent.	340	18	1

Tab. 3. Bones of domestic and wild animals (except fish bones) including beavers and beaver bones alone from the early medieval sites from Břeclav-Pohansko and close hinterland.

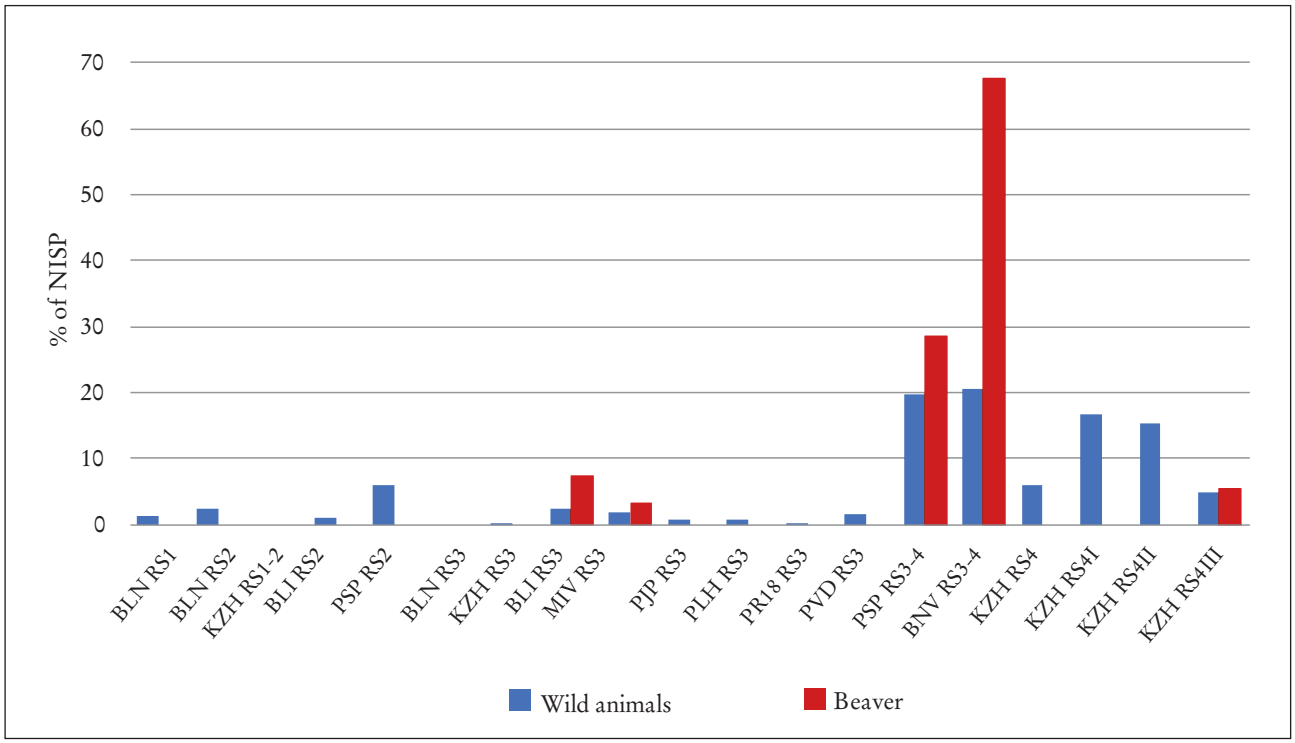

Fig. 5. Proportion as a percentage of the wild animals (except fish) from all identified fragments (NISP) and the proportion as a percentage of beaver fragments within the total of wild animals (except fish bones) – after dating. For data used in this graph see Tab. 3 (Graphics: G. Dreslerová).

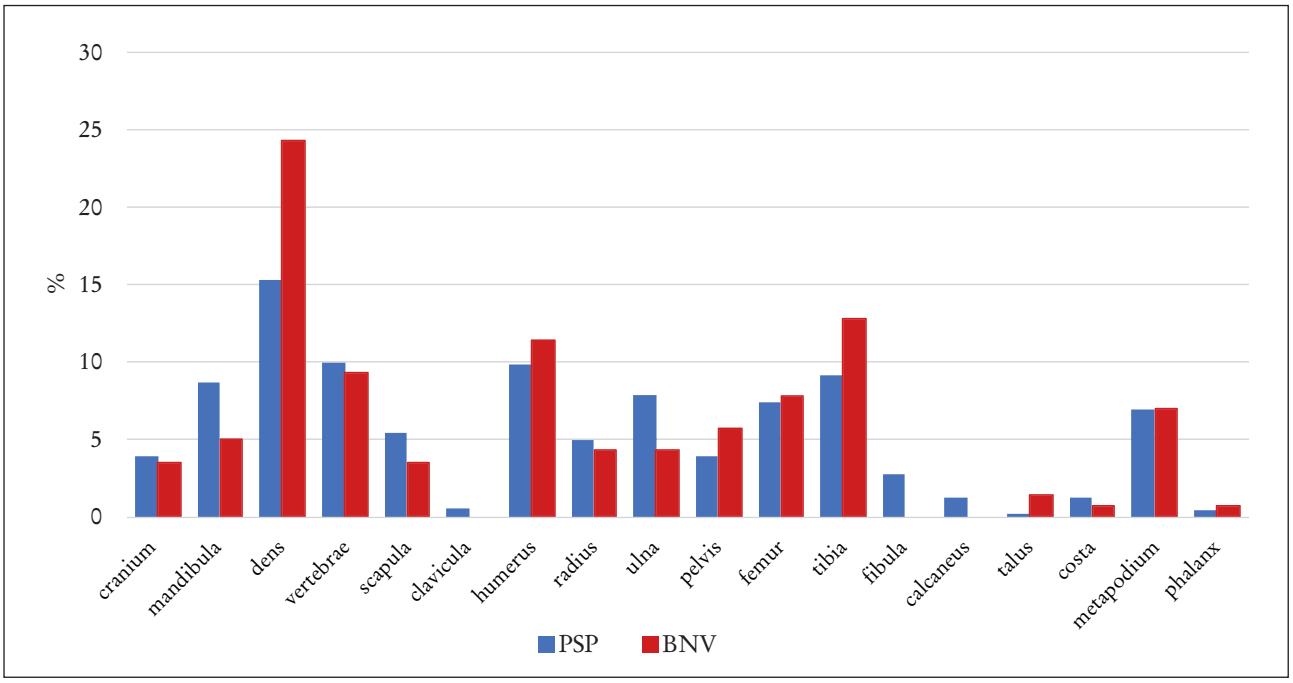

Fig. 6. Occurrence of anatomical parts of beaver skeletons (dens = loose teeth) from Pohansko northeastern suburbium (PSP) and Břeclav-Na Včelách (BNV). Number of fragments expressed as percentages (Graphics: G. Dreslerová).

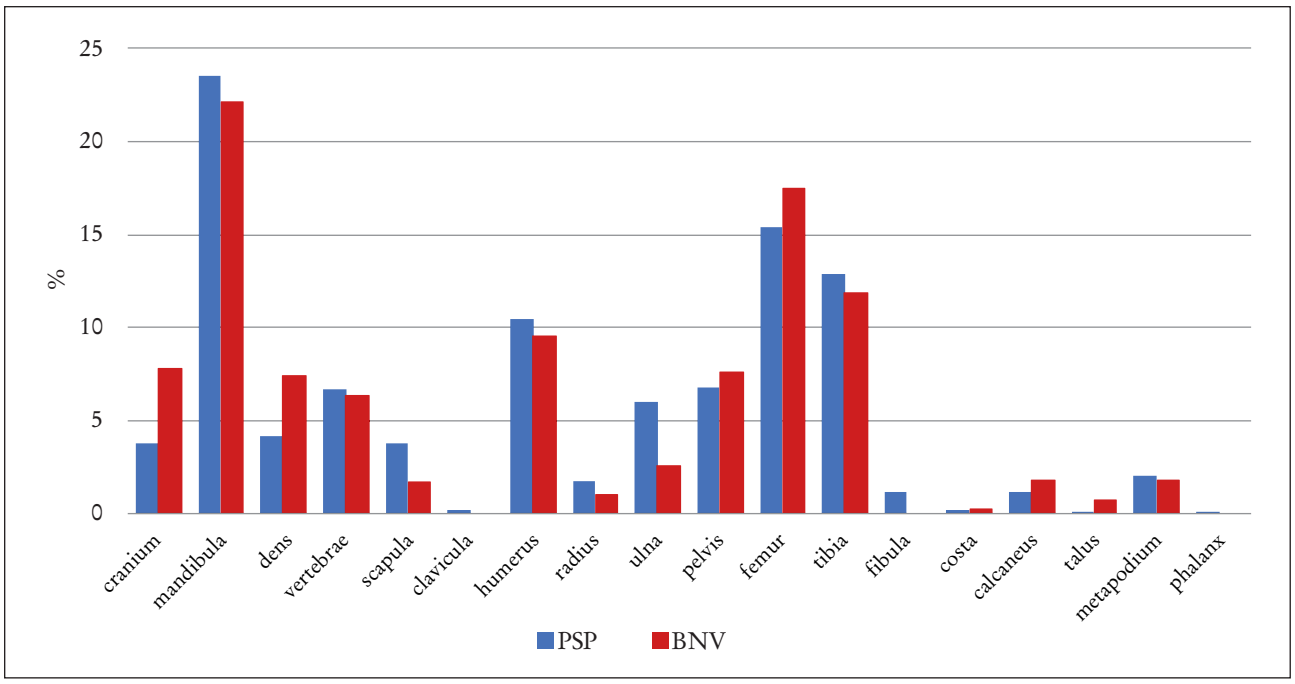

Fig. 7. Occurrence of specific parts of beaver skeletons, by the weight of fragments, expressed as percentages from Pohansko northeastern suburbium (PSP) and Břeclav-Na Včelách (BNV) (Graphics: G. Dreslerová).

The diagram illustrates differences in the number of teeth. Teeth occur in Břeclav-Na Včelách (BNV) in a proportion higher than that in the Pohansko northeastern suburbium (PSP), but the share of individual bone elements between PSP and BNV is similar throughout the whole skeleton.

The situation was also observed in terms of the weight of the fragments (Fig. 7), which partially eliminates the influence

Bone element	dist_o	prox_c	prox_o-dist_o	prox_o-dist_c	dist_c	prox_j	prox_j-dist_o	prox_j-dist_j	prox_c	prox_c-dist_o	prox_c-dist_c	**Total**
scapula					1							**1**
humerus	1			1	14	1					4	**21**
radius					1				3	1	1	**6**
ulna		3	1			1			6	2	1	**14**
femur	1	3	1		1		1	2	3		1	**13**
tibia	3	4		1	7							**15**
fibula		1										**1**
calcaneus		4										**4**
metapodium	5				4							**9**
vertebra			4					1			3	**8**
Total	**10**	**15**	**6**	**2**	**28**	**2**	**1**	**3**	**12**	**3**	**10**	**92**

Tab. 4. European beaver. Pohansko northeastern suburbium (PSP): developmental states of postcranial skeletons. Abbreviations: dist – distal epiphysis, prox – proximal epiphysis, o – open, j – joining, c – closed. Values represent NISP.

Fig. 8. Pohansko northeastern suburbium (PSP), feature O206. Beaver, mandibula of a juvenile individual (Photo: G. Dreslerová).

Fig. 9. Pohansko northeastern suburbium (PSP), feature O217. Beaver, mandibula of an adult individual (Photo: G. Dreslerová).

of fragmented bones. Also, the distribution of the values of each bone element among sites is similar. The authors believe that there is only one possible reason for this: the presence of complete skeletons at the sites, as only skeletons offer a firm, stable proportion of representation for individual bones and teeth. This supports a presumption that the whole carcases of the animals hunted were taken to the settlement.

The age at which the beavers died was derived from the state of the junction of the epiphysis and diaphysis of the long bones, a joining process that may take as long as twelve years in the beaver's body.[42] The table above (Tab. 4) provides an overview of the state of development of the long bones and vertebrae. The values disclose many long bones with unfinished development, clearly related to the long ontogenetic development of the beaver. No bones were found in the age category from birth until 1.5 years; 21 finds are linked with the following sub-adult age (1.5–3 years); 26 with the young adult age (3–6 years); 31 fall into mid-adulthood (6–9 years); and the bones of animals older than this are represented by 1 find of bones of an animal older than 9 years and 4 finds of animals older than 12 years. Thus, mid-adult bones are the most common, followed by finds in the young adult category.

The age of beavers derived from the timing of the teeth eruption[43] in preserved jaw bones revealed the presence of one six-month-old kit (Fig. 8) with an erupting molar. Lack of abrasion of the lower jawbone and teeth also indicates a juvenile individual (Fig. 9).

42 Fandén 2005, Tab. 9.

43 Ognev 1963.

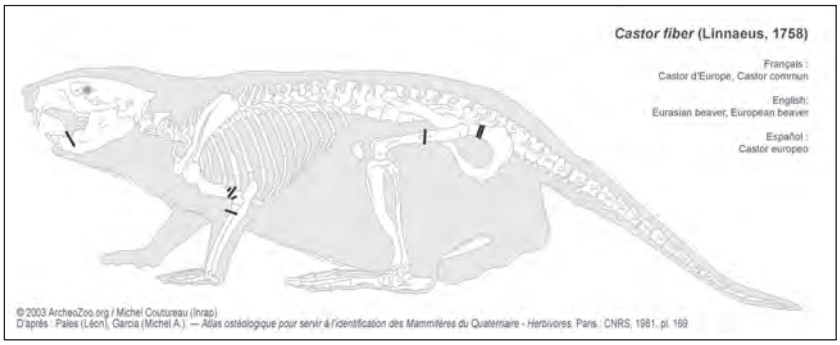

Fig. 10. Summary representation of taphonomic phenomena on beaver skeleton (Source: ArcheoZoo.org, adapted by G. Dreslerová). For absolute numbers see Tab. 5.

	BNV	PSP	Total
Gnawing marks	1	5	**6**
Cut marks	2	5	**7**
Burnt	10	3	**13**
Total	**13**	**13**	**26**

Tab. 5. Taphonomic phenomena on beaver skeleton parts divided into groups. Number of cases: BNV – Břeclav-Na Včelách; PSP – Pohansko northeastern suburbium.

Determination of age based on basal enamel layers of the teeth was not employed,[44] since no tooth found exhibited clear wear.

These age structure findings confirm that beaver hunting at Pohansko did not concentrate upon specific groups but involved animals of all age categories.

Taphonomic Phenomena

The processing of the beaver carcases was, as might be expected, accompanied by post-mortem changes to the bones. An identical number of phenomena were recorded at both sites; however, charred bones prevailed at the Břeclav-Na Včelách (BNV) site, probably burned as fuel, while bones with teeth marks made by carnivores and cutting marks were more common on the Pohansko northeastern suburbium (PSP) site (Tab. 5). Teeth marks were probably made by dogs, whose bones and skeletons are known from Pohansko. We associate the cutting mark on the jaw with skinning,[45] while the frequent findings of cutting marks on nutritionally valuable bones are probably more related to meat consumption (Fig. 10).

4. Discussion

The Great Moravian phase of Pohansko is characterised by a dense network of sunken archaeological features, both in the fortified central area of the complex and in the unfortified suburbiums. Palynological analyses indicate that this period was marked by distinct deforestation, attributed to intense construction of the centre, together with the use and cultivation of the land in the vicinity as well as that farther away.[46] Osteological assemblages from this period are dominated by domestic animals, especially pigs, cattle, sheep, and goats. The proportion of bones of wild animals never exceeds 10 %, while all the fragments of beaver skeletons total only a hundredth of a percent.[47] The same representation of domestic and wild animals in relation to the beaver may be observed in the chronologically identical contexts of neighbouring Mikulčice-Valy[48] and in unfortified rural settlements from the Early Slavic and Early Hillfort periods – and naturally the Great Moravian period as well, investigated both within and beyond the floodplain of the Dyje, the Morava and their tributaries: Břeclav-Pohansko,[49] Břeclav-Líbivá,[50] Břeclav-Lány,[51] Kostice-Zadní hrúd,[52] and Mutěnice-Zbrod.[53] Beaver hunting does not appear to have played a major part in the economies of the cultural centres and rural settlements at these times, either for subsistence or for fur trading. The situation changed completely after the

44 Mayhew 1978. – Mayhew 1979.

45 Reitz, Wing 2008, 128.

46 Macháček et al. 2007. – Dresler, Beran 2019.

47 Dostál 1975. – Dostál 1985. – Vignatiová 1992. – Dreslerová 2018.

48 Kratochvíl 1978. – Chrzanowska, Januszkiewicz-Zalecka 2003. – Chrzanowska, Krupska 2003a. – Chrzanowska, Krupska 2003b.

49 Kratochvíl 1968. – Kratochvíl 1980.

50 Roblíčková 2000.

51 Dreslerová 2018.

52 Dreslerová, Hajnalová, Macháček 2013.

53 Klanica 2008.

depopulation of the centre in the late 9th century or the early 10th century AD. In archaeological contexts, sharp increases in the number of beaver bones in the former Pohansko northeastern suburbium and the new settlement at Břeclav-Na Včelách are observed. What led to this change? Defining the habitat specific to the beaver constitutes a sound first step towards resolving this issue.

4.1. The European Beaver Today

The beaver, Europe's largest indigenous rodent, is exclusively herbivorous, feeding on trees, aquatic plants and herbs growing on the banks of bodies of freshwater.[54] The consumption of these types of vegetation varies with the seasons. In winter, beavers are limited to the tree component of their diet, i.e. outer bark, inner bark (cambium) and twigs from the woody growth on riverbanks. In spring and in the vegetation period, submerged plants and underground tubers are crucial for beavers (knotweed, etc.). A variety of woody plants grows in the immediate surroundings of watercourses in the summer months. Beavers tend to consume largely members of the family Salicaceae *Salix* spp. (willows), *Populus* spp. (poplars/aspens), as well as other hard and soft species. At present, 86 species of trees and 149 species of other plants have been described as parts of the beaver's diet. The choice of food depends on several factors, such as the season, state of the water surface, quality and quantity of edible growth, and the availability and regeneration of plants.[55] The amount and quality of the food correspond to the quantitative characteristics of the population. For example, the extent of family territory is in direct proportion to the extent of growth of preferred trees;[56] where the situation is stable, this reaches a minimum of 1.8 km from the home lodge. In addition, the species mix of trees also appears to influence the number of beavers in a territory. In areas rich in poplar there are, on average, more beavers than in places with willow.[57] Any increase in beaver population increases feeding pressure on growth, perhaps leading to a reduction in preferred plants, acceleration of their decrease at the expense of regeneration, and therefore long-term fluctuations in settlement. However, beavers as such are not, at present, primarily responsible for the disappearance of their food base. Anthropogenic factors play far more damaging roles, such as neglect of riverbank growth, forestry activities, and general interference on the part of local inhabitants.[58]

An increase in the beaver population may be observed at present, since the protection of these animals is anchored in the legislation of the Czech Republic and neighbouring countries, and the study of beaver populations is a subject for state ecological institutions.[59] The adult beaver has only a few natural enemies, such as the wolf (*Canis lupus*), the bear (*Ursus arctos*) and the lynx (*Lynx lynx*), all of them very rare today.[60] In environments where beavers are protected and not subject to predation, the growth of the beaver population depends on the availability of potential habitats. Until appropriate space becomes limited, beaver populations grow rapidly and almost exponentially. When the capacity is exhausted, population densities cease to rise.[61]

To what extent do recent observations, and the ecological requirements of the beaver reflect the past situation in Pohansko and its surroundings? Do the results of the anthracological, archaeobotanical and palynological analyses correspond to an environment appropriate to the occurrence of beavers?

4.2. Surroundings of Pohansko in the Early Medieval Period

The character of the floodplain vegetation in the early Middle Ages is very similar to the vegetation found at the location today. Intensively deforested areas and a mosaic-like structure of forests and meadows, places suitable for growing crops and areas left to natural vegetation preferring a humid and waterlogged environment have been observed. All analysed plant spectra show a heavy human influence.[62]

The palynological analysis shows that the vegetation in the area was typical of a floodplain close to a watercourse (with old channels). Comparing features studied within Pohansko from the pre-Great Moravian period with the Great Moravian period, the landscape appears more forested in the former, with a high proportion of pine. Human impact was higher in the Great Moravian period and was associated with a distinctly lower representation of nitrophile plants (*Chenopodiaceae*, *Artemisia*, *Asteraceae/Liguliflorae*, *Galium*).[63] The regular occurrence of spruce is interesting; its natural occurrence at the confluence of the Dyje and the Morava rivers is detailed on the Pladias database[64] and by studies of the development of forest growths in central Moravia.[65]

54 Heidecke 1989.
55 Heidecke 1989.
56 Fustec et al. 2001.
57 Campbell et al. 2005.
58 Vorel et al. 2013, 22.
59 Vorel et al. 2013.
60 Baker, Hill 2003.
61 Vorel et al. 2013, Fig. 2.
62 Doláková et al. 2020.
63 Doláková, Roszková, Přichystal 2010. – Novák et al. 2017. – Doláková et al. 2020.
64 Pladias 2014–2022.
65 Novák et al. 2017.

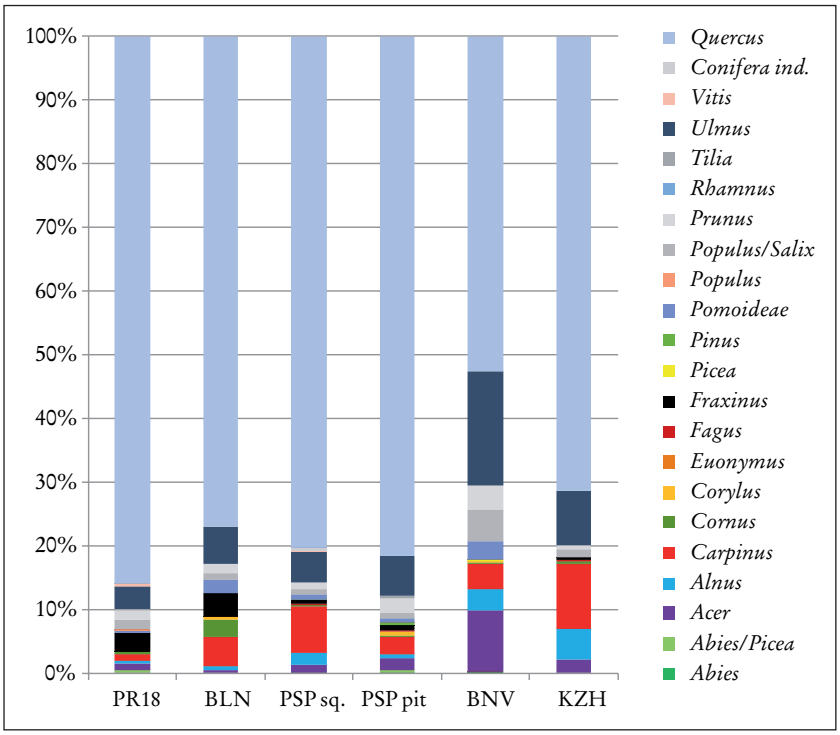

Fig. 11. Pohansko and its surroundings. Comparison of the anthracological spectrum. BNV – Břeclav-Na Včelách; BLN – Břeclav-Lány; KZH – Kostice-Zadní hrúd; PSP sq. – Pohansko northeastern suburbium, settlement layer/square grid; PSP pit – Pohansko northeastern suburbium, pits; PR18 – Pohansko, cross-section through rampart 18 (N=6484) (Graphics: P. Kočár).

A high percentage of walnut pollen is also evident, possibly grown or spread by self-seeding, especially in bright, open, and wet places with a high content of humus, in the vicinity of old river branches.

The small assemblage of charred plant seeds/fruits with a preponderance of millet (*Panicum miliaceum*) and wheat (*Triticum aestivum*) (34 %), while barley (*Hordeum vulgare*) was present in the form of a single caryopsis (2 %), most likely comes from elevated positions within 1 km from where they were transported to the site.

The anthracological spectrum from Břeclav-Na Včelách (BNV) differs from other sites investigated in the region,[66] chiefly in its relatively low proportion of oak and high proportion of other trees (Fig. 3). A relatively distinct proportion of maple and hornbeam indicates the existence of coppices in mesophile forests (oak-hornbeam woodland). The relatively high proportion of poplar/willow group and alder charcoals indicates the exploitation of softwoods and the possible existence of alder coppices. A high proportion of elm charcoals would appear to indicate quite concentrated acquisition of hardwoods for fuel.

It thus appears that inhabitants of the Břeclav-Na Včelách (BNV) settlement acquired most of their firewood from hydrophilic forests not suitable for farming. The specific natural conditions and the situation near a river meant that they probably had at their disposal insufficient areas of mesophilic forests for any intensive management of oak-hornbeam woodland. This, for example, might have arisen out of the fact that a major part of the mesophilic forest area had been felled and the land used for farming.

At the other anthracologically investigated sites in the region (Fig. 11)[67] we either observe a balanced proportion of the indicators of mesophile oak-hornbeam woodland and hydrophile alluvial forests (PSP, BLN), or the dominance of the indicators of mesophile oak-hornbeam woodland (KZH). The sample from cross-section PR18 of rampart construction and destruction at Pohansko is heavily affected by the presence of burnt timber. There is an obvious

66 Doláková et al. 2020.

67 Doláková et al. 2020.

dominance of quality hard wood suitable for the building of wood-earth ramparts (oak, elm admixture).

4.3. European Beaver in Early Medieval Economics and Trade

Apparently, the landscape was relatively favourable for the burgeoning beaver population. Palynological and anthracological analysis shows enough trees, especially softwoods, and a wide range of plants on the riverbanks. It also included poplars, the most sought-after source of food. However, their real volume is usually underestimated in pollen spectrums (sediments do not preserve pollen grains well). Among the anthracological finds, these trees are represented by as much as 5 %.

Existing osteological analyses that map the occurrence of beaver bones in settlement contexts of prehistory and the Middle Ages of central Europe reflect beaver hunting as a more or less random activity.[68] The situation at Pohansko and Břeclav-Na Včelách testifies to the inhabitants' completely different approach to hunting. The range of the beaver bone fragments excavated shows that beavers of all age categories were hunted, with sub-adult individuals prevailing. This age composition does not correspond to the age structure of beaver families, which consist of parents and two or three generations of kits, i.e. juvenile animals expelled from the immediate lodge after reaching adulthood.[69] It seems that Pohansko hunters selected adult and bigger animals rather than hunting whole beaver families. This may have been associated with demand for fur, the size of which is proportionate to the animal's age and reaches its maximum by the third year,[70] and thus its maximum market value. Historical sources from the western, northern and eastern early medieval Europe convey the use of beaver fur as a commodity and exchange article. For example, in Pułtusk (Poland) beaver furs were used to pay levies and rent, the rate being 10 for the prince to 50 for sale.[71] Beaver fur was considered a luxurious and expensive commodity in early medieval Europe. Because we lack information about the value of beaver fur in our area, we had to find information about their real monetary value in other areas of Europe. Detailed records come from Wales from the year 940, with listed prices for furs of different species. Beaver was valued at 120 pence/dinars, which was five times more than weasel and ten times more than otter.[72] High prices led to intensive beaver hunting, and the rarer the beaver became, the more the price rose; beavers became rare in England in the late 10th century AD.[73]

Demand for high-quality beaver fur, especially in black, is known from Polish written sources from the 11th–14th centuries AD. Specialised breeders (*bobrovniks*) emerged, originally known as "the guardians of the beavers" (*cum castoribus et eorum custodibus*). Their role was to breed beavers and manage the subsequent production of fur. *Bobrovniks* feature regularly in lists of providers supplying the monasteries in Lubiąż, Mogilno and Ląd, as well as major churches – Gnezdno, Trzebnica and Włocławek (all Poland). As late as 1229 AD, a beaver breeding station with 251 beavers existed not far from Pułtusk (Poland), administered by Jaszko de Maków. He complained that the beavers needed a vast amount of maple.[74] When addressing *bobrovniks* and specialised breeding, Polish researchers refer to archaeozoological analyses from the northwest of Russia, where beaver bones feature in large quantities at various sites in 11th–12th-century AD layers, making up as much as 40 % of the hunted fauna, e.g. Psków (48.6 %), Voiščina (46.6 %: 90 fragments of beaver bones out of 193 fragments of the hunted fauna), Kamno (37.1 %), Staraja Ladoga (37.7 %); in other areas the proportion of beaver bones varies between 14 % and 25 %.[75] Recent research at the Minino site (Russia) identified wild fauna in osteology assemblages from the 11th to 13th centuries AD at 58–73 %. Wild fauna is mostly represented by beaver, squirrel, marten, and other fur species. Beaver is represented at 38–67 % of the wild animal bone fragments (1583 fragments) or 22–42 % of the total number of 2451 identified bone fragments.[76] A similar situation was recently observed in Estonia and Latvia, where beaver bones were observed at 26–46 % among wild animal bones, and from the Russian settlement Krutik in the Vepsa region, near Beloye Lake, where beaver bones represent almost 97 % of the wild animal bones.[77] These proportions of beaver bones come close to the data from Břeclav/Pohansko northeastern suburbium and Břeclav-Na Včelách. As a result, specialised management of beavers cannot be ruled out. Unfortunately for us, Polish and Russian assemblages of beaver bones from archaeological contexts have not been analysed by age. It is therefore not possible to decide whether they are the remains of hunting or breeding.

68 Kyselý 2005.
69 Vorel et al. 2013, 20.
70 Larson, van Nostrand 1968, Fig. 1.
71 Zwolińska 1969, 30–31.
72 Wade-Evans 1909, 98.
73 Conroy, Kitchener 1996, 10.
74 Zwolińska 1969, 31.
75 Sedov 1960, 77. – Hensel 1965.
76 Maltby 2012.
77 Luik 2010, 447.

Who were the target customers for this specific economic activity, and how was it financially underwritten? In the first half of the 10th century AD, the central Danubian region was under the political and military influence of Hungarian nomads. Contacts between inhabitants of the Břeclav-Na Včelách settlement and this ethnic group are confirmed by the find of a semicircular pendant and a bag fitting.[78] The chronological classification of the Břeclav-Na Včelách settlement points towards the period when the Hungarians suffered a serious defeat in the Battle of Lechfeld in 955 AD. After this event, and later after the baptism of Grand Duke Gejza in 973 AD, the central Danubian region was again open to trade, having been (previously?) closed for over fifty years.[79] The absence of dinars and their imitations in the former northeastern suburbium of Pohansko and Břeclav-Na Včelách confirms the older dating of both settlements, and that settlement there did not last until the last quarter of the 10th century AD. It cannot be ruled out that beaver fur production was intended for trade, in which case it was possibly based on non-monetary exchange. Judging by later analogies, payment of levies through special kinds of natural products can be presumed; see Pułtusk. But to whom? To local elites, the Hungarians or to the Přemyslids who, according to Martin Wihoda, might have become the new rulers of south Moravia soon after the Battle of Lechfeld in 955 AD?[80] Archaeological finds from Great Moravian graves from Staré Město-Na Valách[81] and from the late 10th century AD in Starigard/Oldenburg[82] bear witness to the use of beaver furs as items of clothing. Nonetheless, beaver hunting and possible breeding in Pohansko and Břeclav-Na Včelách did not continue and features from the beginning of the last quarter of the 10th century and from the 11th century AD from the not too distant settlement in Kostice-Zadní hrúd contained no beaver bones, although the proportion of fauna hunted was considerably higher there than at other sites from the same period.[83] Again, the occurrence of beavers is only evidenced by a single bone from the last phase of the existence of the Kostice settlement, i.e. from the 12th century AD (Tab. 3).

5. Conclusion

During the first half of the 10th century AD, the former northeastern suburbium of Pohansko near Břeclav, a Great Moravian fortified settlement, and in the second half of the 10th century AD, the newly established settlement of Břeclav-Na Včelách, saw the development of a highly specific economic system based on hunting, and perhaps also breeding, beavers. This was probably facilitated by a change in the use of the surrounding landscape and the natural environment of the former Great Moravian centre, resulting from a nearly complete depopulation of the large complex, covering 55 ha with more than 2000 inhabitants. The surroundings of the centre, until then intensively exploited and deforested to acquire firewood, food and pasture, became forested again with self-seeding species highly appropriate to beaver life: poplar, alder, willow, maple, etc. At the Břeclav-Na Včelách settlement, natural conditions were completely unsuitable for farming, but the composition of trees was ideal for beavers and hunting, rather than breeding, of the same. Cereals and crops yielded by the cultural layer of the site were probably not grown nearby but in more distant locations, and were transported to the site not completely cleaned, as can be deduced from finds of some field weeds.

The Pohansko northeastern suburbium and Břeclav-Na Včelách settlements were radiocarbon dated to a period marked by distinct political turbulence, when even the neighbouring lands were under the influence of the Hungarians. Although after the defeat in the Battle of Lechfeld in 955 AD, south Moravia is believed to have fallen under the influence and rule of Přemyslid princes, it is not clear for whom the furs were intended. Earlier and more recent archaeological sources related to the observed area show no direct evidence of them being worn, nor are links with trade proven. The occurrence of beavers might thus have been associated with changes in the landscape, in the economy or in the geopolitical situation.

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